Symposium Topics and Organizers

Boxed symposia will be located at the Hilton Hawaiian Village (HHV)

A — General Topics & Tutorials

A0 — Special Lectures – Edward Goodrich Acheson Award and Charles W. Tobias Young Investigator Award Presentations

A1 — General Student Poster Session *(V. Subramanian, V. Chaitanya, M. P. Foley, Y. Katayama, and K. B. Sundaram)*

A2 — Nanotechnology General Session *(O. M. Leonte, F. Chen, J. Chen, N. Kobayashi, and W. E. Mustain)*

A3 — Contemporary Issues and Case Studies in Electrochemical Innovation *(E. J. Taylor, C. Bock, M. Inman, and K. Malek)*

B — Batteries, Fuel Cells, and Energy Conversion

B1 — Batteries and Energy Technology Joint General Session - In Honor of James McBreen *(A. Manivannan, H. Arai, Y. Guo, P. N. Kumta, A. Manthiram, M. Minakshi, S. Mukerjee, S. Narayan and, Y. Sun)*

B2 — Electrochemical Capacitors *(J. W. Long, D. Bélanger, T. Brousse, C. Hu, K. Kim, J. Ko, P. J. Kulesza, M. Morita, K. Naoi, P. Simon, W. Sugimoto, and Y. Xia)*

B3 — Grand Challenges for Energy Conversion and Large Scale Energy Storage *(T. Nguyen, B. Liaw, R. Savinell, X. Zhou, and Y. Katayama)*

B4 — Intercalation Compounds for Rechargeable Batteries *(S. Meng, C. M. Julien, R. Kanno, A. Manthiram, A. Yamada, W. Yoon, and K. Zaghib)*

B5 — Interfaces and Interphases in Battery Systems *(R. M. Kostecki, T. Abe, and B. Liaw)* SC e

B6 — Lithium-Ion Batteries *(M. C. Smart, R. Bugga, D. Doughty, M. Inaba, Y. Kim, K. Tatsumi, and J. Zhao)*

B7 — Metal-Air Batteries *(J. Xiao, N. Imanishi, Y. Shao-Horn, V. Thangadurai, and Y. Xing)*

B8 — Non-Aqueous Electrolytes for Lithium Batteries *(M. Ue, W. A. Henderson, M. Ishikawa, T. Jow, B. L. Lucht, and P. Trulove)*

B9 — Polymer Electrolyte Fuel Cells 12 (PEFC 12) *(H. A. Gasteiger, W. Adam, F. Büchi, E. Cho, C. Coutanceau, M. Edmundson, T. F. Fuller, D. C. Hansen, D. J. Jones, R. A. Mantz, S. Mitsushima, H. Nakagawa, S. Narayanan, V. Ramani, T. J. Schmidt, K. Shinohara, P. Shirvanian, P. Strasser, K. Swider-Lyons, Y. Tak, H. Uchida, W. Xing, and L. Zhung)* CD e

B10— Renewable Fuels from Sunlight and Electricity *(N. Wu, W. Chiu, D. Chu, H. Dinh, K. Domen, P. J. Kulesza, J. Lee, A. Manivannan, S. Narayan, R. Subramanian, H. Wang, X. Zhou, and Z. Zou)*

B11— Sodium Batteries *(C. S. Johnson, M. Doeff, J. W. Fergus, D. B. Hall, R. Kanno, and S. Okada)*

B12— Solid State Ionic Devices 9 - Ion Conducting Thin Films and Multilayers *(E. D. Wachsman, J. A. Kilner, E. Traversa, and S. Yamaguchi)*

C — Biomedical Applications and Organic Electrochemistry

C1 — Organic and Biological Electrochemistry General Poster Session *(A. J. Fry)*

C2 — Bioengineering Based on Electrochemistry *(K. Sode, A. Simonian, and E. Tamiya)*

C4 — New Synthetic and Mechanistic Approaches to Molecular Electroorganic Chemistry *(S. Nishiyama, A. Atobe, and A. J. Fry)*

D — Corrosion, Passivation, and Anodic Films

D1 — Corrosion General Poster Session *(S. Fujimoto)*

D2 — Materials Degradation in Energy Systems: Corrosion and Hydrogen-Material Interactions (*N. Missert, S. Fujimoto, K. R. Hebert, R. Lillard, J. P. Meyers, A. Nishikata, J. J. Noël, and J. R. Scully)*

D3 — Corrosion, Passivity, and Energy: A Symposium in Honor of Digby Macdonald *(M. Urquidi-McDonald, T. Haruna, and C. D. Taylor)*

D4 — High Resolution Characterization of Corrosion Processes 3 *(K. R. Zavadil, K. Azumi, and P. Schmutz)*

D5 — High Temperature Corrosion Materials Chemistry 10 *(E. J. Opila, J. W. Fergus, P. Gannon, D. Helmick, T. Markus, T. Maruyama, P. J. Masset, D. Shifler, E. Wuchina, and S. Yamaguchi)*

D6 — Light Alloys 4 *(S. Virtanen, R. Buchheit, S. Hiromoto, Y. Kojima, and B. Shaw)*

D7 — Pits and Pores 5: A Symposium in Honor of David Lockwood *(R. Boukherroub, P. Granitzer, H. Masuda, and P. Schmuki)*

E — Dielectric and Semiconductor Materials, Devices, and Processing

E1 — Solid State Topics General Session *(R. Todi, N. Ichinose, H. Iwai, O. M. Leonte, K. Shimamura, K. B. Sundaram, and X. Wang)*

E2 — Atomic Layer Deposition Applications 8 *(J. W. Elam, S. Bent, S. De Gendt, A. Delabie, A. Londergan, F. Roozeboom, and O. Van der Straten)* SC e

E3 — Chemical Mechanical Polishing 12 *(R. Rhoades, I. Ali, G. Banerjee, B. Basim, L. Economikos, D. Huang, and Y. Obeng)*

E4 — Gallium Nitride and Silicon Carbide Power Technologies 2 *(K. Shenai, M. Bakowski, M. Dudley, R. Garg, and N. Ohtani)* HC e

E5 — Dielectric Materials and Metals for Nanoelectronics and Photonics 10 *(S. Kar, M. Houssa, K. Kita, D. Misra, and S. Van Elschocht)* HC e

E6 — High Purity Silicon 12 *(E. Simoen, C. Claeys, R. Falster, C. Mazure, and P. Stallhofer)* HC e

E7 — Low-Dimensional Nanoscale Electronic and Photonic Devices 5 *(L. Chou, M. T. Carter, S. Jin, M. Jo, and M. Suzuki)* HC e

E8 — Processing Materials of 3D Interconnects, Damascene and Electronics Packaging 4 *(K. Kondo, R. Akolkar, D. Barkey, M. Hayase, M. Koyanagi, S. Mathad, P. Ramm, F. Roozeboom, and S. Shingubara)*

E9 — Fundamentals and Applications of Microfluidic and Nanofludic Devices *(H. Baumgart, A. Beskok, J. Hsu, S. Joo, S. Qian, and A. Sharma)*

E10— More than Moore *(Y. Obeng, G. Banerjee, S. Datta, P. J. Hesketh, T. Hiramoto, A. Ionescu, and P. Srinivasan)* SC e

E11— Nonvolatile Memories *(S. Shingubara, H. Akinaga, Z. Karim, K. Kobayashi, Y. Suzuki, and N. Takaura)*

E12— Photovoltaics for the 21st Century 8 *(M. K. Sunkara, C. Claeys, L. Deligianni, T. Druffel, T. Miyasaka, J. Park, K. Rajeshwar, and M. Tao)*

E13— Plasma Processing 19 *(S. Mathad, M. Engelhardt, D. Hess, and O. M. Leonte)*

E14— Semiconductor Wafer Bonding 12: Science, Technology, and Applications *(M. Goorsky, H. Baumgart, C. Colinge, K. Hobart, R. Knechtel, H. Moriceau, and T. Suga)* HC e

E15— State-of-the-Art Program on Compound Semiconductors 54 (SOTAPOCS 54) *(P. C. Chang, L. Chou, J. He, J. LaRoche, K. C. Mishra, and M. Overberg)* HC e

E16— Thin Film Transistors 11 (TFT 11) *(Y. Kuo, O. Bonnaud, H. Hamada, J. Jang, W. Milne, and M. Shur)* HC e

E17— SiGe, Ge, and Related Compounds: Materials, Processing, and Devices 5 *(D. Harame, J. Boquet, M. Caymax, T. Krishnamohan, G. Masini, S. Miyazaki, G. Niu, A. Reznicek, B. Tillack, B. Vincent, and Y. Yeo)* HC e

F — Electrochemical / Chemical Deposition and Etching

F1 — Bio-Enabled Materials, Processes, and Devices *(J. N. Harb, Z. Aguilar, N. Myung, D. Schwartz, and S. Yoshihara)*

F2 — Electrodeposition General Session: Fundamentals and New Materials - Dieter M. Kolb Memorial Symposium *(R. Alkire, T. Homma, L. A. Kibler, and K. Uosaka)*

F3 — Electroless Deposition: Principles, Activation, and Applications 2 *(S. Djokic, W. Cai, T. Homma, L. Magagnin, M. Ryan, J. Stickney, and G. Zangari)*

F4 — Emerging Materials and Processes for Energy Conversion and Storage *(L. Deligianni, C. Chan, Y. Fukunaka, Q. Huang, K. Kanamura, E. Podlaha, and J. B. Talbot)*

F5 — Magnetic Materials and Devices 12 *(C. Bonhote, T. Akasaka, S. Brankovic, M. T. Carter, H. Gatzen, P. J. Hesketh, Y. Kitamoto, T. Osaka, W. Schwarzacher, and G. Zangari)* HC e

G — Electrochemical Synthesis and Engineering

G2 — Synthesis and Engineering General Session *(M. Sudoh and V. Ramani)*

H — Fullerenes, Nanotubes, and Carbon Nanostructures

H1 — Carbon Nanotubes and Graphene: From Fundamental Properties and Processes to Applications and Devices (*D. M. Guldi, T. Akasaka, M. T. Carter, F. D'Souza, S. De Gendt, S. Fukuzumi, H. Klauk, Z. Liu, R. Weisman, K. Worhoff, and K. Zaghib)*

I — Physical and Analytical Electrochemistry

I1 — Physical and Analytical Electrochemistry General Session *(R. A. Mantz, S. Chen and T. Chung)*

I2 — Bioelectroanalysis and Bioelectrocatalysis *(S. Minteer, L. Mao, N. Nakamura and K. Sode)*

I3 — Molten Salts and Ionic Liquids 18 *(W. M. Reichert, A. Bund, H. De Long, D. M. Fox, A. Ispas, R. A. Mantz, M. Mizuhata and P. Trulove)* HC e

I4 — Electrocatalysis 6 *(G. Brisard, N. Hoshi, T. Ohsaka, V. Ramani, P. Shen and A. Wieckowski)*

I5 — Electrochemical Atomic Layer Epitaxy and Quantum Confinement *(N. Dimitrov and J. Stickney)*

J — Sensors and Displays: Principles, Materials, and Processing

J1 — Chemical Sensors 10 - Chemical and Biological Sensors and Analytical Systems *(A. Simonian, Z. Aguilar, M. T. Carter, B. Chin, G. Hunter, N. Miura, L. Nagahara, M. J. Sailor, Y. Shimizu and S. Uchiyama)* HC e

J2 — Luminescence and Display Materials: Fundamentals and Applications *(J. Collins, B. Di Bartolo, U. O. Happek, C. Hunt, T. Isobe, T. Kusunoki, D. J. Lockwood, K. C. Mishra, A. Setlur and A. Srivastava)*

J3 — Materials for Solid State Lighting *(A. Setlur, J. Collins, N. Mastsuda, K. C. Mishra and K. Ueda)*

J4 — Microfabricated and Nanofabricated Systems for MEMS/NEMS 10 *(P. J. Hesketh, G. Hunter, A. Londergan, P. Srinivasan, K. B. Sundaram, O. Tabata, P. Vanysek, N. Wu and X. Yang)* HC e

***ECS Transactions* (ECST) – Symposia with issues available "at" the meeting are labeled with the following icons:**

HC **Hard-cover (HC)** editions of *ECS Transactions* will be available for purchase and pick-up at the meeting.

CD **Compact Disc (CD)** editions of *ECS Transactions* will be available for purchase and pick-up at the meeting; or you may pre-order your CD ECST issue using the meeting registration form in this brochure or when registering online. The CD edition of B9 (PEFC 12) also includes a 1 gigabyte USB drive containing the complete issue.

SC **Softcover (SC)** editions editions of *ECS Transactions* will be available for purchase at the meeting and will be shipped to you after the meeting ends. Please visit ECS Central in Honolulu to order your softcover ECST issue.

e **Electronic (PDF)** editions of *ECS Transactions* will be available ONLY via the ECS Digital Library (www.ecsdl.org). Electronic editions of the Honolulu "at" meeting issues should be available for purchase beginning September 28, 2012. Please visit the ECS website for all issue pricing and ordering information for the electronic editions.

***ECS Transactions* – Forthcoming Issues**

In addition to those symposia that have committed to publishing an issue of ECS Transactions, all other symposia potentially will be publishing an issue of ECST approximately 16 weeks after the Honolulu meeting. If you would like to receive information on any of these issues when they become available, please e-mail ecst@electrochem.org. Please include your name, e-mail address, and all issues in which you are interested.

Purchase a hardcover copy of *ECS Transactions* Volume 50, Issues 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, or 12 with your Honolulu meeting registration and receive 10% off that issue's list price! For ECS Members the 10% discount will be on top of your regular Member discount for these issues. Any discounted books purchased must be picked up at the Honolulu meeting. The discount does not apply to electronic editions of these issues. This discount is not valid on any other issues of ECST, Monographs, or Proceedings Volumes purchased at the meeting.

Technical Exhibit

(continued from page 33)

Tanaka Kikinzoku Kogyo K.K.

Booth 214

Yoshikazu Sato
yo-sato@ml.tanaka.co.jp
2-73, Shinmachi, Hiratsuka,
Kanagawa 254-0076 +81.463.35.5170
Japan www.takaka.co.jp

Tanaka Kikinzoku Group has contributed to the society through the continuous pursuit of the inherent possibilities of precious metals for over 120 years. Our activities are sales of Precious Metals (Platinum, Gold, Silver, and others). We also manufacture sales of Industrial Precious Metal Products.

Toshima Manufacturing Co., Ltd.

Booth 112

Tetsuo Yamanaka
staff@material-sys.com
1414 Shimonomoto
Hioashimatsuyama-Shi, Saitama, 355-0036 1.81.493.24.6774
Japan www.material-sys.com

Toshima Manufacturing Co., Ltd. is the manufacture of sputtering target, powder, solution for several categories of electron field, such as battery & energy, optoelectronics, superconductor. We always challenge in providing new type material and believe it makes you satisfactory.

Tosoh Corporation

Booth 207

Eiichi Iwata
eiichi-iwata-tm@tosoh.co.jp
3-8-2, Shiba Minato-ku
Toyko, 105-8623 1.81.3.5427.5172
Japan www.tosoh.com

Tosoh Corporation is a diversified global chemical company with a strong reputation in a basic chemicals, petrochemicals, and specialty products such as Electrolytic Manganese Dioxide. Since 1935, Toso has expanded into a high-value added business including organic chemicals and advanced electrochemical materials.

ULVAC Technologies, Inc.

Booth 116

Evan Sohm
esohm@us.ulvac.com
401 Griffin Brook Drive
Methuen, Massachusetts, 01844 1.978.686.7550
United States www.ulvac.com

ULVAC–Manufactures nanoparticle deposition equipment that coats nanoparticles onto micron size powder substrates for fuel cell electrodes, exhaust gas catalysts and battery research. The APD Arc Plasma Deposition system produces uniform size-controlled nanoparticles from 2 to 9nm in diameter range. Dense ultra thin films can also be produced.

AUDIO-VISUAL RECORDING OR PHOTOGRAPHY IS STRICTLY PROHIBITED WITHOUT CONSENT OF THE PRESENTER/SPEAKER. Anyone recording any meeting activity, without proper authorization and credentials on-hand, by any electronic means or similar reproduction methods, will be required to leave; any registration and/or event fees that had been paid will be forfeited and individual(s) will not be permitted to attend future ECS meetings.

Technical Sessions

Sunday, October 7

08:30h..... Short Courses

15:00h..... Professional Development Series: Learn to Brag…the Right Way

16:15h..... Professional Development Series: Resume/On-Line Profile Writing and Strategies for Cultivating and Maintaining Professional Contacts

17:30h..... Sunday Evening Get-Together

17:30h..... PRiME 2012 Student Mixer (invitation only; contact sponsorship@electrochem.org for details)

B9 Polymer Electrolyte Fuel Cells 12 (PEFC 12)

Energy Technology / Corrosion / Physical and Analytical Electrochemistry / Battery / Industrial Electrochemistry and Electrochemical Engineering

Tapa 2, Tapa Conference Center, Hilton Hawaiian Village

D-0.1 Pt Catalysts on New Carbon Supports – 10:00 – 12:00
Co-Chairs: Peter Pintauro and Akari Hayashi

10:00 **1260** Development of PEFCs with Nanostructurally Controlled Electrocatalysts – A. Hayashi and K. Sasaki (Kyushu University)

10:20 **1261** Graphitized Aerogel Supported PEMFC catalysts for Oxygen Reduction Reaction – P. Kolla, Y. Normah, K. Kerce, and A. Smirnova (SDSM&T)

10:40 **1262** Influence of Chemistry and Structure on the ORR Activity of Pt Supported on N-Doped Mesoporous Carbon – S. Shrestha, S. Ashegi, J. Timbro, and W. E. Mustain (University of Connecticut)

11:00 **1263** Low Pt-Loaded Nanofiber Electrodes for Hydrogen/Air Fuel Cells – M. Brodt and P. Pintauro (Vanderbilt University)

11:20 **1264** Electrospinning : A Promising Pathway in the Design of Carbon Nanotubes-Based Electrodes for Hydrogen Fuel Cells – S. Zils and M. Michel (CRP Henri Tudor)

11:40 **1265** Durability of the Electrocatalyst Fabricated based on Carbon Nanotubes – T. Fujigaya, B. Mohamad, and N. Nakashima (Kyushu University)

D-0.2 Pt-Based Cathode Catalyst Layers – 14:00 – 16:40
Co-Chairs: Shyam Kocha and Hiroyuki Uchida

14:00 **1266** Cathode Thickness Dependency of Oxygen Reduction Rate in PEFC – M. Kawase, S. Chin, G. Inoue, K. Sato, and M. Kageyama (Kyoto University)

14:20 **1267** Investigation of Solvent Effects on Dispersion of Carbon Agglomerates and Nafion Ionomer Particles in Catalyst Inks Using Ultra Small Angle X-Ray Scattering and Cryo-TEM – L. Sun (1Department of Mechanical Engineering, Purdue School of Engineering and Technology, Indiana University-Purdue University Indianapolis (IUPUI)), H. Zhang, L. Stanciu (Weldon School of Biomedical Engineering and School of Materials Engineering), J. Ilavsky (Argonne National Laboratory), and J. Xie (Indiana University Purdue University Indianapolis)

14:40 **1268** Structural Control and Evaluation of PEMFC Catalyst Layers by Blending Platinum-Supported/Stand-Alone Carbon Black – T. Suzuki, S. Tsushima, and S. Hirai (Tokyo Institute of Technology)

15:00 **1269** Influence of Nafion on the Electrochemical Activity of Pt-based Electrocatalysts – S. S. Kocha, J. W. Zack, K. Neyerlin, and B. S. Pivovar (National Renewable Energy Laboratory)

15:20 **1270** Analysis of Oxygen Transport Resistance of Nafion Thin Film on Pt Electrode – K. Kudo (Toyota Central R&D Labs., Inc.) and Y. Morimoto (Toyota Central R&D Labs, Inc.)

15:40 **1271** Effect of High Oxygen Permeable Ionomers on MEA Performance for PEFC – K. Yamada, S. Hommura, and T. Shimohira (Asahi Glass Co., Ltd.)

16:00 **1272** Evaluation of Anion Adsorption on Pt Surface in MEA – Y. Furuya, T. Mashio, A. Ohama (Nissan Mortor Co. Ltd), and K. Shinohara (Nissan Motor Co., Ltd)

16:20 **1273** Elemental and Morphological Analysis of Novel Pt Catalysts Synthesized by Galvanic Displacement – K. A. Perry (Oak Ridge National Laboratory), B. A. Larsen, K. Neyerlin, B. S. Pivovar (National Renewable Energy Laboratory), and K. L. More (Oak Ridge National Laboratory)

B10 Renewable Fuels from Sunlight and Electricity

Energy Technology / High Temperature Materials / Physical and Analytical Electrochemistry / New Technology Subcommittee

Nautilus 2, Mid-Pacific Conference Center, Hilton Hawaiian Village

Photoelectrochemical Cells – 14:00 – 15:50
Co-Chairs: Huyen Dinh and Candace Chan

14:00 **1708** Electron- and (*In Situ*) Soft X-ray Spectroscopy of Materials for Photo-Electrochemical Water Splitting – L. Weinhardt (University of Nevada)

14:30 **1709** Analysis of Functional and Dysfunctional Defects in Photoelectrode Materials for Solar Water Splitting – A. Braun (Empa), N. M. Gaillard, Y. Chang (University of Hawaii at Manoa), D. K. Bora (Lawrence Berkeley National Laboratory), K. Gajda-Schrantz (Empa), J. Guo, Z. Liu (Advanced Light Source), K. Sivula, M. Grätzel (EPFL), and E. Constable (University of Basel)

14:50 **1710** Hybrid Photovoltaic/Photoelectrochemical Device Design Using I-III-VI2 Copper Chalcopyrite-Based Photocathodes – J. M. Kaneshiro, Y. Chang, and N. M. Gaillard (University of Hawaii at Manoa)

15:10 **1711** Silicon Microwires Coupled to Earth Abundant Catalysts as Photocathodes for the Hydrogen Evolution Reaction – E. L. Warren, J. R. McKone, M. R. Shaner, H. A. Atwater, H. B. Gray, and N. S. Lewis (California Institute of Technology)

15:30 **1712** Photoelectrochemical Hydrogen Production from Water Using p-type Calcium Ferrite and n-type Semiconducting Electrodes – S. Ida, K. Yamada, H. Hagiwara, and T. Ishihara (Kyushu University)

Photoelectrochemical Cells and Photocatalysts – 16:00 – 18:00
Co-Chairs: Huyen Dinh and Anne Co

16:00 **1713** Band Structure Controls of $SrTiO_3$ towards Visible-Light Induced Two-Step Overall Water-Splitting – H. Irie (University of Yamanashi)

16:20 **1714** Development of Metal-Oxide-Semiconductor (MOS) Electrodes for Photoelectrochemical Water Splitting – D. V. Esposito, A. Talin, and T. Moffat (National Institute of Standards and Technology)

16:40 **1715** Optimum Conditions for Efficient Water Splitting in an Electrolyzer Powered by Solar Cells or Power Supply – M. Frites and S. U. Khan (Duquesne University)

17:00 **1716** Development of High Throughput Experimentation Capabilities for Accelerated Discovery of PEC Materials – X. Liu, M. Marcin, S. Mitrovic, J. Gregoire, S. Lin (California Institute of Technology), E. Cornell (Lawrence Berkeley National Laboratory), C. Xiang (California Institute of Technology), J. Fan (Zhejiang University), G. D. Stucky (University of California, Santa Babara), and J. Jin (Lawrence Berkeley National Laboratory)

17:20 **1717** Adiabatic Free Energy Surface of Hydrogen Evolution Reaction on $GaInP_2$ – W. Choi, B. C. Wood, E. Schwegler, and T. Ogitsu (Lawrence Livermore National Laboratory)

17:40 **1718** Growth of GaAs Array Assisted-TiO_2 Heterojunction Nanostructure for Solar Hydrogen Production – S. Huang (National Tsing Hua University), C. Kei (National Applied Research Laboratories), and T. Perng (National Tsing Hua University)

I3 Molten Salts and Ionic Liquids 18

Physical and Analytical Electrochemistry / Electrodeposition / Energy Technology

301A, Level 3, Hawaii Convention Center

Electrochemistry in Molten Salts and Ionic Liquids – 14:00 – 18:00
Co-Chairs: G. Cheek and T. Takenaka

14:00 **3604** Dynamic Atomic Force Microscopy (AFM) Studies to Characterize Multi-Layered Structures at Ionic Liquid/Solid Interfaces – W. Zhang, L. Chen, K. Smith, J. J. Sangiovanni, and G. S. Zafiris (United Technologies Research Center)

14:20 **3605** Local Structure of Ionic Liquid / Electrode Interfaces Analyzed by Frequency-Modulation AFM and Photoelectron Spectroscopy – T. Harada, Y. Kanai, Y. Mino, A. Imanishi, Y. Yokota, and K. Fukui (Osaka University)

14:40 **3606** An Arrhenius Argument to Explain Electrical Conductivity Maxima versus Temperature – A. L. East (University of Regina)

15:00 **3607** Electrochemical Investigation of Quinone Complexation by Lewis Acids in a Chloroaluminate Ionic Liquid – G. T. Cheek (United States Naval Academy)

15:20 Intermission (20 Minutes)

15:40 **3608** Effects of the Charge Density of the Anions of Ionic Liquids on the Electrode Kinetics of Ruthenium 2,2'-Bipyridine Complexes – Y. Katayama, Y. Toshimitsu, and T. Miura (Keio University)

16:00 **3609** Voltammetric Studies of Proton Reduction in 1-Butyl-1-methylpyrrolidinium Triflate – G. T. Cheek (United States Naval Academy), D. F. Roeper, and W. O'Grady (Excet, Inc.)

16:20 **3610** Robust Microelectrodes for Molten Salt Analysis – A. Relf, D. Corrigan, C. L. Brady, J. G. Terry, and A. J. Walton (University of Edinburgh)

16:40 **3611** PTFE Bound Activated Carbon – A Quasi Reference Electrode for Ionic Liquids and Its Application – D. Weingarth, A. Foelske-Schmitz, A. Wokaun, and R. Kötz (Paul Scherrer Institute)

17:00 **3612** Critical Evaluation of Metallocenes as Internal Reference Scales for Voltammetric Measurements in Ionic Liquids – A. A. Torriero and M. Forsyth (Deakin University)

17:20 **3613** Electrochemical Conversion of Carbon Dioxide to Oxygen in Ionic Liquid Media – D. Carr, B. Slote, K. Jayne, and M. C. Kimble (Reactive Innovations, LLC)

17:40 **3614** Influence of Temperature on the Electrochemical Characteristics of Bi(111) | 1-Butyl-3-Methylimidazolium Tetrafluoroborate Interface – L. Siinor, R. Arendi, C. Siimenson, K. Lust, and E. Lust (University of Tartu)

Monday, October 8

07:30h..... Professional Development Series: Great Minds Do Not Think Alike

08:45h..... Professional Development Series: Resume/On-Line Profile Writing and Strategies for Cultivating and Maintaining Professional Contacts

09:30h..... Technical Session Coffee Break

12:00h..... *ECS Transactions* Tutorial Session for Authors

13:00h..... Technical Exhibit

13:00h..... Professional Development Series: Career Fair

14:00h..... Professional Development Series: Resume Workshop

14:05h..... ECS Edward Goodrich Acheson Award Lecture: "Plasmas for Thin Film Processing and Surface Modification" by Dennis W. Hess

14:45h..... ECS Charles W. Tobias Young Investigator Award Lecture: "Past, Current, and Future Research in Polymer Electrolyte Fuel Cells" by Bryan S. Pivovar

15:25h..... ECS Charles W. Tobias Young Investigator Award Lecture: "Mechanochemistry at Oxide Thin Film Interfaces" by Bilge Yildiz

17:00h..... PRiME 2012 Lecture: "Cell Bioelectrochemistry and Biomagnet" by Tadashi Matsunaga

18:00h..... Monday Evening Mixer, Technical Exhibit, and Student Poster Session

18:00h..... Professional Development Series: Career Fair

A0 Special Lectures

All Divisions

Kalakaua Ballroom B, Level 4, Hawaii Convention Center

Award Presentations – 14:00 – 16:10

14:00		Introductory Remarks (5 Minutes)
14:05	**1**	(Edward Goodrich Acheson Award Presentation) Plasmas for Thin Film Processing and Surface Modification D. Hess (Georgia Institute of Technology)
14:45	**2a**	(Charles W. Tobias Young Investigator Award Presentation) Past, Current, and Future Research in Polymer Electrolyte Fuel Cells B. S. Pivovar (National Renewable Energy Laboratory)
15:25	**2b**	(Charles W. Tobias Young Investigator Award Presentation) Mechanochemistry at Oxide Thin Film Interfaces B. Yildiz (Massachusetts Institute of Technology)
16:05		Concluding Remarks (5 Minutes)

A1 General Student Poster Session

All Divisions

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

A1 – Poster Session – 18:00 – 20:00

- **3** Analysis of Carbon Electrode and Organic Electrolyte of Electric Double Layer Capacitors after Aging Test – H. Yoshitama, Y. Tanaka, and D. Tashima (University of Miyazaki)
- **4** Atomic Layer Deposition of Vanadium Oxide on Carbon Nanotubes for High-Power Supercapacitor Electrodes – S. Boukhalfa, K. Evanoff, and G. Yushin (Georgia Institute of Technology)
- **5** Growth and Fabrication of GaN Light Emitting Diode on Patterned-Sapphire Substrate – B. Tran, K. Lin (National Chiao Tung University), C. Wang, C. Chen, C. Huang (Industrial Technology Research Institute), C. Chung, and E. Yi Chang (National Chiao Tung University)
- **6** Conversion Reaction of Methane with Carbon Dioxide in Glow Discharge at Atmospheric Pressure – D. Nguyen, J. Park, and W. Lee (Kangwon National University)
- **7** Surface Treatment for Sterilization of Microorganism with Plasma Plume in Atmospheric Pressure – J. Park, H. Kwon, and W. Lee (Kangwon National University)
- **8** Indium Tin Oxide-Coated Glass Modified with Reduced Graphene Oxide Sheets and Gold Nanoparticles for Dopamine Sensing – J. Yang and S. Gunasekaran (The University of Wisconsin-Madison)
- **9** Electrochemical Detection of Phenol and Phenol Derivatives Modified with TiO_2, ZrO_2, and Mixed Metal Oxides (TiO_2 + ZrO_2) – M. K. Hughes, V. Nguyen, and S. K. Lunsford (Wright State University)
- **10** Characteristics of Low-Temperature($\leq$200°C) PECVD Silicon Nitride for Gate Dielectric of TFTs by Using N_2 Highly Diluted SiH_4 – K. Keum, K. No, J. Park, S. Kang, T. Song, and W. Hong (University of Seoul)
- **11** Charge Induced Closing of *Dionaea Muscipula* Ellis Trap – C. Mitchell, N. E. Williams, and A. G. Volkov (Oakwood University)
- **12** Lithium-Sulfur Batteries with Glyme-Li Salt Equimolar Complexes – A. Yamazaki, M. Tsuchiya, K. Yamauchi, K. Ueno, N. Tachikawa, K. Dokko, and M. Watanabe (Yokohama National University)
- **13** Effect of Hydrothermal Synthesis Condition on $LiMnPO_4$ Particle Size – S. Yanaka, K. Yoshida, K. Dokko, and M. Watanabe (Yokohama National University)
- **14** Design of Catalyst Layer of Non-Humidified Intermediate Temperature Fuel Cells – Y. Honda, R. Tatara, S. Nakamura, T. Yasuda, K. Dokko, and M. Watanabe (Yokohama National University)
- **15** Color Changes during Voltammograms of Prussian Yelow on ITO Electrode – J. Agrisuelas, J. García-Jareño, C. Moreno-Guerrero (University of Valencia), A. Roig (UJI), and F. Vicente (University of Valencia)

- **16** Effective Hydrogen Generation and Resource Circulation from Photocatalytic Decomposition of H_2S Aqueous Solution – H. Takahashi, T. Mabuchi, T. Hayashi, S. Yokoyama, and K. Tohji (Tohoku University)
- **17** Control Method for the Amount of Cu Site on the ZnS Stratified Photocatalysts – Y. Kajino (Touhoku University), H. Takahashi, and K. Tohji (Tohoku University)
- **18** Synthesis of Cu Supported Stratified Photocatalysts and Its Application for the CO_2 Conversion into Alcohol – Y. Kajino (Touhoku University), H. Takahashi, and K. Tohji (Tohoku University)
- **19** Improvement of Efficiency of Photo-Excited Electrons Transfer from Thin Film Consisted by the Semiconductor Particles on Electrode Surface to Developing Electrons Pathway – T. Mabuchi, T. Hayashi, H. Takahashi, and K. Tohji (Tohoku University)
- **20** Relation between the Condition of Pd and Te Metal Complexes in the Aqueous Solution and Reduction Mechanism of $Pd_{20}Te_7$ Alloy – T. Mabuchi, S. Yokoyama, H. Takahashi, and K. Tohji (Tohoku University)
- **21** Oxidation of Bulk Amorphous $Ni_{57}Ti_{18}Zr_{20}Si_3Sn_2$ Coating – S. Kim, S. Bong, M. Kim, and D. Lee (Sungkyunkwan University)
- **22** Sodium-Sulfur Batteries with Room-Temperature Ionic Liquid Electrolytes – R. Nozawa, R. Harimoto, M. Tsuchiya, K. Yoshida, N. Tachikawa, K. Dokko, and M. Watanabe (Yokohama National University)
- **23** Single-Crystal Field-Effect Transistors of 21DNTT Derivatives – A. Maeda, T. Arakawa (Tokai University), M. Tsutsui, K. Okamoto (Ushio Chemix Corporation), and Y. Kunugi (Tokai University)
- **24** Conductivity of Ceria Based Composite Electrolytes for Intermediate-Temperature-Solid Oxide Fuel Cells – S. Baek, T. Lee, and J. Park (Sejong University)
- **25** Effect of Synthesis Method and Fe_2P Phase on the Electrochemical Properties of $LiFexMn_{1-x}PO_4$-C Electrode – J. P. Välikangas (University Of Oulu), S. Tuomaala (Kokkola University Consortium Chydenius), M. T. Andersson, S. Manner (Aalto University), P. A. Tanskanen (University of Oulu), T. Kallio, M. Karppinen (Aalto University), and U. Lassi (Kokkola University Consortium Chydenius)
- **26** Co-Ionic Neodymium-Doped Ceria/Carbonate Composite Electrolytes – J. Kim, N. Kim, and J. Park (Sejong University)
- **27** Fabrication of High Performance $BaLaIn_2O_{5.5}$ Electrolyte Single Chamber Solid Oxide Fuel Cell by Using Sublimation Materials as Pore Former in Electrode Preparation – X. Shen, K. Takasu, and T. Yao (Kyoto University)
- **28** Morphology Control of Palladium Nanostructures by Potential Adjustment – X. Pham, M. Bui, C. Li, K. Han, and G. Seong (Hanyang University)
- **29** Preparation of Organoboron Ion-Gels Using PVA and Their Ion Conductive Properties – H. Tsutakawa and N. Matsumi (Japan Advanced Institute of Science and Technology)
- **30** Structure and Electrochemistry of $NaNiO_2$ – R. I. Fielden and M. N. Obrovac (Dalhousie University)
- **31** Fabrication of Ruthenium Oxide Nanosheet Electrodes by Electrophoretic Deposition – S. Ikuta, N. Ishigaki, K. Fukuda, T. Sato, and W. Sugimoto (Shinshu University)
- **32** Characterization Attributes of Metal Oxide Nanocomposites – M. Hockey, Q. Lin, and E. Calderas (Brewer Science Inc.)
- **33** Improvement in ORR Performance of 1-1.5 nm Pt Nanoparticles by Modification with Ruthenium Oxide Nanosheets – D. Takimoto, M. Ohuchi, L. Koodlur, C. Chauvin, and W. Sugimoto (Shinshu University)
- **34** Pt/TiO_2 Nanohybrid Structures on Single-Walled Carbon Nanotubes: Preparation and Electrocatalytic Characteristics – K. Han, C. Li, M. Bui, X. Pham, and G. Seong (Hanyang University)
- **35** Direct Synthesis of Nanostructures in a Microfluidic Device for Electrochemical Analysis – C. Li, K. Han, M. Bui, X. Pham, and G. Seong (Hanyang University)
- **36** Influence of Surface Structure and Ion Type on the Capacitance of Doped SWCNTs Electrode of Electrochemical Capacitors – A. Al-zubaidi, Y. Ishii, T. Matsushita, and S. Kawasaki (Nagoya Institute of Technology)
- **37** Electrochemical Study on Oxygen Reduction in a Pt/Nafion/Humidified Air System – Y. Sugiyama, E. Tada, A. Nishikata, and T. Tsuru (Tokyo Institute of Technology)
- **38** Solid Phase Growth of Nickel Silicides in Polycrystalline Si Film on SiO_2 with Cl Plasma Containing NiCl – K. Kanomata, K. Momiyama, S. Kubota, T. Suzuki, and F. Hirose (Yamagata University)
- **39** Enhancement of Dye-Sensitized Photocurrents by Gold Nanoparticles: Effects of Particle Size and Density – T. Kawawaki (The University of Tokyo), Y. Takahashi (Kyushu University), and T. Tatsuma (University of Tokyo)
- **40** The Synthesizing Process and Electrochemical Characteristics of Si Active Material Particles Covered with Silicon Oxide as Anode Electrodes in a Lithium-Ion Battery – N. Shimoi and Y. Tanaka (Tohoku University)
- **41** Electrochemical Property of the Composition by Ground Process of Active Materials Based on Silicon and Oxides – N. Shimoi, Q. Zhang, and Y. Tanaka (Tohoku University)
- **42** Characterizations of Al_2O_3/Zn_O Grown on Si Substrate by Plasma Enhanced Atomic Layer Deposition – C. Chung, B. Tran, K. Lin (National Chiao Tung University), C. Wang, C. Chen, C. Huang, S. Lee (Industrial Technology Research Institute), and E. Yi Chang (National Chiao Tung University)
- **43** Preparation of π -Conjugated Polycarbzole – Boron Complexes as Fluoride Anion Sensor – Y. Hosono and N. Matsumi (Japan Advanced Institute of Science and Technology)

- **44** Preparation of Marimo Carbon Supported PtCo Bimetal Catalyst by the Nanocolloidal Solution Method – K. Sato, T. Onuma (Ibaraki University), K. Komatsu, M. Kobori (Toyo University), K. Iwasawa, M. Eguchi, Y. Kobayashi (Ibaraki University), M. Nishitani-Gamo (Toyo University), and T. Ando (National Institute for Materials Science)
- **45** Changes in the Conduction Properties of $LaBaGaO_4$ Based Proton Conductor by Liquid-Phase Synthesis – N. Hamao, N. Kitamura, and Y. Idemoto (Tokyo University of Science)
- **46** The effect of the Relationship between Ionomer and Carbon in the PEFC Catalyst Layer – K. Baba, T. Onuma, K. Iwasawa, M. Eguchi, Y. Kobayashi (Ibaraki University), K. Komatsu, M. Kobori, M. Nishitani-Gamo (Toyo University), and T. Ando (National Institute for Materials Science)
- **47** Effects of Misaligned Electrode for Measurement in PEFC with Reference Electrode – K. Baba, S. Ueda, M. Eguchi, Y. Kobayashi (Ibaraki University), and Y. Tsutsumi (FC Development Co., Ltd.,)
- **48** Low-Temperature Synthesis and Study of Apatite-Type Lanthanum Silicates – N. Kitamura, K. Kaneko, and Y. Idemoto (Tokyo University of Science)
- **49** Anodic Oxidation of Alcohols on Ni-Sn Electrocatalysts Prepared by Electrodeposition – K. Maruyama, N. Yoshimoto, M. Egashira, and M. Morita (Yamaguchi University)
- **50** A New 4.3 V Aqueous Hybrid Capacitor Based on Manganese Dioxide Positive and Lithium Negative Electrode – Y. Shinohara, S. Makino, W. Shimizu, and W. Sugimoto (Shinshu University)
- **51** Synthesis and Characteristics of Novel Boric Ester Type Ionic Liquids – Y. Toyota and N. Matsumi (Japan Advanced Institute of Science and Technology)
- **52** Aqueous Electrolytes for Ultracapacitor Devices Using Manganese Oxide as Electrode Material – A. Boisset (Université de Tours), L. Athouël (University of Nantes), J. Jacquemin (Queen's University Belfast), T. Brousse (University of Nantes), and M. Anouti (Université de Tours)
- **53** Molecular Weight Dependence of P-Type Semiconductive Polymer on High Efficiency Thin Film Organic Photovoltaic Cells – M. Sugimoto, H. Nakamura, K. Yamada, and H. Yamane (Kitakyushu National College of Technology)
- **54** Effect of Gold Nano-Seed Particles on Electrochemical Characteristics of Conducting Substrates – Y. Nakayama and M. Oyama (Kyoto University)
- **55** Sn-CNT Fabric for Multifunctional Anodes in Li-ion Batteries – J. Benson, Y. Zhao, B. Hertzberg (Georgia Institute of Technology), M. Schauer, D. Lashmore (Nanocomp Technologies, Inc.), and G. Y. Yushin (Georgia Institute of Technology)
- **56** High Temperature Protonic Conduction and Clystal Structure of Eulytite-Type Phosphates – N. Kitamura, Y. Yamada, and Y. Idemoto (Tokyo University of Science)
- **57** Composition Dependence of Average and Local Structure and Thermodynamic Stability for $xLi(Li_{1/3}Mn_{2/3})O_2$-$(1-x)Li(Mn_{1/3}Ni_{1/3}Co_{1/3})O_2$ as a Cathode Active Material for Li-Ion Battery – M. Inoue, N. Kitamura, and Y. Idemoto (Tokyo University of Science)
- **58** Non-Pacman Type Co-Porphyrin Bilayers for Oxygen Reduction Reaction – S. Satoh, K. Murakoshi, and K. Ikeda (Hokkaido University)
- **59** Stress Durability of Electrolyte Structure in Flexible Sheet Type Direct Methanol Fuel Cell (FS-DMFC) – Y. Sakurai and A. Kawai (Nagaoka University of Technology)
- **60** Fabrication of TiO_2 Layers for Dye Sensitized Solar Cells using Electrostatic Inkjet Printing Method – A. Ishii (Tokai University), S. Umezu (Tokai Univ.), and Y. Kunugi (Tokai University)
- **61** Construction of the Copper (I) Oxide/C_{60} Hybrid Photovoltaic Devices – T. Saitoh, T. Ohata, F. B. Mohamad, J. Sasano, and M. Izaki (Toyohashi University of Technology)
- **62** Electrochemical Oxidation of Ammonia by Multi-Walled Carbon Nanotubes-Supported Pt-Core/Ir-Shell and Pt-Core/Pd-Shell Nanoparticles – S. Morita, S. Azuma, H. Shiroishi (Tokyo National College of Technology), M. Yonekawa, and K. Nagai (Tokyo Institute of Technology)
- **63** A Study of Photochemical Proton Reduction and Oxidation of Water Using $Pb_2Ru_2O_{7-\delta}$ Synthesized by Neutralization Method – S. Hanyu, H. Shiroishia (Tokyo National College of Technology), T. Hatai, Y. Ayato, and J. Kuwano (Tokyo University of Science)
- **64** Performance of Proton Conductive Intermediate Temperature Fuel Cell Using ZrO_2-$1.6P_2O_5$ Electrolyte with 1% CO-H_2 and Methanol as Fuels – Y. Houshi (Tokyo National College of Technology), M. Yonekawa (Tokyo Institute of Technology), H. Shiroishi (Tokyo National College of Technology), M. Kunimatsu (Kanagawa Industrial Technology Center), K. Matsushima, Y. Ayato (Tokyo University of Science), M. Saito (Doshisha University), and J. Kuwano (Tokyo University of Science)
- **65** Electrochemical Studies of Epoxy Based Lignosulfonate Doped Double Stranded Polyaniline-Montmorillonite Nanocomposite Coatings on AA 2024 Alloy – G. Gupta (IITB-Monash Research Academy), A. Khanna (IIT Bombay), and N. Birbilis (Monash University)
- **66** Carbon Nanotube Synthesis over Nickel-Ferrite Loaded Oxidized Diamond Catalyst – G. Tsujino, K. Nakagawa (Kansai University), T. Ando (National Institute for Materials Science), and H. Oda (Kansai University)
- **67** Cycle Performance of Nano Inclusion containing $LiMn_2O_4$ Cathode Material – J. Harada, H. Tsubouchi, Y. Kawai, and T. Yao (Kyoto University)
- **68** Peeling Force of Polymer Micro Pattern by Direct Peeling by using AFM Tip (DPAT) – T. Aiba (Nagaoka University of Technology) and K. Akira (Nagaoka University of Technology Department of Electrical Engineering)
- **69** Monitoring and Modeling for Response Time of Biopotential in Plant Cells – Y. Noguchi and A. Kawai (Nagaoka University of Technology)

- **70** A New High Energy Density Aqueous Hybrid Capacitor Based on Lithium Negative and Ruthenium Oxide Positive Electrode – T. Ban, S. Makino, W. Shimizu, and W. Sugimoto (Shinshu University)
- **71** Construction and Photovoltaic Performance of Hybrid ZnO:CuPc Bulk Heterojunction Solar Cells – H. Ryo, K. Murata, J. Sasano (Toyohashi University of Technology), S. Watase (Osaka Municipal Technical Research Institute), and M. Izaki (Toyohashi University of Technology)
- **72** VOC Sensing Characteristics of $SmFeO_3$ Film Covered with SiC Powder – J. Iseda, M. Mori, and Y. Sadaoka (Ehime University)
- **73** Adsorption States and Reactivity of Nitric Oxide on Pd and Pd-based Binary Electrodes as Studied by Infrared Absorption Spectroscopy – K. Yamaki (Hokkaido University), A. Okubo, S. Notani (Graduate School of Environmental Science, Hokkaido University), K. Nakata (Faculty of Environmental Earth Science, Hokkaido University), M. Osawa, and K. Shimazu (Hokkaido University)
- **74** Platinum Nanodot and Nanohoneycomb Structures: Construction Using a Cyclodextrin Monolayer as a Molecular Template – R. Saito, Y. Domi, T. Kawaguchi, and K. Shimazu (Hokkaido University)
- **75** Design of Polymer Inclusion Complex of Curcumin Using Amylose – Y. Morita and N. Matsumi (Japan Advanced Institute of Science and Technology)
- **76** Electrochemical Quartz Crystal Microbalance Studies on Pt and Pd Ultra-Thin Films on Gold – A. Kurokawa, M. Shibata, T. Wada, and T. Kondo (Ochanomizu University)
- **77** Change of Crystal and Electronic Structure of Layered Cathode Material $0.4Li_2MnO_3$-$0.6LiMn_{1/3}Ni_{1/3}Co_{1/3}O_2$ by Charge and Discharge Process – R. Yamamoto, N. Kitamura, and Y. Idemoto (Tokyo University of Science)
- **78** Structural Studies on Self-Assembled Monolayer of Porphyrin Derivative on Au(111) – N. Aoki, B. Zhang, R. Kuwana, T. Wada, and T. Kondo (Ochanomizu University)
- **79** Electrocatalytic Activity for Oxygen Reduction of Pseudomorphic Pt Monolayer Electrochemically Prepared on a Au(111) Surface – T. Wada, M. Shibata, M. Kawabuchi (Ochanomizu University), I. Yagi (FC-Cubic TRA), and K. Toshihiro (Ochanomizu University)
- **80** Performance of Nb and Mo Alloyed Ferritic Stainless Steel for SOFC Interconnect by Using Button Cell Configuration – D. Yun, H. Seo (Pohang University of Science and Technology), J. Jun (Research Institute of Industrial Science and Technology), and K. Kim (Pohang University of Science and Technology)
- **81** Development of 4 V-class Aqueous Hybrid Electrochemical Capacitor with Porous Positive Electrode and Li Negative Electrode – S. Makino, Y. Shinohara, T. Ban, W. Shimizu, and W. Sugimoto (Shinshu University)
- **82** Electrochemical Properties of Reduced Graphite Oxide Nanosheet Electrodes Prepared by Layer-by-Layer Assembly – T. Mitsui (Shinshu Univeristy), K. Higurashi, J. Sato, K. Fukuda, and W. Sugimoto (Shinshu University)
- **83** A Comparison of Steam and CO_2 Activation of Boron Doped Diamond Electrodes – J. Zhang and W. Sugimoto (Shinshu University)
- **84** Electrochemical Properties of Nanocarbon Produced from Organic Waste and its Application in Electric Double-Layer Capacitor – D. Mishima, Y. Hamasuna, D. Tashima (University of Miyazaki), S. Kumagai (Akita University), and J. Madden (University of British Columbia)
- **85** Amorphous Titanium Oxide Prepared from Peroxo-Polytitanic Acid and Its Electrochemical Properties – K. Kobayashi and I. Tsuyumoto (Kanazawa Institute of Technology)
- **86** One Dimensional Silver/Silver Halide Nanocomposites: Synthesis and Electrocatalytic Activity – S. Kim (Ewah womans University), J. Shim (Daegu University), C. Lee, and Y. Lee (Ewha Womans University)
- **87** Terminal Redox Moiety effects on the Long-Range Electron Conduction of π-Conjugated Bis(Terpyridine) Metal Complex Oligomer Wires on Electrode – S. Katagiri, R. Sakamoto, and H. Nishihara (The University of Tokyo)
- **88** Pyrimidine Ring Motion Correlated with Electron Transfer at the Copper(II)/(I) Coordination Site Immobilized on Au Electrode Surface – Y. Takara, M. Nishikawa (Department of Chemistry, School of Science, The University of Tokyo), S. Kume (Department of Chemistry, Graduate School of Science, Hiroshima University), and H. Nishihara (The University of Tokyo)
- **89** Preparation of Glass-Coated CdSe/CdZnS Quantum Dots and Their Photostability – T. Gunshi (Kwansei Gakuin University), C. Li (National Institute of Advanced Industrial Science and Technology), K. Ogasawara (Kwansei Gakuin University), M. Ando, and N. Murase (National Institute of Advanced Industrial Science and Technology)
- **90** Development and Application of an Electrochemical Dual Microsensor for Simultaneous O_2/pH Measurements – Y. Ha, S. Park (Ewha Womans University), J. Shim (Daegu University), and Y. Lee (Ewha Womans University)
- **91** Electrochemical Impedance Analysis for Corrosion on Current Collecting Electrodes in Dye-sensitised Solar Cells – K. Inoue, I. Shitanda, Y. Hoshi, and M. Itagaki (Tokyo University of Science)
- **92** Preparation of Polymer Nanoparticles Composite Coating Films for Investigation of the Co-Deposition Theory – K. Iwasaki, I. Shitanda, Y. Hoshi, and M. Itagaki (Tokyo University of Science)
- **93** Glancing Angle Sputter-Deposition of Titanium Dioxide Films with Rotating Substrate Holder for Photocatalytic Application – Y. Yasuda, N. Kitahara, and Y. Hoshi (Tokyo Polytechnic University)

- **94** The Synthesis of SnO_2-TiO_2 Core-Shell Nanotubes Using PAN Fiber and Its Cycling Performance for the Anode of Lithium-Ion Batteries – J. Jeun, W. Kim, D. Kim, K. Park, B. Lee, K. Kang, W. Yu, and S. Hong (Seoul National University)
- **95** An InGaP Sub-Wavelength Structure (SWS) Realized by Colloidal Lithography for Solar Cell Applications – D. Kim, S. Eo, and J. Jang (GIST)
- **96** LbL Film with PtNPs as a Sensor of the Dopamine Encapsulated in Liposomes – V. Dos Santos, M. Dos Santos, B. Sandrino, C. De Jesus, J. R. Garcia, S. T. Fujiwara, C. A. Pessôa, and K. Wonhrath (State University of Ponta Grossa)
- **97** Effect of Lateral Size of Reduced Graphite Oxide Nanosheet on the Electrochemical Capacitance – Z. Lei, T. Sakai, and W. Sugimoto (Shinshu University)
- **98** A Model for the Influence of Steel Corrosion Products on Nuclear Fuel Corrosion under Permanent Disposal Conditions – L. Wu (Western University), Y. Beauregard (NOVA Chemicals), Z. Qin, S. Rohani (Western University), and D. W. Shoesmith (University of Western Ontario)
- **99** CO_2 Reduction at Glassy Carbon Electrode in the Presence of Pyridine – J. Agullo, M. Morin, and D. Bélanger (Université du Québec à Montréal)
- **100** Utilizing a Rotating Ring Disk Electrode (RRDE) to Simultaneously Measure Contaminate Species Adsorption effects on Two Different Catalyst Surfaces – J. M. Christ (Colorado School of Mines), K. Neyerlin, H. Wang (National Renewable Energy Laboratory), R. M. Richards (Colorado School of Mines), and H. N. Dinh (National Renewable Energy Laboratory)
- **101** Carbon Deposition and Gasification over Ni-YSZ Cermet during Methane Reforming Reaction – K. Song and J. Jung (Postech)
- **102** Influence of Relaxation Time on the Lifetime of Commercial Lithium-Ion Cells – M. J. Reichert, H. Bremes, S. Passerini, and M. Winter (University of Münster)
- **103** 3-D Electrochemical Impedance Spectroscopy Calculated by Wavelet Transformation -Influence of Scale and Time Parameters on Impedance Spectra- – K. Isobe, Y. Hoshi, I. Shitanda, and M. Itagaki (Tokyo University of Science)
- **104** *In Situ* ATR-IR Analysis of Graphite/ Electrolyte Interface in Li-Ion Batteries – Y. Akita, H. Munakata, and K. Kanamura (Tokyo Metropolitan University)
- **105** Sol-Gel Synthesis of Li_2MnO_3-$LiMO_2$ Cathode with Good Cycle Performance – K. Ando, Y. Jin, T. Nishioka, H. Munakata, and K. Kanamura (Tokyo Metropolitan University)
- **106** Electrochemical Evaluation of $Li_4Ti_5O_{12}$ Single Particle at Various Temperatures – K. Annaka, H. Munakata, and K. Kanamura (Tokyo Metropolitan University)
- **107** 3DOM Polyimide Separator for Rechargeable Lithium Batteries with High Rate Performance – K. Miyahara, Y. Jin, H. Munakata, and K. Kanamura (Tokyo Metropolitan University)
- **108** A Semi-Empirical Model of Ammonia Electrolysis in Comparison to Water Electrolysis – A. Estejab, D. A. Daramola, and G. G. Botte (Ohio University)
- **109** RRDE Studies on Oxygen Reduction Reaction of Pd Single Crystal Electrodes – M. Kawabuchi, T. Wada, M. Shibata, and T. Kondo (Ochanomizu University)
- **110** Synthesis and Characterization of Core-Shell Structured Ni-$Ce_{0.8}Gd_{0.2}O_{1.9}$ SOFC Anodes by Ultrasonic Spray Pyrolysis – C. Lim and K. Lee (Chonbuk National University)
- **111** Broadband Terahertz Antireflection Structure Fabricated By Utilizing Stamping Method – D. Kim (Gwangju Institute of Science and Technology), D. Kim, and J. Jang (GIST)
- **112** Fabrication of GDC Electrolyte Thin Films on NiO-GDC Anode Support by Electrophoretic Deposition for Solid Oxide Fuel Cells – S. Yu and K. Lee (Chonbuk National University)
- **113** Characterization of $Ca_{1-x}La_xTiO_3$ Anode Materials for Hydrocarbon-Fueled Solid Oxide Fuel Cells – J. Koo and K. Lee (Chonbuk National University)
- **114** Design of Ion-gel Electrolytes Using Non-flammable Organoboron Bio-based Polymer as Polymer Support – Y. Yoshinaga and N. Matsumi (Japan Advanced Institute of Science and Technology)
- **115** Enhanced Photocurrent Generation of Porphyrins – Ag Nanoparticles Composite Layers on an Electrode – S. Yagyu, M. Ishizaki, K. Kanaizuka, M. Kurihara, and M. Sakamoto (Yamagata University)
- **116** Electrochemical behavior of Spin-coated Hybrid Thin Film of Prussian-blue Analog Nanoparticles – S. Soma, M. Ishizaki, K. Ono, K. Kanaizuka (Yamagata University), M. Sakamoto, and M. Kurihara (Yamagata University)
- **117** Electrochemical Intercalation of Bis(Fluorosulfonyl)Amide Anion into Graphite – F. Yamane, K. Miyazaki, T. Fukutsuka, and T. Abe (Kyoto University)
- **118** Preparation of Perovskite Type Oxide Thin-Films as Bi-Functional Air Electrodes by Pulsed Laser Deposition Method and Their Electrochemical Properties – Y. Miyahara, K. Miyazaki, T. Fukutsuka, and T. Abe (Kyoto University)
- **119** $MgBr_2$/Ether-Based Electrolyte Solutions for Mg-Rechargeable Batteries – K. Asaka, K. Miyazaki, T. Fukutuka, T. Abe, K. Nihio, and Y. Uchimoto (Kyoto University)
- **120** Electrochemical Properties of $LiCoPO_4$ in the Anion Receptor-Based Organic Electrolyte Solution – T. Nakagawa, K. Miyazaki, T. Fukutsuka, and T. Abe (Kyoto University)
- **121** Anisotropic Anion Conduction of MgAl-CO_3^{2-} Layered Double Hydroxides with Different Cation Ratios – Y. Asada, K. Miyazaki, T. Fukutsuka, and T. Abe (Kyoto University)
- **122** Redox Reaction of Metal Cations on the Surface of $LiCoO_2$ Thin-Film Electrodes – J. Inamoto, K. Miyazaki, T. Fukutsuka, and T. Abe (Kyoto University)
- **123** Electrochemical Behavior of Magnesium Metal in Alkaline Aqueous Solutions – Y. Taniguchi (Graduate School of Engineering, Kyoto University), K. Miyazaki, T. Fukutsuka, and T. Abe (Kyoto University)

- **124** Frequency-Tunable Multicolor Light-Emitting Cell Based on AC-Driven Electrochemiluminescence – M. Nakakomi, T. Nobeshima, K. Nakamura, and N. Kobayashi (Chiba University)
- **125** Electrochemical Properties of Graphite Electrode in Ionic Liquid Containing Bis(Fluorosulfonyl) Amide Anion – K. Ono, K. Miyazaki, T. Fukutsuka, and T. Abe (Kyoto University)
- **126** A Study on Electrochemical Performance of Hard Carbon / $Na_x[Fe_{1/2}Mn_{1/2}]O_2$ Cells as Rechargeable Na-Ion Batteries – M. Kajiyama, N. Yabuuchi (Tokyo University of Science), J. Iwatate (Tokyo Univ. of Science), and S. Komaba (Tokyo University of Science)
- **127** Fabrication of Electroless Cu/CNT Composite Plating Films Containing Different Sized CNTs – T. Osaki and S. Arai (Shinshu University)
- **128** Electrochemical Properties of AZO Films Functionalized with Redox-Active Molecules – H. Kaneko, T. Tsuda, K. Kanaizuka, M. Kurihara, and M. Sakamoto (Yamagata University)
- **129** Fabrication of Silicon Composite Films for Lithium-Ion Batteries by Electrodeposition – T. Kitamura and S. Arai (Shinshu University)
- **130** Molecular Assembly of Porphyrin Derivative on a Substrate by Polymerization Reaction and Its Electrochemical Properties – A. Izumi, M. Ishizaki, K. Kanaizuka, M. Kurihara, and M. Sakamoto (Yamagata University)
- **131** Surface Modification of Vapor Grown Carbon Nanofibers by Plasma Treatment – D. Shimizu (Shinshu University), Y. Suzuki (Shinshu univeristy), M. Endo, and S. Arai (Shinshu University)
- **132** Newly Developed Carbon-Nanocoating of Si Nanoparticles – Y. Sasaki, H. Tabuchi, H. Furukawa, K. Urita, and I. Moriguchi (Nagasaki University)
- **133** Study on the Formation of Self-Assembled Monolayers on Anodized Aluminum – H. Satoh, T. Fujii, E. Tsuji, and H. Habazaki (Hokkaido University)
- **134** Synthesis and Charge-Discharge Property of Si/Carbon Nanocomposites – H. Tabuchi, T. Enjoji, K. Kiyota, Y. Sasaki, K. Urita, H. Yamada, and I. Moriguchi (Nagasaki University)
- **135** Electrochemical Hybrid Capacitor Using Closest-Packed Ferrocene Terminated Monolayer on Carbon Electrode – Y. Sato, T. Kawaguchi, and K. Shimazu (Hokkaido University)
- **136** Electrochemical Properties of Zinc Oxide Electrodes Coated with Anion-Conducting Ionomer in Alkaline Solutions – Y. Lee, K. Miyazaki, T. Fukutsuka, and T. Abe (Kyoto University)
- **137** Field Emission Properties of Nickel/Carbon Nanotube Composite Films Electrodeposited from a Citrate Bath – S. Tanabe and S. Arai (Shinshu University)
- **138** Effects of Interferents on H_2O_2 Quantification by Electrochemical Reduction on IrO_2 Electrodes – M. Ueda, T. Zhang, and M. Morimitsu (Doshisha University)
- **139** Electrochemical Features of Nanoporous Electrodes and Their Applications – J. Han, J. Bae, and T. Chung (Seoul National University)
- **140** All-Solid-State Chloride Ion-Selective Electrodes Using Polycation-Doped Manganese Oxides – T. Akatsuka, C. Suzuki, N. Yabuuchi, and S. Komaba (Tokyo University of Science)
- **141** Development of Titanium Wire-based Dye-sensitized Solar Cells and the Enhancement of the Performance by Surface Plasmon Resonance of Ag Nanoparticles – Y. Kawakami, M. Takeuchi, Y. Horiuchi, and M. Matsuoka (Osaka Prefecture University)
- **142** Study on Deterioration of Electric Double-Layer Capacitor Cells – A. Haruta (Miyazaki – University), Y. Suenaga (Miyazaki University), D. Tashima (University of Miyazaki), T. Kawaji (UD Truks Corporation), and H. Toyama (UD Trucks Corporaion)
- **143** Electrochemical Construction of Pt Nanoparticles As a Catalyst for Oxygen Reduction Reaction – H. Aso, T. Wada, and T. Kondo (Ochanomizu University)
- **144** Segmented Electrode Developed for Complementary Use of Small-Angle Neutron Scattering Measurement – S. Ueda, K. Baba, M. Eguchi, Y. Kobayashi, S. Koizumi (Ibaraki University), and Y. Tsutsumi (FC Development Co., Ltd.,)
- **145** Fundamental Research on Development of Novel Analysis Method for Hyaluronan Production with Use of Human Dermal Fibroblasts – M. Naruoka (Kanagawa Institute of Technology), Y. Nakamura (JUJU Cosmetics Co.), and Y. Iida (Kanagawa Institute of Technology)
- **146** Electrodeposition of Zn-Mg Alloy in Ethylene Glycol-$ZnCl_2$-$MgCl_2$ Non-Aqueous Solution – H. Yamamoto, M. Morishita, T. Miwa, and K. Isono (University of Hyogo)
- **147** Relaxation Structure Analysis for Li Inserted α-Fe_2O_3 – K. Takasu, S. Park, and T. Yao (Kyoto University)
- **148** GroEL Mutant Can Encapsulates Metal Nano Particles in Each Cavity – H. Yoda (Kanagawa Institute of Technology), O. Yamamoto (Yamagata University), and A. Koike-Takeshita (Kanagawa Institute of Technology)
- **149** EIS and CV Characteristics of Pt Cathode Catalyst in PEMFC – S. Kanazawa, E. Tada, A. Nishikata, and T. Tsuru (Tokyo Institute of Technology)
- **150** Pt-Loaded Carbon Nanofilament as an Electrocatalyst for Direct Methanol Fuel Cell – T. Toriyama, K. Nakagawa (Kansai University), T. Ando (National Institute for Materials Science), and H. Oda (Kansai University)
- **151** Fabrication of Sexithiophene/Zr(IV) Hybrid Thin Films and Their Photofunctional Properties – A. Kodaira, T. Harada (Toho University), C. Pac (Toho University, Korea University), H. Moriyama (Toho University), G. Sahara, T. Yui, and O. Ishitani (Tokyo Tech.)
- **152** Corrosion Behavior and Sacrificial Ability of Hot-Dip Al-Mg-Si Coated Steel – K. Chihara, Y. Kyo, E. Tada, A. Nishikata, and T. Tsuru (Tokyo Institute of Technology)
- **153** Morphology of Self-ordered Nano Oxide Coatings for Oxygen and Chlorine Evolution – N. Ohnishi, M. Matsuda, T. Zhang, and M. Morimitsu (Doshisha University)

- **154** Selection of B16 Melanoma Cells by Single Cell Manipulation and Analysis of Tyrosinase Gene Expression and Epigenetic Regulation – M. Hillary, K. Makoto, and Y. Iida (Kanagawa Institute of Technology)
- **155** Co-Electrolysis of CO_2 and H_2O for Syngas Production – S. Nakamura (Tokyo University of Science), Y. Tanaka, K. Sato, K. Nozaki, A. Yamamoto, and T. Kato (National Institute of Advanced Industrial Science and Technology)
- **156** Detailed Observation and Analysis of the Reaction Distribution in $LiFePO_4$ Composite Electrodes – Y. Gogyo, H. Yamashige (Kyoto University), M. Katayama (Ritsumeikan University), Y. Orikasa (Kyoto University), Y. Inada, T. Ota (Ritsumeikan University), H. Arai, Y. Uchimoto, and Z. Ogumi (Kyoto University)
- **157** Metal-Semiconductor-Metal Photodetectors on Flexible Substrats – T. Oh, W. Shin, J. Park, S. Chang, K. Choi, H. Ha, K. Lee, and B. Ju (Korea University)
- **158** Effects of Gas Diffusion Electrodes with Hydrophilic Layer on Cold Start Behavior and Cell Performance of Polymer Membrane Fuel Cells – S. Hirakata, T. Mochizuki, M. Uchida, H. Uchida, and M. Watanabe (University of Yamanashi)
- **159** Surface Oxidization Diamond for Dye-Sensitized Solar Cell – M. Mori, K. Nakagwa (Kansai University), T. Andou (National Institute for Materials Science), and H. Oda (Kansai University)
- **160** Dynamics of Phase Transition in LixFePO4 Using Time-Resolved X-Ray Diffraction – T. Maeda, Y. Koyama, Y. Orikasa, H. Murayama, H. Tanida, H. Arai, E. Matsubara, Y. Uchimoto, and Z. Ogumi (Kyoto University)
- **161** Hydrogen Starvation Tests on PEMFCs Using Segmented Cell Hardware – M. Geymayer, A. Stadlhofer, and V. Hacker (Graz University of Technology)
- **162** Effect of SiO_2 on the Properties of Sulfonated Polyimide and Poly(Arylene Ether) Block Copolymer Membranes – M. Sakamoto, S. Nohara, K. Miyatake, M. Uchida, H. Uchida, and M. Watanabe (University of Yamanashi)
- **163** Electrochemical Quartz Crystal Microbalance Analysis of Degradation Reactions of Pt/C Cathode Catalysts for Polymer Electrolyte Fuel Cells – J. Omura, H. Yano, M. Watanabe, and H. Uchida (University of Yamanashi)
- **164** Relaxation Phase Analysis of Li-Co-O Cathode for Secondary Lithium-ion Battery – S. Nagashima, S. Park, T. Iwai, and T. Yao (Kyoto University)
- **165** Evaluation of Corrosion Resistance of Galvanized Steel under Wet-Dry Cyclic Condition – T. Okazaki, E. Tada, A. Nishikata, and T. Tsuru (Tokyo Institute of Technology)
- **166** The Detection of Odor Vapors, H_2S and CH_3SH, by the Planar-Type Zirconia Sensor – Y. Nagai, M. Mori, and Y. Sadaoka (Ehime University)
- **167** Electrochemical Reaction Mechanism of FeS_2 Cathode Material in $AlCl_3$ – EMIC Ionic Liquids – T. Mori, Y. Orikasa, K. Nakanishi (Kyoto University), T. Ohta (Ritsumeikan University), and Y. Uchimoto (Kyoto University)
- **168** ZrO_2 coating Effect of $LiCoO_2$ Thin-film Model Electrode prepared by PLD – S. Mori (Kyoto University), D. Takamatsu (Office of Society-Academia Collaboration for Innovation, Kyoto University), Y. Orikasa, Y. Koyama, H. Tanida (Kyoto University), T. Uruga (Japan Synchrotron Radiation Research Institute), H. Arai, Z. Ogumi, and Y. Uchimoto (Kyoto University)
- **169** Novel Gel Polymer Electrolytes Based on Ethylene Oxide Containing Block-Copolymers for Lithium-Ion Batteries – M. Schaefer (Institut für Physikalische Chemie WWU Münster), P. Isken (Westfälische Wilhelms-University Münster), M. Winter, S. Passerini (University of Münster), and A. Lex-Balducci (Westfälische Wilhelms-University Münster)
- **170** Phase Transformation Mechanism during Cycling of Li_2FeSiO_4 – T. N. Masese, H. Arai, Y. Orikasa, T. Ina, C. Tassel (Kyoto University), K. Nakanishi, T. Ohta (Ritsumeikan University), K. Hiroshi, Y. Uchimoto, and Z. Ogumi (Kyoto University)
- **171** *In Situ* XAS Study on Effect of Platinum Catalyst on Cathodic Reaction in Nonaqueous Li – Air Batteries – J. Oyama (Graduate School of Human and Environmental Studies, Kyoto University), Y. Orikasa (Kyoto University), and Y. Uchimoto (Graduate School of Human and Environmental Studies, Kyoto University)
- **172** Bioelectrocatalytic Conversion of Atmospheric CO_2 into Extracellular Organic compounds by Acidithiobacillus ferrooxidans – T. Ishii, T. Mogi (University of tokyo), K. Hashimoto, and R. Nakamura (The University of Tokyo)
- **173** Newly Found Electrochemical Oscillations during Reduction of Nitrate ions – S. Yamamoto, Y. Mukouyama, R. Nakazato (Tokyo Denki University), S. Nakanishi (The University of Tokyo), and H. Okamoto (Tokyo Denki University)
- **174** Electrochemical and Surface Properties of Mg – Li Alloys – H. Endo, Y. Sugawara, I. Muto, and N. Hara (Tohoku University)
- **175** Evaluation of Influence of Activated Carbon on Plant Growth – K. Oino and Y. Iida (Kanagawa Institute of Technology)
- **176** Relaxation Structure Analysis for Li Inserted $LiNi_{1/3}Mn_{1/3}Co_{1/3}O_2$ Cathode Material – I. Seo, S. Park, and T. Yao (Kyoto University)
- **177** Performance Evaluation of an Anode-supported Honeycomb Solid Oxide Fuel Cell – A. Fukushima, H. Nakajima, and T. Kitahara (Kyushu University)
- **178** Synthesis of Co-Doped LaP_3O_9 by Precipitation in Phosphoric Acid Solutions – Y. Adachi, N. Hatada, T. Onishi, A. Kuramitsu, and T. Uda (Kyoto University)
- **179** Effect of Particle Size on the Relaxation of $LiFePO_4$ Cathode – S. Park, K. Kameyama, and T. Yao (Kyoto University)
- **180** Electrical Performance Change by the Difference in the Production Methods of the Anode for SOFC – G. Watanabe, N. Takahasi, T. Takatsuka, and H. Fukunaga (Shinshu University)

- **181** Structure and Electrochemical Properties of $La_2Li_{2x}(CO)_{1-x}O_4$ with Layered Structure – M. Iqbal (Tokyo Institute of Technology), G. Kobayashi (Kanagawa University), H. Masaaki, R. Kanno (Tokyo Institute of Technology), and M. Yonemura (High Energy Accelerator Research Organization)
- **182** Li-Air Battery Using Stabilized Acetonitrile Electrolyte – K. Furukawa, Y. Yamada, M. Yaegashi, F. Li (The University of Tokyo), H. Zhou (National Institute of Advanced Industrial Science and Technology), and A. Yamada (The University of Tokyo)
- **183** Control of Growth Density of Multi-walled Carbon Nanotubes Array and Its Gas Sensing Properties – M. Omae (Ritsumeikan University), T. Hashishin (Joining and Welding Research Institute, Osaka University), K. Kojima, and J. Tamaki (Ritsumeikan University)
- **184** Electrochemical Stability of Au sub-ML on Pt/QC Electrode – T. KOBAYASHI, A. Kawamura, K. Katakura, and H. YAMADA (Nara National College of Technology)
- **185** A Novel Gas and Flow Sensor of Penetrating a Porous Polypyrrole Nanofiber Mat – T. Jun and Y. Kim (hanyang University)
- **186** Hydrogen in Platinum Films Electrodeposited from Dinitorosulfatoplatinate Solution – N. Hisanaga (Graduate school of Engineering, University of Hyogo), N. Fukumuro, S. Yae, and H. Matsuda (University of Hyogo)
- **187** Evaluation of Stress Condition of Operated Anode Supported-Type SOFC under Operating Conditions Based on Raman Scattering Spectroscopy – S. Onodera, M. Nagai, F. Iguchi, N. Sata, T. Kawada, and H. Yugami (Tohoku University)
- **188** Development of Low-Temperature Operating Micro-SOFC with Perovskite-Type Proton Conductive Electrolytes – Y. Inagaki, F. Iguchi, K. Kubota, S. Tanaka, N. Sata, M. Esashi, and H. Yugami (Tohoku University)
- **189** Study on Phase Diagram of Li-Rich Layered $Li[Li_{0.2}Ni_{0.18}Co_{0.03}Mn_{0.58}]O_2$ – Y. Irii, G. Kobayashi, T. Kataoka, T. Ikehara, F. Matsumoto (Kanagawa University), A. Ito (Nissan Motor Co., Ltd.), Y. Ohsawa, M. Hatano (Nissan Motor Co., Ltd), and Y. Sato (Kanagawa University)
- **190** Preparation and Photoluminescence Properties of Sn/Mn Phosphate Zirconium Phosphor – T. Nishizaki, S. Takase, and Y. Shimizu (Kyushu Institute of Technology)
- **191** Synthesis and Electrochemical Properties of Organogel Electrolytes Based on Low Molecular Weight Molecules – M. Miura, A. Iuchi, Y. Morita, K. Kasatani, and H. Okamoto (Yamaguchi University)
- **192** Electrochemical Characterization of Lanthanum Calcium Titanium Manganite as Potential Dual Electrode Material in Symmetrical Solid Oxide Fuel Cell – H. Yoon, J. Zou, and J. Chung (Pohang University of Science and Technology)
- **193** Depth-Resolved XAFS Study on Surface Segregation of $La_{1-x}Sr_xCoO_{3-d}$ Electrode – S. Sakou, Y. Orikasa (Kyoto University), E. J.Crumlin (Mechanical Engineering Department,Massachusetts Institute of Technology), Y. Shao-Horn (Massachusetts Institute of Technology), K. Amezawa (Tohoku University), and Y. Uchimoto (Kyoto University)
- **194** Synthesis and Physical Properties of Ionic Liquid Gels Based on Novel Low Molecular Weight Gelators – T. Yoshida, T. Hirakawa, T. Nakamura, Y. Yamada, H. Tatsuno, Y. Morita, and H. Okamoto (Yamaguchi University)
- **195** Single Crystal Silicon based Sensor-Transistor Circuit by Thin Film Transfer Process – S. Jeong, T. Oh, S. Chang, K. Choi, K. Lee, Y. Kim, H. Ha, and B. Ju (Korea University)
- **196** The effect of Au Nanoparticle on Metal Organic Semiconductor Field effect Transistor on Plastic Substrate by Transfer Method – H. Ha, S. Jeong, T. Oh, S. Chang, Y. Kim, K. Lee, K. Choi, and B. Ju (Korea University)
- **197** Increasing Both Anodic and Cathodic Stability of Ether-Based Electrolyte for Li-Air and Li-Ion Batteries – M. Yaegashi, Y. Yamada, S. Nishimura (The University of Tokyo), T. Abe (Kyoto University), and A. Yamada (The University of Tokyo)
- **198** Solvent Extraction Using Microchannel System for High Purification of Silica – N. Matsuo, Y. Matsui, Y. Fukunaka, and T. Homma (Waseda University)
- **199** Control of the Morphology of Si Nanostructure Using Single-Step Metal Assisted Etching Method – T. Yamaguchi, T. Shimizu, F. Inoue, C. Wang, S. Otsuka, Y. Tada (Kansai University), M. Inada (Kansai Univeristy), and S. Shingubara (Kansai University)
- **200** Maintaining Proper Hardness and Frictional Properties as a Noncyanide Gold Bath is Aged – J. R. Pillars (Sandis National Laboratories) and W. Yelton (Sandia National Laboratories)
- **201** Polyoxometalates in Asymmetric Supercapacitors – J. Suarez-Guevara, V. Ruiz, and P. Gomez-Romero (CIN2-CSIC)
- **202** Electrochemical Construction and Characterizations of P-Copper(I) Oxide/N-Zinc Oxide Nano-Pillar Photovoltaic Device – T. Ohta, M. Kondo, J. Sasano (Toyohashi University of Technology), T. Shinagawa (Osaka Municipal Technical Reserch Institute), T. Pauporté (Centre National de la Recherche Scientifique), and M. Izaki (Toyohashi University of Technology)
- **203** A Kinetic Study of Hydroxide, Bicarbonate and Carbonate Ion Inter-Conversion in Anion Exchange Membranes for Fuel Cells Using FT-IR Microscope – T. P. Pandey, J. L. Horan, M. Liberatore, and A. Herring (Colorado School of Mines)
- **204** Effect of Dissolved Gas in an Ionic Liquid Electrolyte for Lithium and Lithium/Sodium Metal Anode – J. K. Stark and P. Kohl (Georgia Institute of Technology)

- **205** Effect of Doping on the Ionic Conductivity and Bonding of Reactively Sputter Deposited Lithium Phosphorus Oxynitride Thin Films – P. Mani, V. Singh, M. Real-Robert, S. Duranceau, S. Seal, and K. Coffey (University of Central Florida)
- **206** Room Temperature Fabrication of Crystalline Germanium Nanowires by Electrochemical Deposition and its Application as Li Ion Battery Anode – J. Gu, S. Collins, A. Carim, X. Hao, B. Bartlett, and S. Maldonado (University of Michigan)
- **207** Wet-Chemical Preparation of $Li_{1.5}A_{10.5}Ti_{1.5}(PO_4)_3$ Lithium Ionic Ceramic Thin-Films – C. Kubo, R. Aono, S. Takase, and Y. Shimizu (Kyushu Institute of Technology)
- **208** Synthesis of Pt-Ir Catalysts by Coelectrodeposition: Application to Ammonia Electrooxidation in Alkaline Media – S. Le Vot (Université du Québec à Montréal), L. Roué (INRS- Énergie Matériaux et Télécommunications), and D. Bélanger (Université du Québec à Montréal)
- **209** Direct Evaluation of Oxygen Chemical Potential in an SOFC Cathode by *In Situ* Micro XAS – Y. Fujimaki, H. Watanabe, Y. Kimura, K. Amezawa (Tohoku University), Y. Terada (JASRI), S. Hashimoto, and T. Kawada (Tohoku University)
- **210** An Entirely Printed, Rechargeable Zinc-based Battery – Z. Wang, B. Kim, J. W. Evans, and P. K. Wright (University of California at Berkeley)
- **211** The effect of the Deposition Conditions on the Electrodeposition of Si Nanopillars in TMHATFSI – Y. Ishibashi, T. Akiyoshi, J. Komadina, Y. Fukunaka, and T. Homma (Waseda University)
- **212** Construction of Zinc Oxide/Phthalocyanine Hybrid Photovoltaic Device – R. Chizaki, K. Murata, J. Sasano (Toyohashi University of Technology), T. Shinagawa (Osaka Municipal Technical Reserch Institute), S. Watase (Osaka Municipal Technical Research Institute), and M. Izaki (Toyohashi University of Technology)
- **213** Novel Surface Modification Technique Based on the Liquid Phase Deposition Using Solid Fluorine Scavenger – T. Hasegawa (Graduate School of Engineering, Kobe University), S. Matsumoto, and M. Mizuhata (Kobe University)
- **214** Electro-Oxidation of CO on Pt in Alkaline Media Studied by *In Situ* Surface-Enhanced Infrared Absorption Spectroscopy – J. Joo, T. Uchida (Hokkaido University), M. T. Koper (Leiden University), and M. Osawa (Hokkaido University)
- **215** Ultra-Strong Silicon-Coated Carbon Nanotube Fabric as Multi-Functional Lithium Ion Battery Anodes – K. Evanoff, J. Benson (Georgia Tech), M. Schauer (Nanocomp), I. Kovalenko (Georgia Institute of Technology), D. Lashmore (Nanocomp), J. Ready (Georgia Tech), and G. Y. Yushin (Georgia Institute of Technology)
- **216** Modification effects on Structural Changes of $LiMn_2O_4$ Electrode during the Electrochemical Process – K. Suzuki, K. Kim, S. Taminato, M. Komo, A. Hagiwara (Tokyo Institute of Technology), J. Son (Japan Synchrotron Radiation Research Institute), T. Inami, H. Konishi, K. Tamura, J. Mizuki (Japan Atomic Energy Agency), M. Hirayama, and R. Kanno (Tokyo Institute of Technology)
- **217** Variation of Crack Voltage in Anodic Aluminum Oxide/Aluminum Sheet for High Power LED Applications – H. Lee, H. Shin, and H. Lee (Korea Institute of Industrial Technology)
- **218** Visualization of Bubble Behavior in Water Electrolyzer with High-Speed Camera – Y. Maeda, S. Tsukamoto, and K. Ito (Kyushu University)
- **219** Memory Effect on Charge Storage in Layer-By-Layer Films of Rod-Shaped Multinuclear Complexes on Electrodes – T. Suzuki, T. Ryo, and M. Haga (Chuo University)
- **220** Nanoporous α-Alumina Membrane with High Chemical Resistance Prepared by Anodizing – T. Masuda, H. Asoh, and S. Ono (Kogakuin University)
- **221** Biocompatibility and Corrosion Resistance of Magnesium Coated with Hydroxyapatite using Alternative Immersion Method – D. Kobayashi, H. Asoh, and S. Ono (Kogakuin University)
- **222** Application of Argon (70) + Nitrogen (30) Plasma Coagulation in Swine Mucosa – K. K. Ou and M. M. Colley (Taipei Medical University)
- **223** Preparation of Flexible Micro-Glucose Sensor – T. Toba, N. Shiba, H. Matsuki, K. Edagawa, and M. Yasuzawa (University of Tokushima)
- **224** Preparation of Nonspecific Adsorption Eliminating Surface Using Perhydropolysilazane – N. Shinsuke, K. Ikebata, K. Rikitake, S. Nomoto, T. Koike (The University of Tokushima), and M. Yasuzawa (University of Tokushima)
- **225** Stability of Different Bis-Terpyridine Metal Cations under Alkaline Solution – Y. Liu, M. Liberatore, and A. Herring (Colorado School of Mines)
- **226** Physical and Electrolytic Properties of Partially Fluorinated Chain Ethers as Solvents for Lithium Secondary Batteries – T. Satoh, N. Nambu (Tokyo Polytechnic University), M. Takehara, M. Ue (Mitsubishi Chemical Group Science and Technology Research Center, Inc.), and Y. Sasaki (Tokyo Polytechnic University)
- **227** Positive-Tone, Aqueous-Developable, Polynorbornene Dielectric – B. K. Mueller, A. Grillo (Georgia Institute of Technology), E. Elce (Promerus LLC), and P. Kohl (Georgia Institute of Technology)
- **228** Fabrication of Nano-Structured (La,Sr)(Zn,Fe) O_3 Cathodes for Intermediate-Temperature SOFC – S. Hwang, J. Jang, G. Choi, S. Lee, O. Kwon, D. Lee (Daegu Gyeongbuk Institute of Science & Technology), S. Mukherjee, and S. Park (University of Louisville)
- **229** Shape Selective Formation and Growth of High Index Polyhedral Gold Nanoparticles and Their Activity to Oxygen Evolution – B. C. Solomon, F. Ke, and X. Zhou (University of South Carolina)
- **230** Study of Optical and Structural Properties of SRSN Fabricated by Cat-CVD below 200 °C – S. Kang, K. Keum, J. Park, T. Song, J. Kim, and W. Hong (University of Seoul)
- **231** The Structure, Thermal Expansion Property and Polymorphism of Solid Solution $Ho_2Mo_{3-x}W_xO_{12}$ – X. Liu, G. Yu (Shanghai Institute of Technical Physics), and Y. Liu (China Institute of Atomic Energies)

A2 Nanotechnology General Session

All Divisions / New Technology Subcommittee

313C, Level 3, Hawaii Convention Center

Nanoparticles, Nanowires and Nanocomposite – 08:00 – 12:00
Co-Chairs: Guoliang Xiao and Fanglin (Frank) Chen

08:00 **232** Growth of Pt Subnano-Clusters on Surface Limited Areas of Prussian-Blue Nanoparticles – M. Ishizaki, S. Tsuruta, K. Kananizuka, M. Kurihara, and M. Sakamoto (Yamagata University)

08:20 **233** Novel Synthesis Method of Copper Nanoparticles by Controlling Metal Complexes in Aqueous Solution – S. Yokoyama, H. Takahashi, and K. Tohji (Tohoku University)

08:40 **234** Characterization Attributes of Metal Oxide Nanocomposites – M. Hockey, Q. Lin, and E. Calderas (Brewer Science Inc.)

09:00 **235** Fabrication and Optical Characteristics of Ordered Crystalline ZrO_2 Nanowires and Nanoporous Films on Glass – S. Chu, Y. Hitoshi (Iwate University), H. Segawa, S. Inoue, and K. Wada (National Institute for Materials Science)

09:20 **236** Electrochemical Synthesis of Crystalline and Compositionally-Uniform $Bi_{1-x}Sb_x$ Nanowire Arrays – W. Yelton, S. Limmer, M. P. Siegal, D. Medlin, J. L. Lensch-Falk, M. Hekmaky, D. L. Overmyer, and J. M. Rivera (Sandia National Laboratories)

09:40 Intermission (20 Minutes)

10:00 **237** Effects of Thermal Annealing on Conducting ZnO Nanowires: Conductor-To-Semiconductor Transition and Its Device Applications – P. Jeon, Y. Lee, R. Ha, H. Choi, and S. Im (Yonsei University)

10:20 **238** Oxygen Activation on Nanometer-Size Gold Nanoparticles – A. T. Staykov, K. Yoshizawa, and T. Ishihara (Kyushu University)

10:40 **239** Synthesis of Tailored Intermetallic Nanoparticles with Core-Shell Structure by Electrochemical Selective Phase Dissolution – G. Pigozzi (EMPA Swiss Federal Laboratories for Materials Science and Technology), D. Mukherji (Technical University Braunschweig), and P. Schmutz (EMPA Swiss Federal Laboratories for Materials Science and Technology)

11:00 **240** Annealing-Induced Interfacial Fracture Energy of Silver Nanoparticle Films on Substrate for Reliable Printed Electronics – I. Lee, S. Kim, J. Yun, I. Park, and T. Kim (Kaist)

11:20 **241** Atomistic Simulation Studies on Oxidation of Metal Nanoparticles – R. Subbaraman, S. A. Deshmukh, and S. Sankaranarayanan (Argonne National Laboratory)

11:40 **242** Photoinduced Spectral and Morphological Changes of Single Plasmonic Silver Nanoparticles on TiO_2: Towards Single Particle Photochromism – T. Tatsuma and I. Tanabe (University of Tokyo)

Characterization of Nanomaterials – 14:00 – 16:00
Co-Chairs: Fanglin (Frank) Chen and Sirikanda Nuansaeng

14:00 **243** Electooptic Study of Charge Carriers in Aligned Liquid Crystalline Polymers Transistors via Polarized Charge Modulation Spectroscopy – M. Lee (Kookmin University), Z. Chen (Université Aix-Marseille III), J. Lee (Kookmin University), and H. Sirringhaus (University of Cambridge)

14:20 **244** Use of Förster Resonance Energy Transfer (FRET) as a New Characterization Method for the Interface in Sustainable Nanocomposites – J. W. Gilman, M. Zammarano (National Institute of Standards and Technology), P. H. Maupin (U.S. Department of Energy), L. Sung, E. McCarthy, Y. S. Kim (National Institute of Standards and Technology), D. Fox (American University), A. J. Berro, and I. Sacui (National Institute of Standards and Technology)

14:40 **245** Nanoimaging and Analysis of Localized Surface Plasmon-Induced Charge Separation and Application to Versatile Photochromism – E. Kazuma (The University of Tokyo) and T. Tatsuma (University of Tokyo)

15:00 **246** Characterization of TiO_2 Particles Irradiated with N_2 Plasma by Newly Developed Plasma-Treatment System – K. Matsubara, M. Inoue, Y. Honda, and T. Abe (University of Toyama)

15:20 **247** Mapping of Electrochemical Interfaces at Nanoscale Dimensions Using Atom Probe Tomography – A. C. Hillier and Y. Zhang (Iowa State University)

15:40 **248** Measurements of Hydrogen Solubility in PdCu Thin Films – J. Galipaud (INRS- Énergie Matériaux et Télécommunications), M. H. Martin (INRS-EMT), L. Roué, and D. Guay (INRS-Énergie Matériaux et Télécommunications)

B1 Batteries and Energy Technology Joint General Session – In Honor of James McBreen

Battery / Energy Technology

Coral 1, Mid-Pacific Conference Center, Hilton Hawaiian Village

Li Battery Cell – 08:00 – 12:20
Co-Chairs: Sanjeev Mukerjee and Manickam Minakshi

08:00 Memory of James McBreen (20 Minutes)

08:20 **320** A Wonderful Life Dedicated to Energy Research In Memery of James McBreen – X. Yang, K. Nam (Brookhaven National Laboratory), S. Mukerjee (Northeastern University), M. Balasubramanian (Argonne National Laboratory), W. Yoon (Sungkyunkwan University), and K. Chung (Korea Institute of Science and Technology)

09:00 **321** Recent Advances in Neutron Imaging for Battery Characterization – D. S. Hussey, J. Kahn, O. Zilcha, D. Jacobson (National Institute of Standards and Technology), B. Khaykovich (Massachusetts Institute of Technology), M. V. Gubarev (NASA), J. Gagliardo, and J. Owejan (General Motors Electrochemical Energy Research Laboratory)

09:20 **322** Application of Synchrotron-Based X-Ray Techniques to Study Thermal Behavior of Electrode Materials for Lithium Rechargeable Batteries – W. Yoon (Sungkyunkwan University), K. Nam (Brookhaven National Laboratory), K. Chung (Korea Institute of Science and Technology), M. Balasubramanian (Argonne National Laboratory), D. Jang (Sungkyunkwan University), J. Hanson, and X. Yang (Brookhaven National Laboratory)

09:40 Intermission (20 Minutes)

10:00 **323** Solid-State Batteries: A Fifty Year Perspective – B. B. Owens and O. Yamamoto (Mie University)

10:20 **324** Rechargeable Lithium Battery Electrodes Using a Multifunctional Polymer Binder – A. E. Javier, S. N. Patel (University of California – Berkeley), and N. P. Balsara (Lawrence Berkeley National Laboratory)

10:40 **325** An Empiric Approach to the Estimation of State of Charge of Lithium Cells and Range of an Electric Vehicle – G. Davolio, R. Giovanardi (Università di Modena e Reggio Emilia), and C. Lanciotti (KEMET Electronics Italia)

11:00 **326** Designing Advanced Hybrid Materials for Rechargeable Lithium Batteries – Y. Guo (Chinese Academy of Sciences)

11:20 **327** Substation Installations of Electrovaya's MWh-Scale Lithium-Ion SuperPolymer Batteries for Smart Grid Applications – R. DasGupta (Electrovaya Inc.)

11:40 **328** Nanostructured Composites for Energy Storage Applications – D. Wang, S. Chen, Z. Song, T. Xu, J. Song, R. Yi, F. Dai, and M. Gordin (The Pennsylvania State University)

12:00 **329** Polymer Gel Electrolytes for Lithium-Ion Batteries – M. Gnanavel, M. Patel, and A. J. Bhattacharyya (Indian Institute of Science)

Coral 2, Mid-Pacific Conference Center, Hilton Hawaiian Village

Li Battery Cathodes – 08:00 – 12:00
Co-Chairs: Hajime Arai and A. Manivannan

08:00 **330** Nanostructured β-Li_3PS_4 for All-Solid Lithium-Sulfur Batteries – C. Liang, Z. Lin, Z. Liu, N. J. Dudney, A. J. Rondinone, and E. Payzant (Oak Ridge National Laboratory)

08:20 **331** Kinetically Asymmetric Reaction Pathways on Charging and Discharging $LiNi_{0.5}Mn_{1.5}O_4$ Electrodes – K. Sato, H. Arai, Y. Orikasa, H. Murayama, Y. Koyama, Y. Uchimoto, and Z. Ogumi (Kyoto University)

08:40 **332** High-Capacity $0.4Li_2MnO_3 \cdot 0.6LiNi_{2/3}Mn_{1/3}O_2$ with Excellent Cyclability for Lithium-Ion Batteries – Y. Jiang, Z. Yang, and Y. Huang (Huazhong University of Science and Technology)

09:00 **333** Fabrication of Macroporous Li_2FeSiO_4/Carbon Monoliths for a Lithium-Ion Battery – G. Hasegawa, M. Sannohe, K. Kanamori, K. Nakanishi, and T. Abe (Kyoto University)

09:20 **334** $Ag_xV_yO_zPO_4$: Silver Vanadium Phosphorous Oxides as Cathode Materials in Lithium Batteries – E. S. Takeuchi, A. C. Marschilok, and K. J. Takeuchi (Stony Brook University)

09:40 Intermission (20 Minutes)

10:00 **335** Selenium and Selenium Sulfide − A New Class of Positive Electrode Material for Room Temperature Lithium and Sodium Rechargeable Batteries – A. Abouimrane, D. Dambournet, K. W. Chapman, P. J. Chupas, W. Weng, Y. Cui, H. El Tayeb, and K. Amine (Argonne National Laboratory)

10:20 **336** Open Framework Electrodes for Stationary Storage Devices – C. D. Wessells, M. Pasta, R. A. Huggins, and Y. Cui (Stanford University)

10:40 **337** Solid State Lithium Sulfur Batteries Using a Nanostructured Block Copolymer Electrolyte – A. A. Teran (University of California, Berkeley) and N. P. Balsara (Lawrence Berkeley National Laboratory)

11:00 **338** Spherical Carbon/Sulfur Composite Cathodes for Rechargeable Lithium Batteries – M. A. Loth, F. Rogers, R. Chen, C. Swartz, U. Graham, and S. M. Lipka (University of Kentucky)

11:20 **339** SnS_2-Graphene Nanocomposite for Advanced Lithium-Ion Battery – L. Ji, H. L. Xin, T. R. Kuykendall, S. Wu, H. Zheng, M. Rao, E. J. Cairns, V. Battaglia, and Y. Zhang (Lawrence Berkeley National Laboratory)

11:40 **340** V_2O_5 Network Structure as Cathode for Lithium-Ion Batteries – Y. Xu, M. Dunwell, and H. Luo (New Mexico State University)

Coral 1, Mid-Pacific Conference Center, Hilton Hawaiian Village

Li Battery Anodes – 14:00 – 16:00
Co-Chairs: A. K. Shukla and V. Battaglia

14:00 **341** Enhancement of Li Insertion Capacity of Carbon Anode on the Basis of Faradaic Adsorption Combined with Nano-Ionics Mechanism – T. Takamura (Harbin Institute of Technology), J. Suzuki, K. Sumiya, and K. Sekine (Rikkyo University)

14:20 **342** Microwave Synthesis of Graphene/Sn Nanocomposite Anodes for Lithium-Ion Batteries – F. R. Beck, R. Epur (University of Pittsburgh), A. Manivannan (U.S. Department of Energy), and P. N. Kumta (University of Pittsburgh)

14:40 **343** Understanding Cycle Life Failure Mechansims in Graphite-Silicon Alloy Composite Electrodes by Electrochemical Calorimetry – L. J. Krause (3M Corporate Research Laboratory), L. Liu, L. Jensen (3M Co.), V. L. Chevrier (3M Corporate Research Laboratory), and J. Singh (3M Co.)

15:00 **344** Tough Solid Composite Electrolytes to Enable Lithium Metal Anodes – W. E. Tenhaeff, K. A. Perry (Oak Ridge National Laboratory), E. Herbert (The University of Tennessee), S. Kalnaus, and N. J. Dudney (Oak Ridge National Laboratory)

15:20 **345** Study of Conversion Reactions in NiO Using Transmission Electron Microscopy and Electron Energy Loss Spectroscopy – A. K. Shukla, U. Boesenberg, and J. Cabana (Lawrence Berkeley National Laboratory)

15:40 **346** Electrochemical Versitility of Carbon for Energy Storage Application – L. A. Riley, H. Constantino, and A. Feaver (EnerG2)

Coral 2, Mid-Pacific Conference Center, Hilton Hawaiian Village

Electrolyzer – 14:00 – 16:00
Co-Chairs: G. Botte and Kathy Ayers

14:00 **347** Combined Experimental and Theoretical Study of Nitrogen Reduction on Novel Mo-N Catalyst Material – I. Matanovic, K. Armstrong, L. Daemon (Los Alamos National Laboratory), J. Eckert (University of South Florida), F. H. Garzon, A. H. Mueller, and N. J. Henson (Los Alamos National Laboratory)

14:20 **348** Challenges in Water Electrolysis and Its Development Potential as a Key Technology for Renewable Energies – J. Mergel (Forschungszentrum Jülich) and D. Stolten (Forschungszentrum Jülich GmbH)

14:40 **349** Electrochemical Modeling of Anode Supported Solid Oxide Electrolyzer Cells (SOEC) in Electrolysis of Carbon Dioxide – J. Njodzefon (Karlsruhe Institute of Technology), A. Weber (Karlsruher Institut für Technologie), and E. Ivers-Tiffée (Karlsruhe Institute of Technology)

15:00 **350** Novel Fluorine Doped Transition Metal Oxide ($Ru_xSn_{1-x}O_2$:F) Oxygen Evolution Electro-Catalysts for Hydrogen Generation from PEM Based Water Electrolysis – K. Kadakia, M. Datta, O. Velikokhatnyi, and P. N. Kumta (University of Pittsburgh)

15:20 **351** Nanostructured Nickel Hydroxides for Urea Electrolysis – D. Wang, W. Yan, S. Vijapur, and G. G. Botte (Ohio University)

15:40 **352** Synthesis of Active Fibrous Perovskite Catalyst and Its Application for Hydrogen Production – Y. Jeon, D. Park, M. Park, G. Lee (Yonsei University), J. Park (Kyushu University), and Y. Shul (Yonsei University)

B2 Electrochemical Capacitors

Battery / Physical and Analytical Electrochemistry
South Pacific 4, Mid-Pacific Conference Center, Hilton Hawaiian Village

Pseudocapacitance I – 08:00 – 09:40
Co-Chairs: J. Long and W. Sugimoto

08:00 **487** A Critical View on Graphene-Metal Oxide Based Electrochemical Supercapacitors – P. Gao (Institut Charles Gerhardt Montpellier), S. Baek, N. Pinna (Seoul National University), F. Moser, T. Brousse (University of Nantes), and F. Favier (Institut Charles Gerhardt Montpellier)

08:40 **488** Tuning the Electrolytic Manganese Oxide/ Graphene Oxide Nanocomposites for High-Energy Asymmetric Electrochemical Capacitors in Aqueous Electrolytes – K. I. Ozoemena (Council for Scientific and Industrial Research), C. J. Jafta (CSIR), M. K. Mathe (Council for Scientific and Industrial Research), and S. Chen (University of California)

09:00 **489** Pseudocapacitive Behavior of Hierarchical Porous Carbide-Derived Carbon with Integrated Niobium Pentoxide Nanoparticles – V. Presser (Drexel University), E. Perre (University of California), M. Lukatskaya (Drexel University), B. Dunn (University of California), and Y. Gogotsi (Drexel University)

09:20 **490** MnO_2/Carbon Nanocomposite Electrode Prepared Via Molecular Bridging – C. Ramirez Castro (University of Nantes), R. Retoux (Université de Caen Basse-Normandie), A. Morel, O. Crosnier, L. Athouël, P. Guillemet, F. Moser, C. Martin (University of Nantes), D. Bélanger (Université du Québec à Montréal), and T. Brousse (University of Nantes)

Pseudocapacitance II – 10:00 – 12:00
Co-Chairs: F. Favier and J. M. Ko

10:00 **491** Hydrous Ruthenium Oxide: A Pseudocapacitance Champ with Lessons of Relevance for the Redesign of Energy-Storage Architectures – D. R. Rolison (U.S. Naval Research Laboratory)

10:40 **492** An Investigation of Nanostructured Thin Film α-MoO_3 Based Supercapacitor Electrodes in an Aqueous Electrolyte – B. Mendoza Sanchez (University of Oxford), T. Brousse, C. Ramirez Castro (University of Nantes), V. Nicolosi, and P. Grant (University of Oxford)

11:00 **493** Kinetic and Mass Transport Phenomena in Different Phases of Manganese Dioxide for Application in Electrochemical Capacitors – M. Dupont and S. W. Donne (University of Newcastle)

11:20 **494** Transition Metal Nitrides Thin Films for Supercapacitor Applications – S. Bouhtiyya (Université de Lorraine), R. Lucio-Porto, J. Ducros (Université de Nantes), P. Boulet, F. Capon (Université de Lorraine), T. Brousse (University of Nantes), and J. Pierson (Université de Lorraine)

11:40 **495** New Developments in Colloidal Fabrication of Manganese Dioxide-Carbon Nanotube Electrodes of Supercapacitors – I. Zhitomirsky (McMaster University)

Pseudocapacitance III – 14:00 – 18:00
Co-Chairs: S.-G. Park and A. Balducci

14:00 **496** Research on Conducting Polymer/Carbon Composite Supercapacitors: Toward Enhanced Cycle Stability and Power Performance – N. N. Wu and Y. Weng (National Taiwan University)

14:40 **497** Polyaniline-MnO_2 Nanocomposite Supercapacitor Electrodes Prepared by Galvanic Pulse Polymerization – G. Pandey and A. Rastogi (Binghamton University (SUNY))

15:00 **498** Electrochemical Codeposition of Polyaniline and Tungsten Oxide for Supercapacitor – B. Zou and X. Liu (Northestern University)

15:20 **499** Aqueous Hybrid Capacitor Based on Doping/ Dedoping of Lithium- Ion into Conducting Polymer – J. Ahn (Korea Institute of Industrial Technology), Y. Shul (Yonsei University), and H. Kim (Korea Institute of Industrial Technology)

15:40 **500** Binder Free Thick Electrodes of Polyaniline Nanofibers/ Multiwalled Carbon Nanotubes – M. Hyder, S. Lee, Y. Shao-Horn, and P. Hammond (Massachusetts Institute of Technology)

B4 Intercalation Compounds for Rechargeable Batteries

Battery

South Pacific 2, Mid-Pacific Conference Center, Hilton Hawaiian Village

Cathode I – 08:00 – 12:25
Co-Chairs: Christopher Johnson and Shirley Meng

08:00 Introductory Remarks (5 Minutes)

08:05 **619** Iron and Manganese Based Cathode Materials for Electrochemical Energy Storage – K. J. Takeuchi, A. C. Marschilok, and E. S. Takeuchi (Stony Brook University)

08:25 **620** Electrochemical and Structural Properties of Li-Rich Layered Cathode Material $Li_{1.2}Ni_{0.2}Mn_{0.6}O_2$ – T. Sasakawa, Y. Harada, H. Inagaki, N. Takami (Toshiba Corporation), N. Kitamura, and Y. Idemoto (Tokyo University of Science)

08:45 **621** Electrochemical Property of Nano Size Multiple Transition Metal Oxides Synthesized from Layered Double Hydroxide – N. Sonoyama, S. Hayashi, T. Toba, and Z. Quan (Nagoya Institute of Technology)

09:05 **622** Ion-Exchange Synthesis and Intercalation Process of $Li_{1.05}Na_{0.02}Ni_{0.21}Mn_{0.63}O_2$ Cathodes for Li-Ion Batteries – M. Slater, S. Rood, D. Kim, S. Kang, E. Lee, V. Maroni, D. Bass (Argonne National Laboratory), A. DeWahl, S. Hackney (Michigan Technological University), and C. S. Johnson (Argonne National Laboratory)

09:45 Intermission (20 Minutes)

10:05 **623** Li_2MnO_3-Based Positive Electrode Materials; Materials Design, Synthesis, and Structural Stability – N. Yabuuchi, Y. Aoki, R. Hara, and S. Komaba (Tokyo University of Science)

10:45 **624** Change of Local, Average and Electronic Structures, and Property by Heat-Treatment under Vacuum Reducing Condition and Charge-Discharge Process in $Li_{1.2}Mn_{0.567}Ni_{0.167}Co_{0.067}O_2$ – Y. Idemoto, T. Kashima, and N. Kitamura (Tokyo University of Science)

11:05 **625** Surface Control and Multi-Composite Cathodes – A. Mauger (Université Pierre et Marie Curie), K. Zaghib (Institut de Recherche d'Hydro-Québec), H. Groult, and C. M. Julien (Université Pierre et Marie Curie)

11:25 **626** Improvement in Electrochemical Performances of $Li[Ni_xMn_yCo_z]O_2$ Upon Cycling and Storage – J. Kim (Mitsubishi Chemical Group Science and Technology Research Center Inc.)

11:45 **627** Structural and Electrochemical Properties of $LiNi_{1/3}Co_{1/3}Mn_{1/3}O_2$ Positive Electrode Material Modified by Coating with Al Oxides (2) – Y. Sasaki (Hitachi Maxell Energy, Ltd.), Y. Kikuzono (Research Institute for Ubiquitous Energy Devices, AIST,1-8-31, Midorigaoka, Ikeda, Osaka 563-8577 Japan), N. Fukiya (Research Institute for Ubiquitous Energy Devices, AIST, 1-8-31, Midorigaoka, Ikeda, Osaka 563-8577 Japan), N. Taguchi (National Institute of Advanced Industrial Science and Technology (AIST)), K. Araki, K. Okamura (Kyoto University), K. Kojima, F. Kita (Hitachi Maxell Energy Ltd.), T. Takeuchi, H. Sakaebe, K. Tatsumi (National Institute of Advanced Industrial Science and Technology (AIST)), and Z. Ogumi (Kyoto University)

12:05 **628** Epitaxial Growth of $LiCoO_2$ Thin Film on Single Crystal Substrate by Sol-Gel Method – T. Kwon, T. Ohnishi, K. Akatsuka, R. B. Cervera, and K. Takada (National Institute for Materials Science)

Computation – 14:00 – 16:00
Co-Chairs: Katsuyo Thornton and Yukinori Koyama

14:00 **629** Simulations of Charge-Discharge Processes in an Intercalation Compound at the Nanoscale – B. Orvananos (Universiy of Michigan), H. Yu (University of Michigan), R. Malik (Massachusetts Institute of Technology), C. P. Grey (University of Cambridge), G. Ceder (Massachusetts Institute of Technology), and K. Thornton (University of Michigan)

14:40 **630** First-Principles Calculations on Defect Chemistry in Layered Lithium Transition-Metal Oxides – Y. Koyama, H. Arai, I. Tanaka, Y. Uchimoto, and Z. Ogumi (Kyoto University)

15:00 **631** First-Principles Study of Two-Phase Interface in $LiFePO_4$ – Y. Asari, Y. Suwa, T. Hamada (Hitachi, Ltd.), V. Dinh, J. Nara, and T. Ohno (National Institute for Materials Science)

15:20 **632** Design Criteria for Electrochemical Shock Resistant Battery Electrode Particles – W. H. Woodford, W. Carter, and Y. Chiang (Massachusetts Institute of Technology)

15:40 **633** Electronic Model of Intercalation of Alkaline Ions into Transition Metal Oxides – J. Molenda (AGH University of Science and Technology)

B5 Interfaces and Interphases in Battery Systems

Battery / Energy Technology

Honolulu 1, Tapa Conference Center, Hilton Hawaiian Village

Interfaces and Interphases in Battery Systems I – 08:00 – 12:00
Co-Chairs: Robert Kostecki and Jason Graetz

08:00 **718** Studies on Reactions and Structures at Electrode/Electrolyte Interface Using Epitaxial Model Electrodes – R. Kanno, M. Hirayama (Tokyo Institute of Technology), and K. Tamura (Japan Atomic Energy Agency)

08:40 **719** *In Situ* XAS and XRD Studies on Electrode/Electrolyte Interface of Li_xCoO_2 Thin-Film Electrode – D. Takamatsu, S. Mori, K. Shimada, Y. Orikasa, T. Kawaguchi, H. Murayama (Kyoto University), T. Hirano (Hitachi, Ltd.), M. Sato (JASRI/SPring-8), H. Tanida, Y. Koyama, H. Arai, E. Matsubara, Y. Uchimoto, and Z. Ogumi (Kyoto University)

09:00 **720** Revealing Positive Electrode Oxide Changes on Electrochemical Cycling by *In Situ* Electron Microscopy – D. J. Miller, C. Proff, J. Wen, and D. P. Abraham (Argonne National Laboratory)

09:20 **721** Lithium Depletion in the Solid Electrolyte Adjacent to Cathode Materials – H. Yamada, K. Suzuki, Y. Oga, I. Saruwatari, and I. Moriguchi (Nagasaki University)

09:40 Intermission (20 Minutes)

10:00 **722** Advanced Characterization and First Principles Modeling of Surface and Interfaces of Lithium Intercalation Compounds – Y. Meng (University of California San Diego)

10:40 **723** Electrochemical Impedance Analysis and Applications of Porous Electrodes for Lithium-Ion Batteries – N. Ogihara, Y. Itou, S. Kawauchi, C. Okuda, Y. Takeuchi, and Y. Ukyo (Toyota Central R&D Labs., Inc.)

11:00 **724** *In Situ* Atomic Force Microscopy Studies of Surface Layer Formation on $LiMn_2O_4$ Thin Films – N. Missert, R. Garcia, and J. M. Rivera (Sandia National Laboratories)

11:20 **725** The Effect of ZrO_2 Coating on Nano Size $LiCoO_2$ Cathode for Lithium-Ion Batteries – Y. Kusachi, T. Shimizu, Y. Orikasa, and Y. Uchimoto (Kyoto University)

11:40 **726** Phosphate-Based Additives for High Voltage Li-Ion Batteries and Their Derivatives – A. V. Cresce (U.S. Army Research Laboratory) and K. Xu (U. S. Army Research Laboratory)

Interfaces and Interphases in Battery Systems II – 14:00 – 16:00
Co-Chairs: Bor Yann Liaw and Shirley Meng

14:00 **727** Two-Layer/Two-Mechanism Model of Li-Ion Diffusion in Solid Electrolyte Interphase – S. Shi (Brown University), Y. Qi (General Motors R&D Center), P. Lu (Trison Business Solution Inc.), Z. Liu (General Motors), L. G. Hector Jr., and S. J. Harris (General Motors R&D Center)

14:40 **728** Effect of Graphite Orientation on Solid-Electrolyte-Interphase Formation and Characterization – M. Tang (Lawrence Berkeley National Laboratory), K. Miyazaki (Kyoto University), J. Newman (University of California, Berkeley), and T. Abe (Kyoto University)

15:00 **729** Real-Time Dynamics during Recharging Cycles – J. Keist, B. El Dasher, S. Torres (Lawrence Livermore National Laboratory), J. W. Evans, P. K. Wright (University of California at Berkeley), F. Ross (IBM Watson), D. Steingart (City College New York), and C. Orme (Lawrence Livermore National Laboratory)

15:20 **730** Simultaneous Coupling of Kinetic Monte-Carlo Simulations with Continuum Models to Examine Capacity Fade – P. Northrop (Washington University), R. Braatz (Massachusetts Institute of Technology), and V. Subramanian (Washington University)

15:40 **731** Diffusion Limitations of the Liquid Metal Battery – G. A. Thompson, S. A. Barriga, U. P. Muecke, and D. R. Sadoway (Massachusetts Institute of Technology)

B6 Lithium-Ion Batteries

Battery / Energy Technology
Coral 3, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Cathodes I (Lithium Metal Phosphate Systems)– 08:00 – 09:40
Co-Chairs: Gao Liu and Vince Battaglia

08:00 **773** Phase Transition Behavior of $LiFePO_4$ Based Cathode Materials – Y. Zhou, X. Wang, X. Yu, K. Nam, E. Hu, J. Liu, and X. Yang (Brookhaven National Laboratory)

08:20 **774** Multi-Scale, Multiphase Mathematical Modeling of $LiFePO_4$ Cathodes – T. W. Farrell and S. Dargaville (Queensland University of Technology)

08:40 **775** Phase Transition Study of $LiFePO_4$ Nanowires in Li-Ion Battery – J. Niu, A. Kushima, L. Qi (Massachusetts Institute of Technology), J. Huang (Sandia National Laboratories), and J. Li (Massachusetts Institute of Technology)

09:00 **776** Thermal Stability of Binary Olivine $Li_{1-y}Fe_{1-x}Mn_xPO_4$ [$0 \leq x, y \leq 1$] for Li Rechargeable Battery – J. Kim, K. Park, I. Park (Seoul National University), J. Yoo (KAIST), J. Hong, and K. Kang (Seoul National University)

09:20 **777** A Novel Double-Structured $LiMn_{0.85}Fe_{0.15}PO_4$: $LiFePO_4$ Core-Shell Materials for Rechargeable Lithium-Ion Batteries – S. Oh (Hanyang University), S. Myung (Sejong University), J. Park (Hanyang University), B. Scrosati (University of Rome Sapienza), K. Amine (Argonne National Laboratory), and Y. Sun (Hanyang University)

Lithium Batteries: Alternative Chemistries – 08:00 – 09:40
Co-Chairs: Yong Yang and Faisal Alamgir

08:00 **778** 3D Nanoporous Current Collectors for Advanced Thin Film Microbatteries – S. Gowda, A. Reddy, and P. Ajayan (Rice University)

08:20 **779** High Energy Cells: Lithium-Sulfur and Lithium-Sulfur-Silicon – M. Hagen (Fraunhofer ICT), S. Dörfler (Fraunhofer IWS), E. Quiroga-González (Christian-Albrechts-University of Kiel), H. Althues (Fraunhofer IWS), J. Tübke (Fraunhofer ICT), and H. Föll (Christian-Albrechts-University of Kiel)

08:40 **780** Effect of Initial Sulfur Morphology on Capacity and Cycle-Life of Lithium-Sulfur Batteries – H. Jha, A. Eberle, S. Eckstein, H. A. Gasteiger (Technische Universität München), C. Poggi, and O. Gröger (Volkswagen Aktiengesellschaft, D-38436 Wolfsburg, Germany)

09:00 **781** Large Self-Weaving Sulfur-MWCNT Composite Cathodes for High Rate Lithium-Sulfur Batteries – Y. Su and A. Manthiram (The University of Texas at Austin)

09:20 **782** Hollow Carbon Balls-Sulfur Composite in Advanced Configuration Lithium Battery – D. Lee (Hanyang University), J. Hassoun (University of Rome Sapienza), J. Park (Hanyang University), B. Scrosati (University of Rome Sapienza), and Y. Sun (Hanyang University)

Coral 3, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Cathodes I (Lithium Metal Phosphate Systems) – 10:00 – 12:00
Co-Chairs: Vince Battaglia and Gao Liu

10:00 **783** Experimental Observation of Coherent Strain Effects on Phase Separation in $LiFePO_4$ Electrode – K. Tokuda, T. Kawaguchi, T. Ichitsubo, E. Matsubara, K. Fukuda, Y. Uchimoto, and Z. Ogumi (Kyoto University)

10:20 **784** Hydro Thermal Synthesized $LiFePO_4$ Modified by $Li_4P_2O_7$ and Carbon Coatings – J. Chong, S. Xun, X. Song, G. Liu, and V. Battaglia (Lawrence Berkeley National Laboratory)

10:40 **785** Comparison of Charge Transfer Resistance for Different $LiFePO_4$-Electrodes – J. Illig, M. Ender, and E. Ivers-Tiffée (Karlsruhe Institute of Technology (KIT))

11:00 **786** A Comparative Study on A_2MnPO_4F (A = Na and Li) Cathodes for Rechargeable Batteries – S. Kim (State University of New York at Stonybrook), D. Seo, H. Kim, K. Park, H. Kim, and K. Kang (Seoul National University)

11:20 **787** Olivine Type Cathodes for Stationary Lithium-Ion Batteries – D. Choi, Y. Choi, Q. Huang, W. Wang, J. Liu, J. Zhang, L. Pederson, and V. Sprenkle (Pacific Northwest National Laboratory)

11:40 **788** Nanosized Effect on Charge-Discharge Property of $LiMnPO_4$ Embedded in Porous Carbons – S. Aono, K. Urita, H. Yamada, and I. Moriguchi (Nagasaki University)

Coral 4, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium Batteries: Alternative Chemistries – 10:00 – 12:00
Co-Chairs: Faisal Alamgir and Yong Yang

10:00 **789** Synthesis and Characterization of Hybrid Organic-Inorganic Composite Electrodes for Li-Based Batteries – C. M. Lopez (CIC Energigune), P. Sánchez-Fontecoba (University of the Basque Country), S. Pérez-Villar, V. Roddatis, and T. Rojo (CIC Energigune)

10:20 **790** Modeling Failure due to Redistribution in Lithium-metal Batteries – A. Ferrese (UC Berkeley) and J. Newman (University of California, Berkeley)

10:40 **791** Solid State Fluoride Ion Batteries – A. Munnangi, R. Witter, and M. Fichtner (Karlsruhe Institute of Technology)

11:00 **792** Rechargeable, Lithium-ion Molten Salt Battery for High Temperature Applications – J. Caja (Electrochemical Systems, Inc.), T. J. Dunstan (Electrochemical Systems Inc.), and M. Caja (Electrochemical Systems, Inc.)

11:20 **793** Fabrication of $Li_{1+x}Ti_{2-x}O_4$ Electrode for All-Solid-State Lithium-Ion Rechargeable Batteries Using a Novel Flux Coating Method – H. Kojima, K. Teshima, H. Wagata, Y. Mizuno, and S. Oishi (Shinshu University)

11:40 **794** In Operando, Naked, and Hot: High Temperature Batteries Without Packaging – C. F. Petersburg, K. Bogaert, and F. M. Alamgir (Georgia Institute of Technology)

Coral 3, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Cathodes I (Lithium Metal Phosphate Systems) – 14:00 – 15:40
Co-Chairs: Linda Nazar and Stefano Passerini

14:00 **795** (ECS Battery Division Research Award) High Capacity Intercalation Materials for Li-Ion and Na-ion Batteries – S. Passerini (University of Münster)

14:40 **796** Improvement of Battery Performances of $LiCoPO_4$ as Cathode Material for Lithium Ion Batteries – J. Yoshida, S. Nakanishi, and H. Iba (Toyota Motor Corporation)

15:00 **797** Combined First-Principle Calculations and Experimental Study of Doping Effect in $LiFe_{0.95}M_{0.05}PO_4$ (M = Na, Mg, Zn, Mn, Ni) – Z. Wang, L. Yuan, and Y. Huang (Huazhong University of Science and Technology)

15:20 **798** Lithium Iron Phosphate Wired by Carbon Nanotubes for High Rate Capability Lithium-ion Batteries – A. J. Bhattacharyya and M. Gnanavel (Indian Institute of Science)

Coral 4, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Cell Design Aspects – 14:00 – 15:40
Co-Chairs: Gen Inoue and Jan Prochazka

14:00 **799** Rapid Charge and Discharge Property of High Capacity Lithium Ion Battery applying 3D-Patterned Electrode – M. Sanada (Dainippon Sreen Mfg. Co., Ltd), K. Furuichi, K. Teraki, T. Matsuda, K. Hiramatsu, D. Ueda, A. Izumi (Dainippon SCREEN Mfg. Co., Ltd.), H. Munakata, and K. Kanamura (Tokyo Metropolitan University)

14:20 **800** Advances in 3D Lithium Battery Technology – J. Prochazka (HE3DA, Ltd)

14:40 **801** High Power 3D Lithium Battery – J. Prochazka (HE3DA, Ltd)

15:00 **802** Lithium Ion Batteries: 3-D Multi-scale Tomography – F. Tariq (Imperial College London), P. Shearing (University College London), V. Yufit (Imperial College London), J. Gelb (Xradia Inc), R. Bradley, P. Withers (University of Manchester), and N. Brandon (Imperial College London)

15:20 **803** Effect of Binder Distribution in LIB Electrode on Mass Transport Performance – G. Inoue (Kyoto University), T. Matsuoka, Y. Matsukuma, and M. Minemoto (Kyushu University)

B7 Metal-Air Batteries

Battery / Energy Technology / Fullerenes, Nanotubes, and Carbon Nanostructures
Nautilus 1, Mid-Pacific Conference Center, Hilton Hawaiian Village

Air Electrode – 08:00 – 11:40
Co-Chairs: Jie Xiao and Fanny Barde

08:00 **1099** (Invited) Metal-Air Batteries: A Reality Check – S. Whittingham (SUNY)

08:40 **1100** Very High Specific Surface Area Capacity Lithium-Air Battery – P. Stevens, G. Toussaint (Electricité de France), P. Vinatier, and L. Puëch (Université de Bordeaux)

09:00 **1101** A Versatile Composite Electrode Design for Metal-Air Batteries – A. C. Marschilok, E. S. Takeuchi, and K. J. Takeuchi (Stony Brook University)

09:20 **1102** Comparison of Air Cathodes and Aluminium Anodes for High-Power Density Alkaline Aluminium-Air Batteries – D. MacAodhagáin, C. Ponce-de-Leon-Albarran, R. J. Wood (University of Southampton), K. R. Stokes (DSTL, UK), and F. C. Walsh (University of Southampton)

09:40 Intermission (20 Minutes)

10:00 **1103** (Invited) Cycling Stability and Charging Behavior of Carbon Nanotube Electrodes for Li-O_2 Batteries – B. M. Gallant, R. R. Mitchell, C. V. Thompson, and Y. Shao-Horn (Massachusetts Institute of Technology)

10:40 **1104** N-Doped Graphene Nanosheet for Li-Air Fuel Cell under Acidic Conditions – E. Yoo (Advanced Industrial Science And Technology), J. Nakamura (University of Tsukuba), and H. Zhou (National Institute of Advanced Industrial Science and Technology)

11:00 **1105** Structure of Li_2O_2 Discharge Products on Free-Standing Aligned Carbon Nanotube Electrodes for Li-Air Batteries – R. R. Mitchell, B. M. Gallant, Y. Shao-Horn, and C. V. Thompson (Massachusetts Institute of Technology)

11:20 **1106** Graphene and N-Doped Graphene as Cathodes for Li-Air Batteries – Y. Li, J. Wang, X. Li, D. Geng, R. Li, and X. A. Sun (University of Western Ontario)

Reaction Meachanism – 13:00 – 15:30
Co-Chairs: Yang Shao-Horn and Nobuyuki Imanishi

13:00 **1107** (Invited) Promoting Ideal Reaction Processes in the Rechargeable Non-Aqueous Li-Air Battery – F. Bardé (Toyota Motor Europe), Y. Chen, S. A. Freunberger, and P. Bruce (University of St. Andrews)

13:30 **1108** (Invited) Fundamental Electrochemistry in Non-Aqueous Li-air – B. McCloskey (IBM Research), A. Speidel, R. Scheffler (Volkswagen of America), V. Viswanathan, J. S. Hummelshøj, J. K. Nørskov (Stanford University), and A. Luntz (IBM Almaden Research)

14:00 **1109** (Invited) Metal-Air Technologies-- Reversibility of Zinc Electrode – J. Yamaki, A. Nakata, T. Yamane, T. Hirai, and Z. Ogumi (Kyoto University)

14:30 **1110** Electrochemistry of Cathode Materials for Lithium-Oxygen Batteries Using Microelectrode Voltammetry – E. Nemanick (The Aerospace Corporation)

14:50 **1111** Decomposition Kinetics of Li-Air Cell Discharge Products in Non-Catalyzed and Catalyzed Carbon Cathodes – S. Meini (Technische Universität München), H. Beyer, N. Tsiouvaras, M. Piana (Technical University Munich), and H. A. Gasteiger (Technische Universität München)

15:10 **1112** Toward Efficiently Rechargeable Li-O_2 Batteries: Freely Diffusing Catalysts and O_2 Electrode-Stable Solvents – W. Walker (Liox Power Inc.), V. Giordani, V. S. Bryantsev, J. Uddin, S. Zecevic, D. Addison, and G. V. Chase (Liox Power, Inc.)

B8 Non-Aqueous Electrolytes for Lithium Batteries

Battery / Energy Technology / Physical and Analytical Electrochemistry

South Pacific 3, Mid-Pacific Conference Center, Hilton Hawaiian Village

Solid Electrolytes, Ceramic 1 – 08:00 – 09:40
Co-Chairs: Dr. Ue and Dr. Hayashi

08:00 **1188** Development of Sulfide Glass Electrolytes for All-Solid-State Lithium Batteries – A. Hayashi and M. Tatsumisago (Osaka Prefecture University)

08:40 **1189** Suppression of H_2S Gas from Li_2S-P_2S_5 Glass Electrolytes by the Addition of Li_2O – T. Ohtomo, K. Kawamoto (Toyota Motor Corporation), A. Hayashi, and M. Tatsumisago (Osaka Prefecture University)

09:00 **1190** New Lithium Superionic Conductor and Its Application to All Solid-State Batteries – R. Kanno, M. Hirayama (Tokyo Institute of Technology), M. Yonemura (High Energy Accelerator Research Organization), Y. Kato, and K. Kawamoto (Toyota Motor Corporation)

Solid Electrolytes, Ceramic 2 – 10:00 – 12:00
Co-Chairs: Dr. Kanno and Dr. Takada

10:00 **1191** Interface Structures in Solid-State Lithium Batteries with Sulfide Electrolytes – K. Takada, X. Xu (National Institute for Materials Science), K. Fukuda (Kyoto University), K. Kumagai, K. Watanabe, K. Akatsuka, B. Hang, M. Osada, I. Sakaguchi, T. Ohnishi, T. Sekiguchi, and T. Sasaki (National Institute for Materials Science)

10:40 **1192** Enlarged Lithium-Ions Migration Pathway by Substitution of B^{3+} for P^{5+} in Li_3PS_4 – K. Homma, T. Yamamoto, S. Watanabe, and T. Tanaka (Fujitsu Laboratories Ltd.)

11:00 **1193** First Principles Investigations of the $Li_{10}GeP_2S_{12}$ Superionic Conductor and Related Materials – S. Ong, Y. Mo, W. D. Richards, and G. Ceder (Massachusetts Institute of Technology)

11:20 **1194** First-Principles Molecular Dynamics Simulations for Li^+ Diffusion in Li_3PO_4 and Li_3PS_4 Elctrolytes – M. Ikeda, T. Yamasaki, C. Kaneta, K. Homma, T. Yamamoto, and T. Tanaka (Fujitsu Laboratories Ltd.)

11:40 **1195** Analysis of Lithium-Ion Conduction in LISICON-Based Solid Electrolytes by First-Principles Molecular Dynamics Simulation – K. Fujimura, A. Kuwabara, H. Moriwake (Japan Fine Ceramics Center), A. Seko, Y. Koyama, and I. Tanaka (Kyoto University)

Solid Electrolytes, Ceramic 3 – 14:00 – 16:00
Co-Chairs: Dr. Takada and Dr. Kanno

14:00 **1196** Research on Electrode-Electrolyte Interfaces of Innovative New Generation Batteries – F. Mizuno (Toyota Research Institute of North America) and H. Iba (Toyota Motor Corporation)

14:40 **1197** The Preparation of $Li_7La_3Zr_2O_{12}$ by Sol-Gel Method and Its Electrochemical Performance – T. Nishioka, J. Wakasugi, N. Saito, H. Munakata, and K. Kanamura (Tokyo Metropolitan University)

15:00 **1198** Flux Growth of Idiomorphic Garnet-Type Solid Electrolyte Crystals for All-Solid-State Lithium-Ion Rechargeable Batteries – H. Onodera, K. Teshima, H. Wagata, Y. Mizuno (Shinshu University), K. Yubuta, T. Shishido (Tohoku University), and S. Oishi (Shinshu University)

15:20 **1199** High Lithium-Ion Conducting Garnet-type Oxide; $Li_{7+X}La_{3-Y}A_YZr_{2-Z}Nb_ZO_{12}$ (A = Alkali Earth Metals) – Y. Kihira, S. Ohta, H. Imagawa, and T. Asaoka (Toyota Central R&D Labs., Inc.)

15:40 **1200** Electrochemical Performance of an All-Solid-State Lithium-Ion Battery with Garnet-Type Oxide Electrolyte – S. Ohta, T. Saeki, S. Morishita, J. Seki, and T. Asaoka (Toyota Central R&D Labs., Inc.)

B9 Polymer Electrolyte Fuel Cells 12 (PEFC 12)

Energy Technology / Corrosion / Physical and Analytical Electrochemistry / Battery / Industrial Electrochemistry and Electrochemical Engineering

Tapa 2, Tapa Conference Center, Hilton Hawaiian Village

Plenary Session – 08:20 – 12:00
Co-Chairs: Hiroyuki Uchida and Hubert Gasteiger

08:20 **1274** Hyundai's FCEVs: A Pathway to New Possibilities – T. Lim and B. Ahn (Hyundai-Kia Motors)

09:00 **1275** Development of Advanced Materials and Devices for Cost Reduction of PEFC CHP System – H. OHARA (Panasonic Corporation) and T. Omura (Tokyo Gas Co., LTD)

09:40 Intermission (20 Minutes)

10:00 **1276** Polymer Electrolyte Fuel Cell Lifetime Limitations: The Role of Electrocatalyst Degradation – D. J. Myers, X. Wang, N. Kariuki, S. DeCrane, T. Nowicki, S. Arisetty, R. Subbaraman, R. K. Ahluwalia (Argonne National Laboratory), J. Gilbert (University of Wisconsin-Madison), B. Puchala (Univeristy of Wisconsin-Madison), E. Holby, D. Morgan (University of Wisconsin-Madison), S. Ball, J. Sharman, B. Theobald, G. Hards (Johnson Matthey Technology Center), M. Gummalla, Z. Yang, S. Zhitnik (United Technologies Research Center), D. Groom, S. Rajasekhara (University of Texas at Austin), P. Ferreira (University of Texas-Austin), J. P. Meyers (The University of Texas at Austin), P. Mathew, S. Kim (University of Texas at Austin), Y. Shao-Horn, W. Sheng, and B. Han (Massachusetts Institute of Technology)

10:40 **1277** Membrane Fuel Cells – Options for Bipolar Plate Materials and Production Technology – A. Heinzel (University Duisburg-Essen), L. Kühnemann, T. Derieth, T. Grimm, and P. Butzen (ZBT GmbH)

11:20 **1278** Limiting Current as a Tool to Study Oxygen Transport in PEM Fuel Cells – D. R. Baker and D. Caulk (General Motors R&D Center)

Plenary Session – 14:00 – 16:00
Co-Chairs: Deborah Jones and Vijay Ramani

14:00 **1279** Ionomer in the Catalyst Layer – S. Holdcroft (Simon Fraser University)

14:40 **1280** Development of Thin, Reinforced PEMFC Membranes through Understanding Structure-Property-Performance Relationships – W. Liu (W. L. Gore & Associates, Inc.), T. Suzuki (W. L. Gore & Associates, Co., Ltd. (Nihon Gore)), H. Mao, and T. Schmiedel (W. L. Gore & Associates, Inc.)

15:20 **1281** Development of Highly Active and Durable Pt Core-Shell Catalysts for Polymer Electrolyte Fuel Cells – M. Inaba and H. Daimon (Doshisha University)

B10 Renewable Fuels from Sunlight and Electricity

Energy Technology / High Temperature Materials / Physical and Analytical Electrochemistry / New Technology Subcommittee

Nautilus 2, Mid-Pacific Conference Center, Hilton Hawaiian Village

Keynote Speech on Solar Fuels – 08:10 – 12:00
Co-Chairs: Nick Wu and Kazunari Domen

08:10 Introductory Remarks (10 Minutes)

08:20 **1719** Hydrogen Production from Photoelectrochemical Cells: Economic and Theoretical Considerations and Experimental Results – J. A. Turner (National Renewable Energy Laboratory)

09:00 **1720** Critical Assessment of Research and Development Needs in Solar to Hydrogen Production Technologies – E. L. Miller, S. Dillich, E. Sutherland, and S. Studer (US Department of Energy)

09:40 Intermission (20 Minutes)

10:00 **1721** Materials for Photocatalytic and Photoelectrochemical Water Splitting – A. Kudo (Tokyo University of Science)

10:40 **1722** Solar Energy Conversion and Environmental Remediation Using Semiconductor-Liquid Interfaces: Design Paradigms for the Photocatalyst Material and Progress Update – K. Rajeshwar (The University of Texas)

11:20 **1723** Solar Energy Materials for High Efficiency Photoelectrochemical Sensitized Solar Cell – N. Park (Sungkyunkwan University)

New Materials for Photocatalysts & Photoelectrochemical Cells – 14:00 – 16:00
Co-Chairs: Pawel Kulesza and Ravi Subramanian

14:00 **1724** Photoelectrochemical Energy Conversion Using Earth-Abundant Semiconductor Nanomaterials – S. Jin (University of Wisconsin-Madison)

14:30 **1725** All-Oxide Quantum-Confined Heteronanostructures for Solar Hydrogen Generation – L. Vayssieres (Xi'an Jiaotong University)

15:00 **1726** Plasmon-Enhanced Photocatalytic Activity of Metal/Metal Oxide Composites – S. Cushing, J. Li, A. Bristow, and N. Wu (West Virginia University)

15:20 **1727** Photooxidation of Water at Nanostructured Hybrid Materials Utilizing Polyoxometallate-Decorated Tungsten Oxide and Gold Nanoparticles – P. J. Kulesza, R. Solarska, K. Miecznikowski, S. Zoladek (University of Warsaw), and S. Fiechter (Helmholtz Zentrum)

15:40 **1728** Plasmonic-Enhancing Efficiency of Water Splitting in Au/Quantum Dots Sensitized ZnO Nanowires-Array Photoelectrodes – R. Liu, H. Chen, C. Chen, D. Tsai (National Taiwan University), and S. Hu (National Taiwan Normal University)

B12 Solid State Ionic Devices 9 – Ion Conducting Thin Films and Multilayers

High Temperature Materials

South Pacific 1, Mid-Pacific Conference Center, Hilton Hawaiian Village

Ion Conducting Thin Film Electrolytes 1 – 09:00 – 12:00
Co-Chairs: Eric Wachsman and John Kilner

09:00 **1879** Innovative Oxides Materials for Electrochemical Energy Conversion – E. D. Wachsman (University of Maryland)

09:40 Intermission (20 Minutes)

10:00 **1880** Study of Crystal Growth in Oxide Thin Films Fabricated by Pulsed Laser Deposition – N. Sata, S. Tamura, Y. Fujiwara, Y. Shibata, F. Iguchi, H. Yugami (Tohoku University), Y. Nagao (JAIST), H. Kageyama, and K. Nomura (AIST Kansai)

10:40 **1881** Probing $Pr_xCe_{1-x}O_{2-d}$ Thin Film Defect Concentrations Using *In Situ* Optical Absorption and Impedance Spectroscopy Techniques – S. R. Bishop (Kyushu University), D. Chen, J. Kim, N. Thompson, and H. L. Tuller (Massachusetts Institute of Technology)

11:00 **1882** Metastable Thin Films for Energy Applications: On Structural Lattice Anomalies and Electrical Transport – J. L. Rupp, S. Bishop (Massachusetts Institute of Technology), E. Fabbri (Paul Scherrer Institute), J. Han (Massachusetts Institute of Technology), D. Marrochelli (Trinity College Dublin), E. Traversa (National Institute for Materials Science), H. L. Tuller, and B. Yildiz (Massachusetts Institute of Technology)

11:20 **1883** Relating Nanostructures of Yttria-Stabilized-Zirconia Thin Films to Their Proton Conductivity – J. Martynczuk, M. V. Schlupp, B. Scherrer (ETH Zurich), D. Stender (Paul Scherrer Institute), R. Tölke, A. Evans, M. Prestat, and L. Gauckler (ETH Zurich)

11:40 **1884** Ion Conduction in $BaZr_{0.85}Y_{0.15}O_{3-\delta}$ Films Fabricated by Pulsed Laser Deposition in Various Conditions – D. Jang, K. Bae, and J. Shim (Korea University)

Ion Conducting Thin Film Multilayers – 14:00 – 18:00
Co-Chairs: Enrico Traversa and Shu Yamaguchi

14:00 **1885** Do Oxygen-Ion Conductors Feel the Strain – D. Pergolesi (National Institute for Materials Science), E. Fabbri (Paul Scherrer Institute), S. N. Cook (Imperial College London), V. Roddatis (CIC Energigune), E. Traversa (Univeristy of Roma Tor Vergata), and J. A. Kilner (Imperial College London)

14:40 **1886** Epitaxial Zirconia and Ceria Based Thin Films and Multilayers with Arbitrary Composition – W. Shen, J. Jiang, and J. L. Hertz (University of Delaware)

15:00 **1887** Electric Conductivity in Cu- and Ga-Doped Pr_2NiO_4 Nano Film Laminated with Sm-Doped CeO_2 – J. Hyodo and T. Ishihara (Kyushu University)

15:20 **1888** Electronic Activation in the $(La_{0.8}Sr_{0.2})CoO_3/(La_{0.5}Sr_{0.5})_2CoO_4$ Supperlattices at High Temperature – Y. Chen, Z. Cai, Y. Kuru, H. L. Tuller, and B. Yildiz (Massachusetts Institute of Technology)

15:40 **1889** Low Energy Ion Scattering (LEIS) Analysis of $SrTiO_3$ (100) and $NdGaO_3$ (110) Single Crystal Surface Terminations – A. Cavallaro (Imperial College, London) and J. A. Kilner (Imperial College London)

C2 Bioengineering Based on Electrochemistry

Organic and Biological Electrochemistry / Sensor

324, Level 3, Hawaii Convention Center

Co-Chairs: K. Sode, H. Nam, J. Choi, and E. Tamiya

08:00 **1999** Electrochemical-Based Bioprocessing Device Composed of Recombinant Protein/DNA Conjugate – J. Choi (Sogang University)

08:40 **2000** Fabrication of Multilayer Cell Structure Using Electro-Deposited Alginate Gel – F. Ozawa, K. Ino, H. Shiku, and T. Matsue (Tohoku University)

09:00 **2001** Metabolism Feature of Multicellular Tumor Spheroids Assessed by a Comprehensive System – Y. Zhou, T. Arai, Y. Horiguchi, K. Ino, H. Shiku, and T. Matsue (Tohoku University)

09:20 **2002** Development of Voltage Switching Mode Scanning Electrochemical Microscopy for Topographical and Electrochemical Nanoscale Imaging of Living Cells – Y. Takahashi (Tohoku University), A. I. Shevchuk (University of Southampton), P. Novak (Imperial College London), Y. Matsumae (Tohoku University), B. Babakinejad (Imperial College London), J. V. Macpherson, P. R. Unwin (University of Warwick), K. Ino, H. Shiku (Tohoku University), J. Gorelik (Imperial College London), D. Klenerman (Cambridge University), Y. E. Korchev (Imperial College London), and T. Matsue (Tohoku University)

09:40 Intermission (20 Minutes)

Co-Chairs: K. Sode, H. Nam, J. Choi, and E. Tamiya

10:00 **2003** Electrochemically Modulated Release of Nitric Oxide through Polymers to Inhibit Bacterial Biofilm Formation and Prevent Platelet Activation – M. E. Meyerhoff, L. Höfler, D. Koley, H. Ren, T. C. Major, J. Wu, and C. Xi (University of Michigan)

10:40 **2004** Engineering of Catalytic Domain of Cellobiose Dehydrogenase and Its Application for the Direct Electron Transfer Type Enzyme Electrode – S. Ando, S. Ferri, W. Tsugawa, and K. Sode (Tokyo University of Agriculture and Technology)

11:00 **2005** Aptameric Sensor for Detection of VEGF Based on Labeling Technique Using GDH Fused Zinc Finger Protein – A. Tatsumi, K. Abe, T. Fukaya, K. Sode, and K. Ikebukuro (Tokyo University of Agriculture and Technology)

11:20 **2006** Evolution of Cathodic Characteristics (Water and Oxygen Transport) in Microbial Fuel Cell (MFC) – C. Santoro, M. Cremins, A. Mackay, U. Pasaogullari (University of Connecticut), M. Guilizzoni, A. Casalegno (Politecnico di Milano), and B. Li (University of Connecticut)

11:40 **2007** Turning Oxidase into Dehydrogenase for Application to the Electrochemical Measurement – S. Saito, Y. Horaguchi, T. Endo, S. Ferri (Tokyo University of Agriculture and Technology), K. Mori, K. Kojima (Ultizyme International Ltd.), W. Tsugawa, and K. Sode (Tokyo University of Agriculture and Technology)

Co-Chairs: K. Sode, H. Nam, J. Choi, and E. Tamiya

14:00 **2008** Peroxidase Activity of G-Quadraplex Hemin-Binding DNA Aptamers Determined by Electrochemical Measurement – I. Kubo, Y. Hoshino (Soka University), M. Liu, H. Abe, and Y. Ito (RIKEN Advanced Science Institute)

14:40 **2009** Electron Transfer between Cytoplasm and Electrode via Redox-Active Phospholipid Polymer – K. Nishio, R. Nakamura, S. Nakanishi, X. Lin, T. Konno, K. Ishihara, and K. Hashimoto (The University of Tokyo)

15:00 **2010** *In Situ* Observation of Direct Electron Transfer Reaction between Cytochrome c and ITO Electrode with Electrochemically Controlled Slab Optical Waveguide Spectroscopy – N. Matsuda and H. Okabe (National Institute of Advanced Industrial Science and Technology)

C4 New Synthetic and Mechanistic Approaches to Molecular Electroorganic Chemistry

Organic and Biological Electrochemistry

306B, Level 3, Hawaii Convention Center

Co-Chairs: S. Nishiyama and S. Suga

10:00 **2066** Anodic Oxidation of *gem*-Diaryl Ketones in the Presence of Alcohols – A. J. Fry and B. Sheludko (Wesleyan University)

10:20 **2067** Oxidative Dechlorination of Chlorinated Organic Compound Catalyzed by Vitamin B_{12}-TiO_2 – H. Shimakoshi and Y. Hisaeda (Kyushu University)

10:40 **2068** Controlling and Improvement of Electrosynthetic Reaction by Using Microreactor: Application to Intermolecular Coupling Reaction of Phenol Derivatives – T. Kashiwagi (Tokyo Institute of Technology), S. R. Waldvogel (University of Mainz), and M. Atobe (Tokyo Institute of Technology)

11:00 **2069** Site-Controlled Modification of Conducting Polymer Films Based on Bipolar Electrochemistry – S. Inagi, Y. Ishiguro, and T. Fuchigami (Tokyo Institute of Technology)

11:20 **2070** Electrochemical Dehalogenation of Persistent Organic Pollutants with a Silver Cathode in Aqueous Media – A. A. Peverly and D. G. Peters (Indiana University)

11:40 **2071** Electrochemical Fuorination Using Alkali-Metal Fluorides – T. Fuchigami, T. Sawamura, and S. Inagi (Tokyo Institute of Technology)

Co-Chairs: A. Fry and T. Fuchigami

14:00 **2072** Development of Regioselective Electrochemical Glycosylation Oriented Natural Products Synthesis – K. Kawa, T. Saitoh, E. Kaji, and S. Nishiyama (Keio University)

14:20 **2073** Direct Reduction of 6-Halo-1-Phenyl-1-Hexynes at Silver Cathodes – L. M. Strawsine and D. G. Peters (Indiana University)

14:40 **2074** Application of Methoxy Radical Generation on a Boron-Doped Diamond Electrode – T. Sumi, T. Saitoh, K. Natsui, T. Yamamoto (Keio University), M. Atobe (Tokyo Institute of Technology), Y. Einaga, and S. Nishiyama (Keio University)

15:00 **2075** Electrocatalytic Reduction of 1,1,2-Trichloro-1,2,2-Trifluoroethane (CFC-113) at a Silver Cathode – E. R. Wagoner and D. G. Peters (Indiana University)

15:20 **2076** Coordination Programming of Photo- and Electro-Functional Molecular Materials – R. Sakamoto, M. Hayashi, S. Kusaka, M. Tsuchiya, J. Kakinuma, and H. Nishihara (The University of Tokyo)

15:40 **2077** Evaluation of Bioluminescence Activity of Firefly Luciferin Nucleotide Derivatives – S. Iwano (The University of Electro Communications Chofu), S. Kojima, T. Hirano, S. Maki, and H. Niwa (The University of Electro Communications, Chofu)

D3 Corrosion, Passivity, and Energy: A Symposium in Honor of Digby Macdonald

Corrosion

301B, Level 3, Hawaii Convention Center

Passivity and Passivity Breakdown – 08:00 – 10:00
Co-Chairs: Barry MacDougall and Fouzia Hannour

08:00 **2176** The Semiconducting Properties and Impedance Analysis of Passive Films on Copper in Anaerobic Sulfide Solutions from the Viewpoint of the Point Defect Model – Y. Ling, M. L. Taylor, S. Sharifiasl, and D. D. Macdonald (The Pennsylvania State University)

08:15 **2177** Determining the Coupling Current as a Means of Detecting Crevice Activity and Inhibition – S. Lee (The Pennsylvania State University), J. A. Mathews (Electric Power Research Institute), and D. D. Macdonald (The Pennsylvania State University)

08:30 **2178** Influence of the Microstructure on the Passive Character of Titanium Oxide Films Characterized by EIS – N. Rodríguez de la Cruz, E. M. Arce, J. Torres (Instituto Politécnico Nacional), R. Luna Sánchez (Universidad Autónoma Metropolitana – Azcapotzalco), J. G. Vazquez Arenas (University of Waterloo), J. Hallen, and R. Cabrera Sierra (Instituto Politécnico Nacional)

08:45 **2179** Effects of Solution Temperature on the Kinetic Nature of Passive Film on Ni – K. Park (KAIST), S. Ahn (Korea Institute of Energy Research), and H. Kwon (Korea Advanced Institute of Science and Technology)

09:00 **2180** Effect of Sour Environment pH on Crack Morphology in Ultra Strength Drilling Steel under Cyclic Stress – M. Ziomek-Moroz, J. Hawk (U.S. Department of Energy, National Energy Technology Laboratory), R. Thodla, and F. Gui (DNV)

09:15 **2181** Electrochemical Reduction of Ethanol at Lead Electrodes – S. B. Hall, N. Wise, and M. Waterland (Massey University)

09:30 **2182** IGSCC Caused by Passive Film's Dielectrostrictive Stress – T. M. Devine (University of California Berkeley)

09:45 Intermission (15 Minutes)

Passivity and Passivity Breakdown – 10:00 – 12:00
Co-Chairs: David W. Shoesmith and Bernard Tribollet

10:00 **2183** The Relationship between Nanostructure and Electronic Properties of Passive Films Studied by Scanning Tunneling Microscopy Combined with Scanning Tunneling Spectroscopy – P. Marcus, T. Massoud, and V. Maurice (CNRS Chimie ParisTech)

10:30 **2184** Characterization of Repassivation Process on Fe-Cr Alloys Using Scratching Technique – M. Wada, A. Kawano, M. Saito, and S. Fujimoto (Osaka University)

10:45 **2185** Coupling the Point Defect Model and the Density Functional Theory for Modeling Pit Nucleation – B. Malki, B. Baroux, O. Le Bacq, and A. Pasturel (Grenoble INP)

11:00 **2186** Development of Base Electrocatalysts which are Passive towards Corrosion in Hot Acidic Electrolytes – G. T. Burstein, G. E. Haslam, and X. Y. Chin (University of Cambridge)

11:15 **2187** Characterization of Bound Water in Passive Film of Titanium Formed in H_2SO_4 Solution – T. Haruna, S. Ito, and K. Kimoto (Kansai University)

11:30 **2188** Kinetic Stability of Aluminium and Its Alloys: The Role of "Structural" Features – X. Zhou (Monash University), D. D. Macdonald (The Pennsylvania State University), and N. Birbilis (Monash University)

11:45 **2189** Effect of Galvanostatic Condition on Growth Behavior and Repassivation Potential of Crevice Corrosion of Duplex Stainless Steels – S. Aoki, T. Ehashi, and J. Sakai (Waseda University)

Passivity and Passivity Breakdown – 13:30 – 14:45
Co-Chairs: Ashok Kumar Shukla and Srdjan Nesic

13:30 **2190** Metallographic Characterization of Transgranular Stress Corrosion Cracking on Type316L Stainless Steel in High Temperature and High Pressure Water Environment – S. Fujimoto, N. Okada, T. Saito, and H. Tsuchiya (Osaka University)

13:45 **2191** Corrosion Inhibition of Localized Corrosion and Stress Corrosion Cracking of Steam/Gas Turbine Materials – B. Bavarian, J. Zhang, and L. Reiner (California State University)

14:00 **2192** Comparison of Electrochemical Pitting Characteristics of Alloy 825, Alloy 690 and Titanium for a Concentrated Radioactive Waste Hold-Up Tank – H. Kim and K. Na (KHNP-CRI)

14:15 **2193** Studies of Pitting Initiation on High-Strength Pipeline Steel by Metallurgical Micro-Electrochemistry – Y. Cheng (University of Calgary)

14:30 **2194** Hydrogen Induced Passivity Degradation and Stress Corrosion Cracking – J. Luo, B. Lu (University of Alberta), and S. Shi (The Hong Kong Polytechnic University)

Passivity and Passivity Breakdown – 14:45 – 16:00
Co-Chairs: Damien Feron and Farrel Martin

14:45 **2195** Birth and Death Stochastic Process in Pitting Corrosion and Stress Corrosion Cracking – T. Shibata (Osaka University)

15:15 **2196** Implications for the Initiation of Pitting Corrosion of Composition Changes around Sulphide Inclusions in Stainless Steels – D. E. Williams (University of Auckland)

15:30 **2197** Effect of Sulfate Ion on Pitting Corrosion Behavior of Type 420 Martensitic Stainless Steel in Chloride Solution – W. Ji, S. Pan, and W. Tsai (National Cheng Kung University)

15:45 **2198** Intrinsic Vacancies and Their effect on Corrosion Reactivity at the FeS_2 (100) Surface – A. Krishnamoorthy, F. W. Herbert, and B. Yildiz (Massachusetts Institute of Technology)

D5 High Temperature Corrosion Materials Chemistry 10

High Temperature Materials / Corrosion
318A, Level 3, Hawaii Convention Center

Solid Oxide Fuel Cells – 08:00 – 12:00
Co-Chairs: E. Opila and S. Yamaguchi

08:00 **2291** *In Situ* Optical Studies of Electrochemically Induced Anode Degradation in High Temperature Solid Oxide Fuel Cells – R. A. Walker, J. D. Kirtley, D. M. Halat, and M. McIntyre (Montana State University)

08:40 **2292** Mechanical Properties of Ni-YSZ Cermets under Simulated Environment of Redox Cycling – T. Miyasaka, S. Sukino, S. Watanabe, T. Kawada, K. Sato, and T. Hashida (Tohoku University)

09:00 **2293** Improved Sintering Property of Y-Doped $BaZrO_3$ by Mn Addition – D. Kim, E. Patrik, S. Miyoshi, T. Tsuchiya, and S. Yamaguchi (The University of Tokyo)

09:20 **2294** Non-Linear Doping effect on the Electrochemical Properties of $BaZr_{1-x}Pr_xO_3$ – M. Tamaru, S. Miyoshi, D. Kim (The University of Tokyo), T. Higuchi (Science University of Tokyo), Y. Oyama, and S. Yamaguchi (The University of Tokyo)

09:40 Intermission (20 Minutes)

10:00 **2295** Study on Electrode Reaction of Perovskite Oxide Electrodes on a Proton Conducting Electrolyte – K. Suzuki, S. Hashimoto, K. Amezawa, and T. Kawada (Tohoku University)

10:20 **2296** Mechano-Electrochemical effect on Materials Property of Ion Conducting Oxides – K. Yashiro, Y. Kawamura, S. Nakakawaji, K. Sato, K. Amezawa, and J. Mizusaki (Tohoku University)

10:40 **2297** Chemical Stability of $Ba_{0.5}Sr_{0.5}Co_{0.8}Fe_{0.2}O_{3-\delta}$ (BSCF) – F. Wang, K. Yashiro, K. Amezawa, and J. Mizusaki (Tohoku University)

11:00 **2298** A Study of Nickel-Substituted Lanthanum Cobaltite as Cathode Materials for SOFCs – Y. Uzumaki, S. Hashimoto, K. Amezawa, and T. Kawada (Tohoku University)

11:20 **2299** La/Sr-Co Perovskite-Based Multi-Layered Super Cathode Fabricated by Sputtering Method – A. Takeshita, S. Miyoshi, and S. Yamaguchi (The University of Tokyo)

11:40 **2300** Oxygen Transport in Perovskite Type Oxide $La_{0.6}Sr_{0.4}Co_{0.2}Fe_{0.8}O_{3-\delta}$ – H. Kudo, K. Yashiro, S. Hashimoto, K. Amezawa, T. Kawada, and J. Mizusaki (Tohoku University)

High Temperature Chemistry of Carbides, Borides, and Nitrides – 14:00 – 18:00
Co-Chairs: E. Wuchina and T. Markus

14:00 **2301** Influence of Phase Crystallography on Precipitation Microstructures and Deformation Mechanisms in Tantalum Carbides – G. B. Thompson, R. A. Morris, N. De Leon, B. Wang (The University of Alabama), and C. Weinberger (Sanda National Laboratories)

14:40 **2302** Preparation and Characterization of Materials in the Ta-Hf-C System – J. A. Zaykoski, M. M. Opeka, and I. Talmy (Naval Surface Warfare Center)

15:00 **2303** Variability in Oxidation Resistance of ZrB_2-SiC – K. N. Shugart and E. J. Opila (University of Virginia)

15:20 **2304** Effect of Silicon Addition on the Oxidation Kinetic and on the Structure of the Oxide Layer Formed on Transition Metal Nitride Coatings – J. Pierson (Université de Lorraine), P. Steyer (INSA de Lyon), A. Mège-Revil (Ecole Centrale de Lille), and D. Pilloud (Université de Lorraine)

15:40 **2305** Oxidation of Cr_2AlC between 700 and 1300°C in Air – S. Kim, S. Bong, and D. Lee (Sungkyunkwan University)

D7 Pits and Pores 5: A Symposium in Honor of David Lockwood

Corrosion / Luminescence and Display Materials
323B, Level 3, Hawaii Convention Center

Silicon Dissolution and Characterization – 08:00 – 10:00
Co-Chairs: C. Lévy-Clément and M. J. Sailor

08:00 Intermission (10 Minutes)

08:10 **2365** Thinking Again of Porous Si Formation – Y. H. Ogata (Kyoto University)

08:40 **2366** Investigation of Pore Diameter Modulation in Depth in p-type Silicon – E. Ossei-Wusu (Universität zu Kiel), J. Carstensen, E. Quiroga-González (Christian-Albrechts-University of Kiel), M. Amirmaleki (Universität zu Kiel), and H. Föll (Christian-Albrechts-University of Kiel)

09:00 **2367** Differential Photoacoustic Electrochemical Cell to Study *In Situ* the Porous Silicon Formation – D. G. Espinosa-Arbelaez and M. E. Rodriguez-Garcia (Universidad Nacional Autónoma de México)

09:20 **2368** Spontaneous Groove Formation on Silicon during Anodic Dissolution Induced by Turing Instability – K. Fukami, T. Urata, T. Sakka (Kyoto University), K. Krischer (Technische Universität München), and Y. H. Ogata (Kyoto University)

09:40 Intermission (20 Minutes)

Metal-Assisted Silicon Dissolution – 10:00 – 12:00
Co-Chairs: Y. Ogata and P. Schmuki

10:00 **2369** Anodic Dissolution of Si: Electrochemical Oscillations and Porous Silica Formation – F. Ozanam and J. Chazalviel (CNRS-Ecole polytechnique)

10:30 **2370** Stain Etching of Silicon with and without the Aid of Metal Catalysts – K. W. Kolasinski, J. Gogola, W. B. Barclay, and C. Somerville (West Chester University)

10:50 **2371** Metal-Assisted Chemical Etching of Silicon Using Oxygen as an Oxidizing Agent – S. Yae, Y. Morii, M. Enomoto, N. Fukumuro, and H. Matsuda (University of Hyogo)

11:10 **2372** On the Metal-Assisted Chemical Etching of Nanoporous Silicon – D. Goryachev, L. Belyakov, O. Yeltsina, J. Vainshtein, and O. M. Sreseli (Ioffe Physical-Technical Institute of the Russian Academy of Sciences)

11:30 **2373** Formation of Group IV Porous Semiconducting Nanowires and Nanotubes: The Role of Etching – X. Huang, R. Gonzalez, and J. L. Coffer (Texas Christian University)

Silicon Etching and Optical Properties – 14:00 – 18:00
Co-Chairs: J. L. Coffer and R. B. Wehrspohn

14:00 **2374** A "Cook's Tour" of Two Decades of Research into the Optical Properties of Nanostructured Materials – D. J. Lockwood (National Research Council)

14:30 **2375** Magnetic Field Assisted Etching of Porous Silicon as a Tool to Enhance Magnetic Characteristics – P. Granitzer, K. Rumpf (Karl-Franzens-University Graz), T. Ohta, N. Koshida (Tokyo University of Agriculture and Technology), P. Poelt (University of Technology Graz), and M. Reissner (Vienna University of Technology)

14:50 **2376** Structural and Morphological Study of Mesoporous Germanium Layers Formed by Bipolar Electrochemical Etching – S. Tutashkonko (INSA de Lyon), A. Boucherif (Université de Sherbrooke), T. Nychyporuk (INSA de Lyon), R. Arès, V. Aimez (Université de Sherbrooke), and M. Lemiti (INSA de Lyon)

15:10 **2377** Morphological Development from Uniform Microporous Structure to Macropore-Like Structure – T. Urata, K. Fukami, T. Sakka, and Y. H. Ogata (Kyoto University)

15:30 **2378** Relaxation Processes and Functions of Blue Phosphorescent Porous Silicon – B. Gelloz (Nagoya University), R. Mentek (Tokyo Univ. of A & T), and N. Koshida (Tokyo University of Agriculture and Technology)

E2 Atomic Layer Deposition Applications 8

Dielectric Science and Technology / Electronics and Photonics
304B, Level 3, Hawaii Convention Center

General Session – 08:30 – 10:00

08:30 Introductory Remarks (10 Minutes)

08:40 **2456** Fabrication of Sb_2Te_3 and Bi_2Te_3 Multilayer Composite Films by Atomic Layer Deposition – K. Zhang, D. Nminibapiel, M. Tangirala, H. Baumgart (Old Dominion University), and V. Kochergin (MicroXact Inc.)

09:00 **2457** Trimethylaluminum-Based Atomic Layer Deposition of Al:MO_2 (M=Zr, Hf): A Viable Route to Integrate High-Permittivity Oxides on $In_{0.53}Ga_{0.47}As$ Substrates – A. Molle, E. Cianci, A. Lamperti, C. Wiemer, S. Baldovino, L. Lamagna, S. Spiga, M. Fanciulli (CNR-IMM), G. Brammertz, C. Merckling, and M. Caymax (imec)

09:40 Intermission (20 Minutes)

Reaction Mechanisms I – 10:00 – 12:00

10:00 **2458** Are Ions Good or Bad during Plasma-Assisted ALD – H. B. Profijt and W. Kessels (Eindhoven University of Technology)

10:40 **2459** Atomic Layer Deposition of Mo: Al_2O_3 Nanocomposites with Tunable Resistivity – A. U. Mane and J. W. Elam (Argonne National Laboratory)

11:00 **2460** *In Situ* Study of ALD Processes Using Synchrotron-based X-ray Fluorescence and Scattering Techniques – J. Dendooven, K. Devloo-Casier, M. Ide (Ghent University), K. Grandfield (University of Antwerp), K. F. Ludwig (Boston University), S. Bals (University of Antwerp), P. Van Der Voort, and C. Detavernier (Ghent University)

11:40 **2461** Reaction Mechanism of Non-Heating SiO_2 Atomic Layer Deposition by Using TDMAS and Plasma Excited Water Vapor – F. Hirose, K. Kanomata, M. Degai, and K. Momiyama (Yamagata University)

Oxides – 14:00 – 18:00

14:00 **2462** Crystallization Study by Transmission Electron Microscopy of $SrTiO_3$ Thin Films Grown by Plasma-Assisted ALD – V. Longo, M. A. Verheijen, F. Roozeboom, and W. Kessels (Eindhoven University of Technology)

14:20 **2463** TiO_2-Based Metal-Insulator-Metal Structures for Future DRAM Storage Capacitors – K. Fröhlich (Institute of Electrical Engineering SAS), B. Hudec, M. Tapajna, K. Hušeková, A. Rosová (Institute of Electrical Engineering, SAS), J. Aarik, R. Rammula, A. Kasikov, T. Arroval (Institute of Physics, University of Tartu), K. Murakami, M. Rommel, and A. J. Bauer (Fraunhoffer Institute for Integrated Systems and Dvice Technology)

15:00 **2464** Application of the Plasma Surface Modification for Uniform Al2O3 Films Grown by Atomic Layer Deposition on Polyethylene Blown Film – G. Lee, K. Son (Korea University), S. Park (Korea University, Mechanical Engineering), J. Shim (Korea University), and B. Choi (Korea University, Mechanical Engineering)

15:20 **2465** Atomic Layer Deposition of Molybdenum Oxide Using Bis(Tert-Butylimido)Bis(Dimethylamido) Molybdenum – A. Bertuch, L. Lecordier, M. Dalberth, G. Sundaram, J. Becker (Cambridge Nanotech), E. Deguns (Unaffiliated), M. Saly, D. Moser, and R. Kanjolia (SAFC Hitech)

15:40 **2466** Room-Temperature ALD of Metal Oxide Thin Films by Energy-Enhanced ALD – S. E. Potts, H. B. Profijt, R. Roelofs, and W. Kessels (Eindhoven University of Technology)

E4 Gallium Nitride and Silicon Carbide Power Technologies 2

Electronics and Photonics / Dielectric Science and Technology

316C, Level 3, Hawaii Convention Center

Plenary Session – 08:00 – 10:00
Co-Chairs: Krishna Shenai and Noboru Ohtani

08:00 **2513** Overview of Three-Dimension Integration for Point-of-Load Converters – F. C. Lee and Q. Li (Virginia Tech)

08:30 **2514** Development of High Power Density All-SiC Three-Phase Inverter – S. Sato, K. Matsui, Y. Zushi, Y. Murakami, and S. Tanimoto (R&D Partnership for Futire Power Electronics Technology)

09:00 **2515** Defect Electronics in SiC and Fabrication of Ultrahigh-Voltage Bipolar Devices – T. Kimoto (Kyoto University)

09:30 Intermission (30 Minutes)

Silicon Carbide Power Devices I – 10:00 – 12:00
Co-Chairs: Mietek Bakowski and Sunny Kedia

10:00 **2516** SiC Trench Devices with Ultra Low R_{on} – T. Nakamura, M. Aketa, and Y. Nakano (ROHM Co., Ltd.)

10:20 **2517** Fabrication of a SiC Double Gate Vertical Channel JFET and It's Application in Power Electronics – A. Schöner and M. Bakowski (Acreo AB)

10:40 **2518** Recent Advances in VJFETs at SemiSouth – K. Chatty, D. C. Sheridan, V. Bondarenko, R. Schrader, K. Speer, and J. B. Casady (SemiSouth Laboratories)

11:00 **2519** Optimization of 4.5kV Si IGBT/SiC Diode Hybrid Module – K. D. Hobart, E. Imhoff (Naval Research Laboratory), T. Duong, and A. Hefner (National Institute of Standards and Technology)

11:20 **2520** Aspects on SIC Switches for Soft-Switching Converters in an Industrial Application – P. Ranstad and J. Linner (Alstom Power)

11:40 **2521** Fast High Voltage Switching With SiC Power Devices – T. Funaki (Osaka University)

Silicon Carbide Crystal Growth – 14:00 – 16:00
Co-Chairs: Mike Dudley and Noboru Ohtani

14:00 **2522** On the De-Rating of Silicon Carbide (SiC) Power Devices – K. Shenai (University of Toledo)

14:20 **2523** Managing Basal Plane Dislocations in SiC: Perspective and Prospects – D. Gaskill, R. Myers-Ward, V. Wheeler (U.S Naval Research Laboratory), R. Stahlbush, N. Mahadik, E. Imhoff, L. O. Nyakiti, and C. Eddy Jr (U.S. Naval Research Laboratory)

14:40 **2524** Growth and Characterization of Thick 4H-SiC Epilayers for Very High Voltage Bipolar Devices – H. Tsuchida, T. Miyazawa, X. Zhang, M. Nagano, R. Tanuma, I. Kamata, and M. Ito (Central Research Institute of Electric Power Industry)

15:00 **2525** Life-Time Killing Defects in Ion-Implanted 4H-SiC; Enhanced Annealing and Lateral Distribution – L. Sundnes Løvlie, L. Vines, I. Pintilie, and B. G. Svensson (University of Oslo)

15:20 **2526** Silicon Carbide Bulk Crystal Growth Modeling from Atomic Scale to Reactor Scale – S. NISHIZAWA (National Institute of Adanced Indusctrial Science and Technology)

15:40 **2527** Modeling of SiC CVD Epitaxial Growth using CFD-ACE+ – A. Bhoj (ESI US R&D Inc), S. Tangli (University of Southern Carolina), and K. Shenai (University of Toledo)

Panel # 1: Can We Eliminate Defects in Bulk SiC and GaN Materials? – 18:00 – 20:00
Co-Chairs: Krishna Shenai and Noboru Ohtani

18:00 Introduction of Panelists (15 Minutes)
18:15 K. Gaskill (10 Minutes)
18:25 T. Kimoto (10 Minutes)
18:35 K. Waldrip (10 Minutes)
18:45 M. Mann (10 Minutes)
18:55 S. Nishizawa (10 Minutes)
19:05 M. Dudley (10 Minutes)
19:15 Q&A (45 Minutes)

E5 Dielectric Materials and Metals for Nanoelectronics and Photonics 10

Dielectric Science and Technology / Electronics and Photonics
313A, Level 3, Hawaii Convention Center

Non Volatile Memory – 10:00 – 12:30
Co-Chairs: Albert Chin and Samares Kar

10:00 Introductory Remarks (10 Minutes)

10:10 **2574** Ultra-Low Switching Power RRAM Using Hopping Conduction Mechanism – A. Chin, Y. Chiu (National Chiao-Tung University), C. Cheng (National Taiwan Normal University), Z. Zheng, and M. Liu (Chinese Academy of Sciences)

10:40 **2575** ALD Grown Functional Oxide Layers for Nonvolatile Resistive Switching Memory Applications – S. Hoffmann-Eifert and R. Waser (Forschungszentrum Juelich)

11:10 **2576** Hafnium Oxide Based CMOS Compatible Ferroelectric Materials – U. Schroeder (Namlab gGmbH), J. Mueller (Fraunhofer CNT), E. Yurchuk, S. Mueller, D. Martin, S. Slesazeck, and T. Mikolajick (Namlab gGmbH)

11:40 **2577** HfO_2-based RRAM for Embedded Nonvolatile Memory: From Materials Science to Integrated 1T1R RRAM Arrays – T. Bertaud, C. Walczyk, D. Walczyk, M. Sowinska, D. Wolansky, B. Tillack, G. Schoof, C. Wenger (IHP), S. Thiess (DESY), and T. Schroeder (IHP)

12:10 **2578** Resistive Switching of Iron Oxide Nanoparticles in Patterned Array Structure on Flexible Substrate – J. Kim, J. Yoo, Y. Baek, H. Kim, Q. Hu, C. Kang, and T. Yoon (Myongji University)

Novel Dielectrics – 13:50 – 16:00
Co-Chairs: Joerg Osten and Sven Van Elshocht

13:50 **2579** Theoretical Perspectives in Defect and Impurity Physics toward Materials Design for Oxides – N. Umezawa (National Institute for Materials Science)

14:20 **2580** Strain-induced effects on dielectric properties of thin, crystalline rare earth oxides on silicon – H. Osten and D. Schwendt (Leibniz University)

14:50 **2581** Epitaxial Si and Gd_2O_3 Heterostructures – Distributed Bragg Reflectors with Stress Management Function for GaN on Si Light Emitting Devices – R. Dargis, A. Clark, E. Arkun, R. Roucka, D. Williams, R. S. Smith, and M. Lebby (Translucent Inc.)

15:10 **2582** Room Temperature Ferromagnetism Induced by Electric Field in Cobalt-Doped TiO_2 – T. Fukumura (University of Tokyo)

15:40 **2583** Enhancement of Dielectric Properties and Magnetic Coupling of $Pb(Fe_{0.5}Nb_{0.5})O_3$ by Doping $Ni_{0.65}Zn_{0.35}Fe_2O_4$ – S. K. Barik, D. K. Pradhan, S. Sahoo, V. Pauli, and R. Katiyar (University of Puerto Rico)

E6 High Purity Silicon 12

Electronics and Photonics
320, Level 3, Hawaii Convention Center

Keynote – 08:50 – 09:40
Co-Chair: E. Simoen

08:50 Introductory Remarks (10 Minutes)

09:00 **2624** Challenges for the Semiconductor Industry in the 21st Century – P. A. Gargini (Intel Corporation)

09:40 Intermission (20 Minutes)

Crystal Growth – 10:00 – 12:00
Co-Chairs: R. Falster and G. Kissinger

10:00 **2625** Si Crystal Growth from a Melt: The Secrets Behind the v/G Criterion – J. Vanhellemont (Ghent University)

10:30 **2626** FZ Crystal Growth of Si and Ge- Current Limitations and Approaches to Overcome – H. Riemann, H. Rost, M. Wuenscher, R. Menzel, and B. Hallmann-Seiffert (Leibniz-Institute for Crystal Growth)

11:00 **2627** Electrolytic Deposition of Silicon for Solar Application – S. Sokhanvaran and M. Barati (University of Toronto)

11:20 **2628** A Study on Density Functional Theory of the effect of Pressure on the Formation and Activation Enthalpies of Intrinsic Point Defects in Growing Single Crystal Si – K. Sueoka, E. Kamiyama, and H. Kariyazaki (Okayama Pref. University)

11:40 **2629** Surface and Gate-Oxide Properties of a Large-Scale, <110>-oriented High-Purity CZ-Si – J. Lee, W. Lee, J. Kim, D. Hwang, and H. Kang (LG Siltron)

12:00 Lunch Break (120 Minutes)

Doping, Impurities and Point Defects – 14:00 – 15:50
Co-Chairs: P. Stallhofer and J. Vanhellemont

14:00 **2630** Schottky Barrier Height Engineering for Low Resistance Contacts to Ge and III-V Devices – K. Saraswat, J. Lin, A. Nainani, A. Roy (Stanford University), B. Yang (Globalfoundries), and Z. Yuan (Stanford University)

14:30 **2631** Challenges and Opportunities for Doping Control in Ge for Micro and Optoelectronics Applications – E. Bruno (University of Catania), G. Scapellato, E. Napolitani, S. Mirabella, A. La Magna (CNR-IMM), M. Mastromatteo, D. De Salvador (University of Padova), S. Boninelli, G. Fortunato, V. Privitera (CNR-IMM), and F. Priolo (University of Catania)

15:00 **2632** Defect Engineering at the Nanoscale: Challenges and Trends – E. G. Seebauer (University of Illinois)

15:30 **2633** Long-Range Interaction between H and (B or P) Dopant Atoms in Silicon Crystals Investigated by First Principles Calculation – E. Kamiyama and K. Sueoka (Okayama Pref. University)

E7 Low-Dimensional Nanoscale Electronic and Photonic Devices 5

Electronics and Photonics / Dielectric Science and Technology / Sensor
304A, Level 3, Hawaii Convention Center

Low-Dimensional Silicide Materials – 10:10 – 11:40
Co-Chairs: Li-Jen Chou and Song Jin

10:10 **2660** Syntheses of a Variety of Silicide Nanowire and Nanosheet Bundles – H. Tatsuoka, W. Li, E. Meng, and D. Ishikawa (Shizuoka University)

10:35 **2661** Bottom-up Process to Fabricate Periodic Arrays of β-$FeSi_2$ Nanopillars for Photonic Applications – Y. Kaneko, M. Suzuki, K. Nakajima, and K. Kimura (Kyoto University)

11:00 **2662** Mn Silicide Nanowires on the Si(001)-2×1 Surface Having Anisotropic Strain Fields with Bi Nanolines – K. Miki, H. Liu (National Institute for Materials Science), and J. Owen (Université de Genève)

11:25 **2663** A Proposal of Schottky Barrier Height Tuning Method with Interface Controlled Ni/Si Stacked Silicidation Process – Y. Tamura, R. Yoshihara, K. Kakushima, P. Ahmet, Y. Kataoka, A. Nishiyama, N. Sugii, K. Tsutsui, K. Natori, T. Hattori, and H. Iwai (Tokyo Institute of Technology)

Low-Dimensional Materials for Energy Conversion – 14:00 – 15:45
Co-Chairs: Hirokazu Tatsuoka and Motofumi Suzuki

14:00 **2664** High-Performance Piezoelectric Nanogenerators Based on Piezoelectric and Semiconducting Coupled Properties – S. Kim (Sungkyunkwan University)

14:25 **2665** Novel Functional Materials and Characterizations for Highly Efficient Dye-Sensitized Solar Cells – E. W. Diau (National Chiao Tung University)

14:50 **2666** WO_3 Nanotubes for Effective Photoelectrochemical Water-Splitting – X. Zheng (Stanford University)

15:15 **2667** Fabrication of Silicon Groove/Pyramid Hierarchical Structures for Solar Cell Applications – Z. Lin (Photonics and Optoelectronic), A. Li, H. Wang (National Taipei University of Technology), and J. He (National Taiwan University)

15:30 **2668** Large Scale Single-Crystal Cu(In,Ga)Se_2 Nanotip Arrays For High Efficiency Solar Cell – Y. Chueh (National Tsing Hua University)

E8 Processing Materials of 3D Interconnects, Damascene and Electronics Packaging 4

Dielectric Science and Technology / Electrodeposition / Electronics and Photonics
310, Level 3, Hawaii Convention Center

Challenges in Damascene and 3D Integration – 08:00 – 09:40
Co-Chairs: K. Kondo and R. Akolkar

08:00 **2715** Innovation Through Industry and University Collaboration – S. Johnston (Intel Corporation)

08:40 **2716** Heterogeneous 3D Stacking Technology Developments – H. Ikeda (ASET)

09:10 **2717** Metallization for 3D interconnect processing – H. Philipsen, Y. Civale, K. Vandersmissen, M. Honore, F. Inoue, and P. Leunissen (IMEC)

Novel Processes for 3D Packaging – 10:00 – 12:00
Co-Chairs: F. Roozeboom and M. Koyanagi

10:00 **2718** 3D Wafer Stacking via Bonding of Recessed Cu Damascene Structures – C. Tan (Nanyang Technological University)

10:30 **2719** 3D Integration Technologies Based on Surface-Tension Driven Multi-Chip Self-Assembly Techniques – T. Fukushima, K. Lee, J. Bea, T. Tanaka, and M. Koyanagi (Tohoku University)

11:00 **2720** High Aspect Ratio Silicon Etch – B. Wu (Applied Materials, Inc.)

11:30 **2721** Through Silicon Via (TSV) Process Using DRIE and Cathode Coupled PE-CVD – Y. Kusuda (SAMCO INC.)

Electrodeposition and Electroless Plating Advances – 14:00 – 16:00
Co-Chairs: M. Hayase and G. Mathad

14:00 **2722** Advances in Semiconductor Metallization Technologies for New Applications and Device Scaling – R. Preisser (Atotech USA Inc.)

14:30 **2723** Opportunities for Electroless Copper Deposition in Semiconductor Manufacturing – Y. Dordi (Lam Research Corp)

15:00 **2724** Cu Electroless Deposition on Ru Barrier – Investigation of Growth Phenomena and Film Properties – K. Kim, T. Lim, K. Park, H. Koo, M. Kim, and J. Kim (Seoul National University)

15:20 **2725** Control of Adhesion Strength and TSV Filling Morphology of Electroless Barrier Layer – R. Arima, F. Inoue, H. Miyake, T. Shimizu, and S. Shingubara (Kansai University)

15:40 **2726** The Wire Grid Polarizer made by Electro- and Electroless- Deposition Processes – N. Okamoto, Y. Ikeda, Y. Koyama (Osaka Prefecture University), Y. Kawazu (Asahi Kasei E-materials Corp.), T. Saito, and K. Kondo (Osaka Prefecture University)

E10 More than Moore

Dielectric Science and Technology / Electronics and Photonics / Sensor / New Technology Subcommittee

319A, Level 3, Hawaii Convention Center

Roadmaps – 08:00 – 10:00

08:00 **2782** More Moore or More than Moore – C. Hobbs, K. Ang, R. Hill, C. Kang, W. Loh, K. Hummler, S. Arkalgud, P. Kirsch, and R. Jammy (SEMATECH)

08:40 **2783** Technology Roadmapping of ICs "More than Moore" Functional Diversification – B. Bader (iNEMI) and M. Gaitan (National Institute of Standards and Technology (NIST))

09:20 **2784** Emerging Research Devices and Architectures for More-Than-Moore Applications – A. Chen (Globalfoundries)

Bioelectronics – 10:00 – 12:00

10:00 Intermission (15 Minutes)

10:15 **2785** Engineering the Bio-Abio Interface to Enable Next Gen Bionics – A. Guiseppi-Elie, C. Kotanen, O. Karunwei, and A. Wilson (Clemson University)

10:50 **2786** Enabling Long-Term Dielectrophoretic Actuation for Cell Manipulation and Analysis in Microfluidic Biochips – D. R. Reyes (National Institute of Standards and Technology)

11:25 **2787** Microsystem Pathways to a Greener World Using Radioisotopes – A. Lal (Cornell University)

3D Systems – 13:05 – 14:50

13:05 **2788** Superconducting Fault Current Limiter with Fast Nanosecond Switching Time for Communication System Application – T. Chiu, C. Shih (CSIST), C. Cheng, C. Cheng (Chung-Shan Institute of Science & Technology), T. Huang (CSIST), and T. Chang (Chung-Shan Institute of Science & Technology)

13:40 **2789** High-Speed Alkaline Etching for Backside Exposure of through Silicon Vias – K. Yoshikawa (Tohoku University), T. Miyazaki (PRE-TECH AT CO., LTD), N. Watanabe, and M. Aoyagi (National Institute of Advanced Industrial Science and Technology)

14:15 **2790** Development of Novel MOSFET with Front and Back Side Electrodes for 3D-Structured Image Sensors – M. Goto, K. Hagiwara, Y. Iguchi, H. Ohtake (NHK Science and Technology Research Laboratories), T. Saraya, H. Toshiyoshi, and T. Hiramoto (The University of Tokyo)

3D Metrology – 14:50 – 16:00

14:50 **2791** Metrology to Enable "More than Moore" Applications of Resistive Switching Devices – C. A. Richter, J. Tedesco (NIST), H. Jang (NIST & Wake Forest University), H. Li (NIST & George Mason University), O. Jurchescu (Wake Forest University), and Q. Li (George Mason University)

15:25 **2792** Measurement Science for "More-Than-Moore" Technology Reliability Assessments – Y. Obeng (National Institute of Standards and Technology), C. Okoro, and J. Kopanski (National Institute of Standards and Technology (NIST))

E14 Semiconductor Wafer Bonding 12: Science, Technology, and Applications

Electronics and Photonics

312, Level 3, Hawaii Convention Center

Fundamentals – 08:00 – 09:40

08:00 **2952** Direct Bonding Energy Measurement Under Anhydrous Atmosphere – F. Fournel, L. Contini, C. Morales, J. Da Fonseca, H. Moriceau, C. Martin Cocher (CEA, LETI), F. Rieutord (CEA, INAC), A. Barthelemy, and I. Radu (Soitec)

08:40 **2953** Study of Hydrophilic Si Direct Bonding with Ultraviolet Ozone Activation for 3D Integration – J. Fan, G. Chong, and C. Tan (Nanyang Technological University)

09:00 **2954** Hydrophilic Wafer Bonding – An Acid/Base Concept – M. Reiche (Max-Planck-Institut für Mikrostrukturphysik)

09:20 **2955** Surface Activiation for Semiconductor Wafer Direct Bonding Using Polymer-Stripping Wet Chemicals – R. Knechtel, H. Wünschre, and H. Klingner (X-FAB Semiconductor Foundries AG)

Bonded Interface Properties – 10:00 – 12:00

10:00 **2956** *In Situ* Observation of Formation of Bonded Interface using MEMS-in-TEM at the Nanoscale – T. Ishida (Tokyo Institute of Technology)

10:40 **2957** Structure of Directly Bonded Interfaces Between Si and SiC – M. Yoshimoto, R. Araki, T. Kurumi, and H. Kinoshita (Kyoto Institute of Technology)

11:00 **2958** Influence of Interfacial Particles on Unbonded Area in Semiconductor Wafer Bonding: an Experimental Approach – H. Kim-Lee, A. Kim, D. Kim, J. Jeon, K. Woo, and B. Park (Samsung Corning Precision Materials)

11:20 **2959** Strain Characterization of Directly Bonded Germanium-to-Silicon Substrates – I. P. Ferain (Tyndall National Institute-UCC), N. Bennett, P. McNally (Dublin City University), S. Holl (California State University, Sacramento), and C. Colinge (Tyndall National Institute-UCC)

11:40 **2960** The Study on Defects of Germanium-on-Insulator Fabricated by a Low Temperature Smart-Cut Process – X. Zhang, F. Yang, Y. Ou (Institute of Miccroelectronics of Chinese Academy of Sciences), T. Ye (Chinese Academy of Sciences), and S. Zhuang (University of Shanghai for Science and Technology)

Wafer Bonding for Solar Cells – 14:00 – 16:00

14:00 **2961** Advanced III-V Multijunction Solar Cells Fabricated by Semiconductor Wafer Bonding – D. C. Law, D. Bhusari, S. Mesropian, S. Singer, P. Chiu, W. Hong, R. Woo, X. Liu, C. Fetzer, A. Palmer, E. Rehder, R. King, J. Boisvert, and N. Karam (Spectrolab, Boeing)

14:40 **2962** Development of GaInP/GaAs/Si Solar Cells using Surface Activated Wafer Bonding – S. Essig, K. Derendorf, E. Oliva, A. Wekkeli, J. Benick, M. Hermele, G. Siefer, A. Bett, and F. Dimroth (Fraunhofer Institute for Solar Energy Systems ISE)

15:20 **2963** Electrical Conductivity of Direct Wafer-Bonded GaAs/GaAs Structures for Wafer-Bonded Tandem Solar Cells – K. Yeung, J. Mc Kay, C. Roberts (University of California – Los Angeles), and M. Goorsky (University of California, Los Angeles)

E15 State-of-the-Art Program on Compound Semiconductors 54 (SOTAPOCS 54)

Electronics and Photonics / Luminescence and Display Materials

328, Level 3, Hawaii Convention Center

Advances in Wide Bandgap Semiconductors – 08:00 – 12:00

08:00 **3001** Progress in Nonpolar and Semipolar GaN Materials and Devices – J. S. Speck (University of California Santa Barbara)

08:30 **3002** Study of Protein-Peptide Binding Affinity Using AlGaN/GaN High Electron Mobility Transistors – C. Huang (National Tsing Hua University), G. Lee, J. Chyi (National Central University), H. Cheng (National Taiwan University Hospital), C. Hsu (National Tsing Hua University), Y. Hsu (NanoEngineering and MicroSystems, National Tsing Hua University), F. Ren (University of Florida), and Y. Wang (National Tsing Hua University)

09:00 **3003** Science Challenges of Ultra-Efficient Solid-State Lighting – M. H. Crawford and J. Tsao (Sandia National Laboratories)

09:30 **3004** InGaN/GaN Nanostructure Arrays for LEDs – T. Yeh, Y. Lin, and P. D. Dapkus (University of Southern California)

10:00 Intermission (15 Minutes)

10:15 **3005** Wide Bandgap Semiconductors for Sensing within Extreme Harsh Environments – D. G. Senesky (Stanford University)

10:45 **3006** ZnS-based Nanostructures: An Unique UV-Light Sensor – X. Fang, L. Hu, and L. Wu (Fudan University)

11:15 **3007** Detection of SARS Coronavirus Nucleocapsid Protein Using AlGaN/GaN High Electron Mobility Transistors – Y. Hsu (NanoEngineering and MicroSystems, National Tsing Hua University), G. Lee, J. Chyi (National Central University), C. Chang (Institute of Biomedical Sciences, Academia Sinica), C. Huang, C. Hsu (National Tsing Hua University), T. Huang (Institute of Biomedical Sciences, Academia Sinica), F. Ren (University of Florida), and Y. Wang (National Tsing Hua University)

11:30 **3008** n-type Nanostructures / p- GaN or Si Thin Film Positioned by Non-Uniform Electric Field – J. Kim (Korea University)

Advanced ins Wide Bandgap Semiconductors – 13:30 – 18:00

13:30 **3009** Resistive Switching in Zinc-Tin-Oxide and Atomic Layer Deposition of Nanolaminates for Amorphous Oxide Semiconductor Thin Film Transistors – J. Conley Jr. (Oregon State University)

14:00 **3010** Impurity-Induced Disordering in Si- and Mg-doped AlGaN-AlN Superlattices – A. Allerman, J. Wierer, Q. Li, M. H. Crawford, and S. Lee (Sandia National Laboratories)

14:30 **3011** III-Nitride Growth by PAMBE and Characterizations Towards Green Energy Applications – L. Tu, Y. Lin, C. Chang, P. Wadekar, T. Chen, and T. Deng (National Sun Yat-Sen University)

15:00 **3012** Phosphor-Free Green and Yellow LEDs in Nano-Patterned and Polarization Controlled Epitaxy – C. Wetzel and T. Detchprohm (Rensselaer Polytechnic Institute)

15:30 **3013** Improved Hydrogen Sensing Performance of AlGaN/GaN based sensor with Platinum Nanonetworks – S. Jang, H. Kim (Dankook University), S. Pearton, and F. Ren (University of Florida)

E16 Thin Film Transistors 11 (TFT 11)

Electronics and Photonics

327, Level 3, Hawaii Convention Center

Oxide TFTs and Fabrication Process I – 08:00 – 10:20
Co-Chair: Y. Kuo

08:00 Introductory Remarks (10 Minutes)

08:10 **3043** Transparent Amorphous Oxide Semiconductor TFTs: History and current status – H. Hosono (Tokyo Institute of Technology)

08:50 **3044** Top-Gate effects in Dual-Gate Amorphous $InGaZnO_4$ Thin-Film Transistors – K. Takechi (NLT Technologies, Ltd.), S. Iwamatsu, T. Yahagi, Y. Watanabe, S. Kobayashi (Yamagata Research Institute of Technology), and H. Tanabe (NLT Technologies, Ltd.)

09:30 **3045** Deposition of Low Stress Amorphous Zinc Tin Oxide at Ambient Temperature using a Remote Plasma Sputtering Process Suitable for Delicate Substrates – S. M. Pfaendler (University of Cambridge), G. Ercolano, J. Driscoll (Department of Material Science, University of Cambridge), and A. J. Flewitt (Department of Engineering, University of Cambridge)

09:50 Intermission (30 Minutes)

Oxide TFTs and Fabrication Processes II – 10:20 – 12:00
Co-Chairs: S. Fonash and H. Hosono

10:20 **3046** MgZnO/ZnO Heterostructure Field-Effect Transistors Fabricated by RF-Sputtering – B. Wang (Graduate Institute of Photonics and Optoelectronics & Department of Electrical Engineering, National Taiwan University), I. Cheng, and J. Chen (National Taiwan University)

10:40 **3047** a-InGaZnO Thin-Film Transistor with Non-Vacuum Processed InGaZnO/AlOx Gate Dielectric Stack – M. Furuta, T. Kawaharamura (Kochi University of Technology), T. Toda (School of Environmental Science and Engineering, Institute for Nanotechnology, Kochi University of Technology), and W. Dapeng (Kochi University of Technology)

11:00 **3048** Simple Aqueous Solution Route for Fabrication of High Performance Oxide TFT – B. Bae (Korea Advanced Institute of Science ad Technology (KAIST)), Y. Hwang, J. Seo, and G. Choi (KAIST)

11:20 **3049** Fabricating Multiple Channeled Zinc Oxide Thin Film Transistor via Sol-Gel Method – G. Chiou, S. Liu (National Chi Nan University), S. Chen (National Tsing Hua University), and H. Chen (National Chi Nan University)

11:40 **3050** Improvement of Solution-Processed Oxide Thin-Film Transistors by Ultra-Violet Treatment – J. Lee, S. Song, D. Kang, Y. Kim, J. Kwon, and M. Han (Seoul National University)

Oxide TFT Device and Reliability – 14:00 – 16:00
Co-Chairs: H. Hosono and P. Migliorato

14:00 **3051** Light and Bias Induced Defects in a-IGZO Thin Film Transistors – P. Migliorato (Cambridge University), M. Seok, J. Um, M. Chowdhury (Kyung Hee University), and J. Jang (Kyung Hee Univ.)

14:40 **3052** Improvement of the Photo-Bias Stability of Zn-Sn-O Field effect Transistors by an Ozone Treatment – B. Yang, S. Oh, Y. Kim, and H. Kim (Seoul National University)

15:00 **3053** Improvement in the Photo-Induced Bias Instability of Oxide TFT by Controlling Sub-Gap States – K. Son, T. Kim, J. Park, H. Kim, S. Seo, J. Seon (Samsung Advanced Institute of Technology), K. Ji, J. Jeong (Inha University), H. Lee, S. Im (Yonsei University), M. Ryu, and S. Lee (Samsung Advanced Institute of Technology)

15:20 **3054** Mixed Oxide Thin Film Transistors Under Combinatory Optical Irradiation and Electrical Bias – T. L. Alford, R. Vemuri, and W. Mathews (Arizona State University)

15:40 **3055** The effect of Zn/Sn Ratio on the Electrical Performance of Amorphous ZrZnSnO (ZZTO) Thin Film Transistors by RF Sputtering – I. Chiu, I. Cheng, and J. Chen (National Taiwan University)

E17 SiGe, Ge, and Related Compounds: Materials, Processing, and Devices 5

Electronics and Photonics
316A, Level 3, Hawaii Convention Center

Opening and Plenary Session – 08:25 – 10:35
Co-Chair: David Harame

08:25 Introductory Remarks (20 Minutes)

08:45 **3101** Advanced CMOS Scaling and FinFET Technology – E. J. Nowak (IBM)

09:40 **3102** FinFET--How to Make a Very Short Channel MOSFET – C. Hu (Univ. of Calif., Berkeley)

FET/Strain Session 1: FinFET – 10:50 – 12:10
Co-Chairs: Yee-Chia Yeo

10:50 **3103** Effect of Fin Doping Concentration on the Electrical Characteristics of Germanium-on-Insulator Multi-Gate Field-Effect Transistor – B. Liu, X. Gong, C. Zhan (National University of Singapore (NUS)), G. Han (National University of Singapore), N. Daval, C. Veytizou, D. Delprat, B. Nguyen (Soitec), and Y. Yeo (National University of Singapore)

11:10 **3104** Germanium Gate-All-Around FETs on SOI – H. Chang (GIEE,NTU), S. Hsu, C. Chu (National Nano Device Laboratories), W. Tu, Y. Chen (National Taiwan University), P. Sung, G. Luo (National Nano Device Laboratories), and C. Liu (National Taiwan University)

11:30 **3105** Selective Growth Of Strained Ge Channel On Relaxed SiGe Buffer In Shallow Trench Isolation For High Mobility Ge Planar And Fin p-FET – B. Vincent, L. Witters, O. Richard, A. Hikavyy, H. Bender, R. Loo, M. Caymax, and A. Thean (imec)

11:50 **3106** Stress Techniques and Mobility Enhancement in FinFET Architectures – G. Eneman, L. Witters, J. Mitard, G. Hellings, A. De Keersgieter (Imec), D. Brunco (Globalfoundries), A. Hikavyy, B. Vincent, E. Simoen, P. Favia, H. Bender, A. Veloso, T. Chiarella, G. Boccardi, M. Kim, M. Togo, R. Loo, K. De Meyer, N. Horiguchi, N. Collaert, and A. Thean (imec)

HBT Session 1: Advanced SiGe HBT Technology – 13:40 – 16:00
Co-Chairs: Guofu Niu and Mikael Ostling

13:40 **3107** Advanced Transistor Architectures for Half-Terahertz SiGe HBTs – B. Heinemann, A. Fox, and H. Rücker (IHP)

14:10 **3108** Understanding the Effects of Epitaxy Artifacts on SiGe HBT Performance through Detailed Process/Device Simulation – R. Camillo-Castillo, Q. Liu, P. Cheng, J. Adkisson (IBM Microelectronics), and D. Harame (IBM Systems and Technology Group)

14:30 **3109** Improved Frequency Response in a SiGe npn Device through Improved Dopant Activation – J. Adkisson (IBM Microelectronics), M. Khater (IBM T.J. Watson Research Center), J. Gambino, P. Cheng, V. Jain, R. Camillo-Castillo (IBM Microelectronics), C. Lavoie (IBM T.J. Watson Research Center), A. Sutton, O. Gluschenkov (IBM Semiconductor Research and Development Center), Q. Liu, T. McDevitt (IBM Microelectronics), S. Engelmann (IBM T.J. Watson Research Center), J. Pekarik (IBM Microelectronics), and D. Harame (IBM Systems and Technology Group)

14:50 **3110** Evaluation of RF Noise Source Relative Importance in SiGe HBTs Using Various Noise Representations – Z. Xu and G. Niu (Auburn University)

15:10 **3111** Strained Silicon Heterojunction Bipolar Transistors – A. ONeill (Newcastle University)

15:40 **3112** A Self-Aligned Sacrificial Emitter Process for High Performance SiGe HBT in BiCMOS – Q. Liu (IBM Microelectronics) and D. Harame (IBM Systems and Technology Group)

F1 Bio-Enabled Materials, Processes, and Devices

Electrodeposition / Physical and Analytical Electrochemistry / Sensor

311, Level 3, Hawaii Convention Center

Electrochemical Biosensors – 10:00 – 11:40
Co-Chairs: John Harb and Zorida Aguilar

10:00 **3244** (Invited) DNA-Translocation through a Solid-State Nanopore Coated with a Functionally Switchable Self-Assembled Monolayer – S. Harrer (IBM Research Laboratory Melbourne), D. Wang, B. Luan, G. Stolovitzky, H. Peng, and A. Afzali-Ardakani (IBM Research USA)

10:40 **3245** (Invited) Electrochemical Biosensors for Detecting Pathogens – W. R. Heineman, X. Guo, A. Kulkarni, S. Iyer, and H. Halsall (University of Cincinnati)

11:20 **3246** Iridium Oxide Hybrids as Electrodes for the Neural System – N. M. Carretero, J. Moral, A. Cruz, and N. Casañ-Pastor (ICMAB-CSIC)

Biologically Inspired Systems – 14:00 – 15:40
Co-Chair: Daniel Schwartz

14:00 **3247** (Invited) Hierarchically Assembly of Materials Using Biological Building Blocks – S. Kim, M. Vasudev, J. Slocik, S. Jones, T. Bunning, and R. Naik (Air Force Research Laboratory)

14:40 **3248** (Invited) Biologically Inspired Synthesis of a Photocatalytically Active Membrane for Water Treatment – N. Kinsinger, A. Dudchenko, A. Wong (UC Riverside), D. Li (Lawrence Berkeley National Labs), and D. Kisailus (UC Riverside)

15:20 **3249** Bio-Inspired Chemistry for Electrophoretic Nanotechnology – I. Zhitomirsky (McMaster University)

F2 Electrodeposition General Session: Fundamentals and New Materials – Dieter M. Kolb Memorial Symposium

Electrodeposition

313B, Level 3, Hawaii Convention Center

Session I – 08:00 – 10:00
Co-Chairs: R. Alkire and T. Homma

08:00 Introductory Remarks (20 Minutes)

08:20 **3262** On the Structure of the Helmholtz Layer at the Solid-Electrolyte Boundary and its Relation to Electrode Kinetics – H. J. Lewerenz (California Institut of Technology)

09:00 **3263** Metal Deposition on Metal, Semiconductor, Organic Layer – Common Interests with Prof. Dieter Kolb – K. Uosaki (NIMS)

09:40 Intermission (20 Minutes)

Session II: UPD and Adsorption – 10:00 – 12:00
Co-Chairs: T. Homma and R. Alkire

10:00 **3264** Underpotential Deposition of Cu on Au(111) in Acid Sulfate Solution – N. Vasiljevic (University of Bristol), L. Viyannalage (SUNY-Binghamton), N. Dimitrov (SUNY at Binghamton), and K. Sieradzki (Arizona State University)

10:20 **3265** Tuning the Driving Force in Underpotential Codeposition of Alloys via Selective Complexation: Application to Au-Cu Alloys – D. Liang and G. Zangari (University of Virginia)

10:40 **3266** Lead Underpotential Deposition on Sub-Monolayer Pt and Ru Modified Au(111) Surface – Q. Yuan, A. Tripathi, M. Slavkovic, and S. Brankovic (University of Houston)

11:00 **3267** EC-STM Study of Two-Dimensional Complex Adlayer Directly Formed on Au(111) – S. Yoshimoto (Kumamoto University) and K. Nishiyama (Kumamoto Univ.)

11:20 **3268** Characterisation of the Deposition of n-octano-hydroxamate on Copper Surfaces – G. K. Parker (Griffith University), S. Holt (Australian Nuclear Science and Technology Organisation), and G. Hope (Griffith University)

11:40 **3269** Electrochemical Formation of Cu-Corronene Adlayer on Au(111) in Acidic Solution – T. Sawaguchi (National Institute of Advanced Industrial Science and Technology) and S. Yoshimoto (Kumamoto University)

Session III: Thin Film Electrodeposition – 14:00 – 16:00
Co-Chairs: K. Uosaki and L. Kibler

14:00 **3270** E-ALD of Pd on Au Single Crystals – L. Sheridan, Y. Kim, J. Stickney (The University of Georgia), and D. B. Robinson (Sandia National Laboratories)

14:20 **3271** Layer-by-layer Pt Electrodeposition on Au Single Crystal Surfaces Studied by *In Situ* Resonance Surface X-ray Scattering – T. Kondo, M. Shibata (Ochanomizu University), T. Masuda, and K. Uosaki (NIMS)

14:40 **3272** The Evolution of Surface Morphology and Stress in Electrodeposited Copper Nanofilms – M. O'Grady, C. Lenihan (Materials and Surface Science Institute, University of Limerick), and D. Buckley (Materials & Surface Science Institute, University of Limerick)

15:00 **3273** Electrochemical Impedance Spectroscopy Applied to Cantilever Curvature – M. C. Lafouresse, U. Bertocci, C. Beauchamp, and G. Stafford (NIST)

15:20 **3274** Controlling Pt Nucleation and Growth by Solution Chemistry and Deposition Conditions – Y. Liu, D. Gokcen (National Institute of Standards and Technology), U. Bertocci (NIST), and T. Moffat (National Institute of Standards and Technology)

15:40 **3275** XAS Study of Core-Shell PtRu Nanoparticles from Galvanic Pulse Current Deposition – Y. Hsieh (National Chiao Tung University), L. Chang (Graduate Program for Science and Technology of Accelerator Light Source), P. Wu (Department of Materials Science and Engineering National Chiao Tung University), and J. Lee (National Synchrotron Radiation Research Center)

F3 Electroless Deposition: Principles, Activation, and Applications 2

Electrodeposition

306A, Level 3, Hawaii Convention Center

Co-Chairs: Stojan Djokic, John Sickney, T. Homma, and W. Cai

08:00		Introductory Remarks (5 Minutes)
08:05	**3312**	Influence of Added Elements on Electroless Ni-P – P. Cavallotti and L. Magagnin (Politecnico di Milano)
08:25	**3313**	Corrosion of Copper and Nickel During Electroless NiP/Pd Deposition – C. S. Tiwari and R. Nguyen (Micron Technology Inc.)
08:45	**3314**	Electrochemical Evaluation of Electroless Ni-Zn-Cu-P Alloy Deposition – M. Zaimi and K. Noda (Shibaura Institute of Technology)
09:05	**3315**	Deposition of Thin Metallic Films on Semiconductor Substrates – S. Djokic (Elchem Consulting, Ltd.), N. Djokic (Elchem Consulting Ltd.), and T. Thundat (University of Alberta)
09:25	**3316**	Copper Electroless Deposition on a Glass Substrate – P. Chan and W. Dow (National Chung Hsing University)
09:45	**3317**	Co-Ni Electroless Composite Plating of 20 nm Diamond particles on 10 micrometer Plastic Balls and the Application of thus prepared devices to Post CMP Processes – S. Yoshihara (Utsunomiya University)
10:05		Intermission (15 Minutes)
10:20	**3318**	Impact of the Silicon Substrates Cleaning and Activation in the Nickel Electroless Plating – M. Bouttemy (Institut Lavoisier de Versailles), H. El Belghiti (OMG Ultra Pure Chemicals), D. Aureau (CNRS-UVSQ), E. Delbos (OMG Ultra Pure Chemicals), and A. Etcheberry (Institut Lavoisier de Versailles)
10:40	**3319**	Fluoride Free Galvanic Displacement of Copper and Silver as Surface Modifications for MEMS – D. Serrao, A. Raygani, and L. Magagnin (Politecnico di Milano)
11:00	**3320**	Solution-Source Vapor-Phase Mist Deposition Method for Future Roll-to-Roll Process in Semiconductor Device Fabrication – S. Fujita, S. Katori, T. Ikenoue, and J. Piao (Kyoto University)
11:20	**3321**	Effect of Light/Heat on Fast Formation Reaction of Highly-Conductive Polymer with Metal Shell Structure – Y. Hashimoto (Chiba Institute of Technology), J. Kawakita, T. Chikyow (National Institute for Materials Science), and Y. Sakamoto (Chiba Institute of Technology)
11:40	**3322**	Deposition Rate of Metal on Conducting Polymer Under Photo Irradiation – H. Fujihira, J. Kawakita, T. Chikyow (National Institute for Materials Science), and Y. Sakamoto (Chiba Institute of Technology)

Co-Chairs: J. Stickney, Stojan Djokic, and L. Magagnin

14:00	**3323**	On the Mechanism of Electroless Deposition of Ni-P: Electrochemical and Computational Investigations – L. Magagnin, C. Cavallotti, and P. Cavallotti (Politecnico di Milano)
14:20	**3324**	Electroless Deposition for Developing ATR Surface Enhanced IR Spectroscopy – W. Cai (Department of Chemistry, Fudan University)
14:40	**3325**	Investigation of Reactions and Additive Effects in Electroless Deposition by *In Situ* Transmittance Measurement – K. Park, T. Lim, M. Kim, and J. Kim (Seoul National University)
15:00		Intermission (20 Minutes)
15:20	**3326**	Factors Affecting Reaction Rates of Chemical Bath Deposition of Copper Oxide Thin Films – J. Sasano, Y. Adachi, and M. Izaki (Toyohashi University of Technology)
15:40	**3327**	The Interaction of Tantalum with Tellurite Ions in Basic Solution – C. Tsang and J. Stickney (The University of Georgia)

F5 Magnetic Materials and Devices 12

Electrodeposition

323C, Level 3, Hawaii Convention Center

Magnetic Recording and Materials 1 – 09:00 – 16:00
Co-Chairs: C. Bonhote, G. Zangari, and S. Brankovic

09:00	**3391**	Thin Film Magnetic Heads – Early Inventions and Their Ongoing Impact on Magnetic Storage and on Electrochemistry – L. Romankiw (IBM, Thomas J. Watson Research Center) and S. Krongelb (IBM Thomas J. Watson Research Center)
09:40		Intermission (20 Minutes)
10:00	**3392**	Beyond Perpendicular Magnetic Recording-Alternative Magnetic Storage Technologies – N. Robertson (HGST Research)
10:40	**3393**	Electrodeposition of Magnetic Alloys Used in Fabrication of Recording Heads – I. Tabakovic, S. Riemer, J. Gong, V. Venkatasamy, and M. Kautzky (Seagate Technology)
11:20	**3394**	Magnetic Tape Heads and Contact Recording – R. G. Biskeborn (IBM Corporation)
12:00		Intermission (120 Minutes)
14:00	**3395**	Electrochemical Deposition of Magnetic Alloy Films with Large Magnetic Anisotropy – D. Liang and G. Zangari (University of Virginia)
14:40	**3396**	Reversible Change of Magnetism in FePt and CoPt Films by Electrochemical Charging – K. Leistner (IFW)
15:20	**3397**	Resistivity Control in CoFeNiX Magnetic Alloys – N. Dole (University of Houston), D. Lee, N. Brockie, A. Papou, W. French (Texas Instruments), and S. Brankovic (University of Houston)
15:40	**3398**	Composition Gradients and Magnetic Properties of 10-100nm NiFe and CoFe Films Obtained by Electrodeposition – J. Gong, S. Riemer, V. Venkatasamy, M. Kautzky, and I. Tabakovic (Seagate Technology)

I1 Physical and Analytical Electrochemistry General Session

Physical and Analytical Electrochemistry

318B, Level 3, Hawaii Convention Center

PAED General Session 1 – 09:00 – 12:00
Co-Chairs: R. Calhoun and S. Chen

09:00	**3527**	Electrochemical Measurements in High Magnetic Fields for Energy Storage – A. Migliori, C. R. Kreller, R. L. Borup, and F. H. Garzon (Los Alamos National Laboratory)

09:20 **3528** The Importance of Electrochemical Surface Potentials in Pressure Solution – K. Kristiansen, M. Valtiner (University of California, Santa Barbara), G. Greene (Deakin University), J. Boles, and J. Israelachvili (University of California, Santa Barbara)

09:40 Intermission (20 Minutes)

10:00 **3529** Surface Intermediates of the Oxygen Evolution Reaction on Iridium as Observed by Surface Interrogation Scanning Electrochemical Microscopy (SI-SECM) – N. Arroyo-Curras and A. Bard (University of Texas at Austin)

10:20 **3530** SECM Footprint Analysis of Reactive Oxygen Species Produced During Multielectronic O_2 Reduction – J. Noel (University of Rennes 1), A. Latus (University of Bucharest), C. Lagrost (University of Rennes 1), E. Volanschi (University of Bucharest), and P. Hapiot (Universite de Rennes 1)

10:40 **3531** New Methods and New Applications of Electrochemiluminescent Analysis – G. Xu, L. Hu, L. Zhang, Y. Yuan, T. Yuan, and S. Parveen (Changchun Institute of Applied Chemistry)

11:00 **3532** Probing The Structure and Composition at the Electrode Interface: Understanding the Importance of Through-Space Interactions – M. R. Anderson, M. De La Rosa, M. Tomlinson, and M. Anderson (University of Colorado Denver)

11:20 **3533** Surface-Enhanced Raman Spectroscopy Platforms for Studying Electrodeposition and Surface Chemistry of Nanostructured Semiconductors – J. Gu and S. Maldonado (University of Michigan)

11:40 **3534** Detection of Tetryl by Electrogenerated Chemiluminescence (ECL) quenching of Ru(bpy)32+ – P. Lindhome and R. L. Calhoun (US Naval Academy)

PAED General Session 2 – 14:00 – 18:00
Co-Chairs: P. Trulove and R. Mantz

14:00 **3535** Simulation of Electrochemical Micromachining with Nanosecond Pulses – E. L. Hotoiu, S. Van Damme, and J. Deconinck (Vrije Universiteit Brussel)

14:20 **3536** Performance Characterization of the Titanium(IV)-Porphyrin Reagent for Determining Hydrogen Peroxide based on Ab Initio Calculations – K. Takamura (Tokyo University of Pharmacy and Life Sciences) and T. Matsumoto (Institute of Multidisciplinary Research for Advanced Materials, Tohoku University)

14:40 **3537** Quantum Mechanical Analysis on the Effect of Electric Field on the Adsorption of Water and Hydronium on Transition Metal Surfaces – A. Huzayyin, J. Chang, F. Dawson, and K. Lian (University of Toronto)

15:00 **3538** A Temperature Dependent Multi-Ion Model for Time Accurate Numerical Simulation of the Electrochemical Machining Process – D. Deconinck, S. Van Damme, and J. Deconinck (Vrije Universiteit Brussel)

15:20 **3539** Electroless Deposition of the cylindrical Iron Nanotubes using Anodic Aluminium Oxide Template – T. Hussain, A. Shah, and G. Zohra (University of the Punjab)

15:40 **3540** Extract Metals by a Treated Scallop Shell Powder – K. Takeuchi, H. Honda, S. Tamura, T. Ishiguro, Y. Kogo (Tokyo University of Science), H. Koyanaka (Kyoto University), J. Neuefeind, M. Feygenson, and A. Kolesnikov (Oak Ridge National Laboratory)

I2 Bioelectroanalysis and Bioelectrocatalysis

Physical and Analytical Electrochemistry
317B, Level 3, Hawaii Convention Center

Bioelectroanalysis – 08:20 – 12:00
Co-Chairs: L. Mao and A. Brajter-Toth

08:20 **3572** Electrochemical Investigations of Lipid Membranes and Proteins at the Liquid-Liquid Interface – R. Kataky (Durham University)

08:40 **3573** Fabrication of Nanoporous 1- 3 nm Thick Membranes on Nanostructured Microelectrodes for Low nM Detection – A. Boateng (University of Florida), F. Irague (Université Paul Sabatier Toulouse III), and A. Brajter-Toth (University of Florida)

09:00 **3574** Electrochemical Immunoassay of Phosphorylated Proteins – D. Du (Central China Normal University)

09:20 **3575** Intermediate Layers for Immobilization of Biomacromolecules on Various Substrates – A. Nowicka, A. Kowalczyk, M. Fau, and Z. J. Stojek (University of Warsaw)

09:40 Intermission (20 Minutes)

10:00 **3576** Functional Nanomaterials for Sensitive Bioassay – D. Du (Pacific Northwest National Laboratory) and Y. Lin (Pacific Northwest National Lab)

10:20 **3577** In Vivo Electroanalytical Chemistry: Strategies Based on Surface/Interface Chemistry – L. Mao (Institute of Chemistry, Chinese Academy of Sciences (CAS))

10:40 **3578** Development of Nano-Pt/Graphene/Nafion Composite Membrane for Glucose Biosensor – H. Leu, K. Chiu, and C. Lin (Feng Chia University)

11:00 **3579** Electrochemical Techniques as Effective Readout Methods for Aptamer based Biosensors – E. Wang (Changchun Institute of Applied Chemistry)

11:20 **3580** Synthesis Graphene-based Nanocomposites and Apply in Electrochemical Sensors – Z. WANG (Changchun Institute of Applied Chemistry, Chinese Academy of Sciences)

11:40 **3581** Electrochemical Surface Plasmon Resonance Sensor based on Nanohole Array Electrode Fabricated by Nanoimprinting Technique – O. Niwa (National Institute of Advanced Industrial Science and Technology), K. Nakamoto (National Institute of Advanced Industrial Science and Technology, University of Tsukuba), and R. Kurita (National Institute of Advanced Industrial Science and Technology)

Bioelectrocatalysis – 14:00 – 18:00
Co-Chairs: D. Cliffel and S. Calabrese Barton

14:00 **3582** Investigation of the Dissimilarity Metal Reduction (DMR) Pathways of *Shewanella* with Spatial Resolution by Scanning Electrochemical Microscopy – G. Chen, D. Kimmel, and D. Cliffel (Vanderbilt University)

14:20 **3583** Facilitation of High-Rate NADH Electrocatalysis at Activated Carbon Electrode – H. Li, R. Li, R. Worden, and S. Calabrese Barton (Michigan State University)

14:40 **3584** Ionic Liquid-Based Electrochemical Biosensors – P. Yu and L. Mao (Institute of Chemistry, Chinese Academy of Sciences (CAS))

15:00 **3585** Electrochemical Biosensor and Biofuel Cell Applications of Nanomaterials Modified Electrodes – S. Chen, Y. Li, V. Mani, and M. Rajkumar (National Taipei University of Technology)

15:20 **3586** Direct Electron Transfer and Electrocatalysis of Hemoglobin on ITO Nanoparticle Electrode – Y. Ayato, K. Yamagiwa (Tokyo University of Science), H. Shiroishi (Tokyo National College of Technology), and J. Kuwano (Tokyo University of Science)

15:40 **3587** A Third Generation L-fucose Biosensor based on a Novel Dehydrogenase from the Basidiomycete Coprinopsis Cinerea – M. Inukai (Tokyo University of Agriculture and Technology), H. Matsumura, K. Igarashi, M. Samejima (The University of Tokyo), N. Nakamura, and H. Ohno (Tokyo University of Agriculture and Technology)

I3 Molten Salts and Ionic Liquids 18

Physical and Analytical Electrochemistry / Electrodeposition / Energy Technology

301A, Level 3, Hawaii Convention Center

Electrochemistry in Molten Salts and Ionic Liquids – 08:00 – 08:40
Co-Chair: W. M. Reichert

08:00 **3615** Fundamental Study on Reduction Rate for Electrolytic Reduction of SiO_2 Powder in Molten $CaCl2_2$ – T. Toba, K. Yasuda, T. Nohira, R. Hagiwara (Kyoto University), K. Ichitsubo, K. Masuda (Taiheiyo Cement Corporation), and T. Homma (Waseda University)

08:20 **3616** Anodic Reactions on Some Materials in LiCl-KCl Melt – T. Takenaka, M. Umehara, D. Araki, and T. Morishige (Kansai University)

New Molten Salts and Ionic Liquids and Properties – 08:40 – 14:00
Co-Chairs: W. M. Reichert and J. Davis

08:40 **3617** Properties of Quaternary Phosphonium Fluorohydrogenate Ionic Liquids and Their Derivatives Giving Ionic Plastic Crystal Phases – R. Hagiwara, T. Enomoto, and K. Matsumoto (Kyoto University)

09:00 **3618** Border between Ionic Liquids and Electrolyte Solutions – M. Watanabe (Yokohama National University)

09:40 Intermission (20 Minutes)

10:00 **3619** Ion Pairs in Ionic Liquids – J. Hallett, I. Villar-Garcia, and T. Welton (Imperial College, London)

10:40 **3620** Bulk and Interfacial Properties of Ionic Liquids and Their Mixtures with Lithium Salts – O. Borodin (U.S. Army Research Laboratory), J. Vatamanu (University of Utah), L. Xing (The University of Utah), G. Smith (Wasatch Molecular Inc), and D. Bedrov (The University of Utah)

11:00 **3621** Polymorphic Behavior of Alkali Metal Bis(Fluorosulfonyl)Amides – K. Matsumoto, T. Oka, T. Nohira, and R. Hagiwara (Kyoto University)

11:20 **3622** Effect of Interaction between Cation-Anion on Ionic Conductivity in Room Temperature Molten Fluorides Containing HF – A. Tasaka, H. Inoue, T. Isogai, T. Nakai, M. Saito, and M. Inaba (Doshisha University)

11:40 **3623** Protic Ionic Liquids as Fuel Cell Electrolytes: Contrast and Similarities between Bulk and Electrochemical Properties – M. Miran, T. Yasuda, M. Susan, K. Dokko, and M. Watanabe (Yokohama National University)

12:00 Lunch Break (120 Minutes)

New Molten Salts and Ionic Liquids/Properties of MS and IL – 14:00 – 16:00
Co-Chairs: D. Fox and M. Watanabe

14:00 **3624** Boronium Based Ionic Liquids: Salts of Boron Centered Cations as Promising Salts for Electrochemical Applications – J. H. Davis Jr. (University of South Alabama), T. Ruether (Commonwealth Scientific and Research Organization, CSIRO, Energy Technology), and S. Dorman (Birmingham Southern College)

14:40 **3625** The Structure of Ionic Liquids on the Nanoscale – C. J. Margulis, H. Kashyap, H. Annapureddy, J. Hettige (University of Iowa), E. Castner Jr., C. Santos, and N. Murthy (Rutgers University)

15:20 **3626** Physicochemical and Electrochemical Properties of Novel Ionic Liquids Containing Aprotic Heterocyclic Anions Doped with Lithium Salts – C. Shi, A. DeSilva, M. Guzman, and J. Brennecke (University of Notre Dame)

15:40 **3627** New Approaches to the Low-melting Inorganic Ionic Liquid Challenge – T. G. Tucker and C. Angell (Arizona State University)

I4 Electrocatalysis 6

Physical and Analytical Electrochemistry / Energy Technology / Industrial Electrochemistry and Electrochemical Engineering

315, Level 3, Hawaii Convention Center

Electrocatalysis Structural Effects I – 08:15 – 12:00
Co-Chairs: G. Brisard and V. Ramani

08:15 Introductory Remarks (5 Minutes)

08:20 **3737** (Invited) Oxygen Evolution Reaction on Minute Amounts of Ru and Ir Catalyst for Application in Fuel Cell Protection – R. T. Atanasoski (3M Company), D. A. Cullen (Oak Ridge National Laboratory), and L. Atanasoska (3M Company)

09:00 **3738** ORR Activity Enhancement of MBE-prepared Pt monolayer on Au(111) Single Crystal Substrate – Y. Iijima, Y. Takahashi, N. Todoroki, K. Matsumoto, and T. Wadayama (Tohoku University)

09:20 **3739** Facile Synthesis of Pd_xCo@Pd/C Core-Shell Nanoparticles and Pt-Decorated Pd_3Co@Pd/C as Oxygen Reduction Reaction Electrocatalysts – D. Wang, C. Li (Southwest University), and H. D. Abruña (Cornell University)

09:40 Intermission (20 Minutes)

10:00 **3740** Oxygen Reduction for Fuel Cells and Batteries: Mechanistic Studies and the Design of New Catalysts – A. A. Gewirth, C. Tornow, and E. Tse (University of Illinois)

10:20 **3741** Surface Modification of PtRu/C by Mono-layered Decoration of Pt, Au, Pd, and Ir for Oxygen Reduction Reaction – C. Kuo (National Chiao Tung University), L. Chang (Graduate Program for Science and Technology of Accelerator Light Source), Y. Hsieh (National Chiao Tung University), P. Wu (Department of Materials Science and Engineering National Chiao Tung University), and J. Lee (National Synchrotron Radiation Research Center)

10:40 **3742** An Excellent Electrocatalysis of Novel Pt-TaOx Composite Electrocatalysts for Oxygen Reduction Reaction – Z. Awaludin, T. Okajima, and T. Ohsaka (Tokyo Institute of Technology)

11:00 **3743** Carbon Supported Pt-Os Electrocatalysts for Oxygen Reduction Reaction – Y. Lee, C. Kuo, Y. Hsieh (National Chiao Tung University), P. Wu (Department of Materials Science and Engineering National Chiao Tung University), and J. Lee (National Synchrotron Radiation Research Center)

11:20 **3744** Instantaneous One-Pot Synthesis of Fe-N-codoped Graphene as an Efficient Electrocatalyst for Oxygen Reduction Reaction in Acidic Solutions – K. Kamiya, K. Hashimoto, and S. Nakanishi (The University of Tokyo)

11:40 **3745** Strip-Like Nanosized Tungsten Carbide as Catalyst for Oxygen Reduction Reaction – S. Kang and P. Shen (Sun Yat-Sen University)

Surface Characterisation of Electrocatalysts – 14:00 – 16:00
Co-Chairs: P. K. Shen and R. Atanasoski

14:00 **3746** *In Situ* STM Elucidation of the effects of Step Structures on Pt(111) Electrodes for Dissolved CO Oxidation – J. Inukai, D. A. Tryk, T. Abe, M. Wakisaka, H. Uchida, and M. Watanabe (University of Yamanashi)

14:20 **3747** High Speed AFM Study on the Potential Dependence of the Dissolution of Shape-controlled Pt Nanoparticles – Y. Yamada, C. Yoshida (Chiba University), M. Nakamura (Chiba Univeristy), and N. Hoshi (Chiba University)

14:40 **3748** XPS and STEM of the Interface Formation between Ultra-Thin Ru, Ir and Pt Layers and Perylene Red Catalyst Support Whiskers – L. L. Atanasoska (3M Company), D. A. Cullen (Oak Ridge National Laboratory), A. Hester (3M), and R. T. Atanasoski (3M Company)

15:00 **3749** Ethanol Electrooxidation on a (2x2)-Sn/Pt(111) Surface Alloy and a SnO_x/Pt(111) Surface: A Combined Surface Science and *In Situ* FTIR Study – W. Zhou, J. Magee, S. Axnanda, R. R. Adzic, and M. G. White (Brookhaven National Laboratory)

15:20 **3750** Electrochemical and ATR-IR Investigation on Decontaminated Shape-Controlled Pd Nanocrystals – H. Zhang and W. Cai (Department of Chemistry, Fudan University)

15:40 **3751** Molecular Structures of Fluorinated Self-Assembled Monolayers (SAMs) Constructed on Metal Surfaces Investigated by Surface Vibrational Spectroscopies – I. Yagi, K. Nomura, and K. Inokuma (FC-Cubic TRA)

J1 Chemical Sensors 10 – Chemical and Biological Sensors and Analytical Systems

Sensor

319B, Level 3, Hawaii Convention Center

J1-1 – Nano/Bio Sensors – 08:00 – 12:00
Co-Chairs: A. Simonian and B. Chin

08:00 **3827** Phytosensors and Phytoactuators – A. G. Volkov, M. Volkova (Oakwood University), and V. Markin (University of Texas)

08:20 **3828** Biofuel Cell Providing a Platform for Self-Powered Biosensors – S. Dong (Changchun Institute of Applied Chemistry)

08:40 **3829** Miniature Enzymatic Biosensors for Tear Glucose Measurement in Capillary Tubes – B. Peng, Q. Yan (University of Michigan), B. Cohan (EyeLab Group), T. C. Major, and M. E. Meyerhoff (University of Michigan)

09:00 **3830** Real-time and Ultra-sensitive detection of Cancer Marker Using a Novel Silicon Nanobelt Field Effect Transistor – Y. Yu (Graduate Institute of Biomedical Materials and Tissue Engineering), J. Wu (Department of Dentistry, Taipei Medical University Hospital), and C. Wu (Graduate Institute of Biomedical Materials and Tissue Engineering)

09:20 **3831** Graphene Oxide-Based Aptasensor for Heavy Metal Detection – M. Li and N. Wu (West Virginia University)

09:40 **3832** Time Sensors: Circadian Rhythms in Biologically Closed Electrochemical Circuits of Plants – A. Waite, J. Wooten, A. G. Volkov (Oakwood University), and V. S. Markin (The University of Texas)

10:00 Intermission (20 Minutes)

10:20 **3833** Immobilization of Enzymes and Redox Proteins and Their Electrochemical Biosensor Applications – S. Chen, V. Mani, S. Palanisamy, and Y. Li (National Taipei University of Technology)

10:40 **3834** Salmonella Typhimurium Detection on Food Surface using Magnetoelastic Biosensors – Y. Chai, S. Horikawa, M. Park, S. Li, and B. Chin (Auburn University)

11:00 **3835** Bio-Inspired Autonomous Sentinel System for Screening Invasive Pathogens – S. Li, H. Wikle, Y. Chai, M. Park, S. Horikawa, and B. Chin (Auburn University)

11:20 **3836** New Multimode Sensors based on Nanostrucured Materials for Simultaneous Screening of Biological Fluids for Specific Breast Cancer and Hepatitis B Biomarkers – R. I. Stefan – van Staden (National Institute of Research for Electrochemistry and Condensed Matter) and M. Enachescu (Center for Surface Science and Nanotechnology, University "Politehnica" of Bucharest)

11:40 **3837** Direct Detection of Salmonella Typhimurium on Tomato and Spinach using a Phage-based Magnetoelastic Biosensor Method – M. Park, S. Li, K. Weerakoon, S. Horikawa, Y. Chai, and B. Chin (Auburn University)

J1-2 – Nano/Bio Sensors – 13:40 – 16:00
Co-Chairs: G. Hunter and Y. Shimizu

13:40 **3838** Development of Electrochemical Cantilever Sensors for DNA Applications – X. Quan, Y. Sun (Technical University of Denmark), A. Labuda (McGill University), A. Heiskanen, A. Wolff (Technical University of Denmark), J. Jorge Dulanto, P. Grutter (McGill University), and A. Boisen (Technical University of Denmark)

14:00 **3839** Fabrication of Minimally-Invasive Patch Type Glucose Sensors – M. Yasuzawa, S. Sato, H. Nakanishi, and K. Edagawa (University of Tokushima)

14:20 **3840** Flexprint based Glucose Sensors for Continuous Measurement of Glucose Profiles of Diabetic Patients – P. D. Van der Wal (EPFL), P. Hadvary, H. Tschirky (PharmaSens AG), and N. De Rooij (EPFL Lausanne)

14:40 **3841** Nanodiamond Microelectrode Array with Mesa Structure Fabricated for Bio-Analytical Applications – S. Raina, N. Ghosh, and W. Kang (Vanderbilt University)

15:00 **3842** An Electrochemical Probe Technology for a Label-Free, Point-of-Care Biosensor – J. Wei, S. Singhal (CFD Research Corporation), and H. Liu (Michigan Technological University)

15:20 **3843** Electrical Impedance Sensors for Cancer Cell Study – L. Yang (North Carolina Central University)

15:40 **3844** Terahertz Chemical Imaging and Spectroscopy of Molecular Networks in Pharmaceutical and Biomedical Applications – K. Ajito, Y. Ueno, H. Song, E. Tamechika, N. Kukutsu (NTT Corporation), W. Limwikrant, K. Yamamoto, and K. Moribe (Chiba University)

J3 Materials for Solid State Lighting

Luminescence and Display Materials / New Technology Subcommittee
316B, Level 3, Hawaii Convention Center

Inorganic & Organic Semiconductors – 08:00 – 12:00
Co-Chairs: Anant Setlur and John Collins

08:00 **3955** (Centennial Outstanding Achievement Award Presentation of the LDM Division) Toward Further Breakthroughs in Nitride Phosphors – H. Yamamoto (Tokyo University of Technology)

09:00 **3956** Spatio-Time-Resolved Cathodoluminescence Studies on Freestanding GaN Substrates Grown by Hydride Vapor Phase Epitaxy – S. F. Chichibu, Y. Ishikawa, K. Hazu, M. Tashiro, K. Furusawa (Tohoku University), H. Namirta, S. Nagao, K. Fujito (Mitsubishi Chemical Corporation), and A. Uedono (University of Tsukuba)

09:40 **3957** Electrical Characterization of High-quality InGaN-based Blue Light Emitting Diodes on 8inch Silicon Grown by Metalorganic Chemical Vapor Deposition – J. Kim, J. Kim, Y. Tak, J. Kim, H. Hong, S. Chae, M. Yang, J. Lee, H. Choi, J. Park, Y. Park, and U. Chung (Samsung Advanced Institute of Technology)

10:00 **3958** Simulation and Design of (In,Ga)N-Based Light Emitting Diodes – Z. Liang, E. Stach, T. Sands, and E. García (Purdue University)

10:20 **3959** Tuning of Indium Tin Oxide Work Function with an Ionic Solid Thin Film in Polymer Light-Emitting Diodes – Y. Chou and T. Wen (National Cheng Kung University)

10:40 **3960** First Principles Investigations of the Electronic Structures and Associated Properties of Solid Solutions of AlN and GaN – K. C. Mishra (Osram Sylvania), P. Schmidt (Technische Universität Darmstadt, Darmstadt, Germany), and K. Johnson (MIT, Cambridge, MA, USA)

11:00 **3961** Fabrication Semipolar GaN on Nanoscale Pattern C-sapphire by Using Self-Assembled Ni Pattern as Mask – C. Chen, C. Hsieh, and Y. Wu (National Chiao Tung University)

11:20 **3962** Transparent Electrode for Top Emitting Organic Light Emitting Diodes by Suppression of Surface Plasmons – B. Koo, S. Kim, K. Hong, K. Kim, I. Lee, and J. Lee (Pohang University of Science and Technology)

11:40 **3963** Growth and Electrical Properties of n-type 4H-SiC Single Crystals – X. Xu, Y. Peng, S. Song, X. Chen, and X. Hu (Institude of Crystal Materials)

Nanomaterials and New Downconverters – 13:30 – 15:10
Co-Chairs: Kailash Mishra and Kyota Ueda

13:30 **3964** Nanoco's CFQDs for Solid-State Lighting Applications – N. Pickett (Nanoco Technologies)

14:10 **3965** Fabrication of Efficient, Stable White Light-Emitting Diodes Based on Highly Fluorescent Copper-Indium-Sulfide Quantum Dots – W. Song and H. Yang (Hongik University)

14:30 **3966** Glass Matrices Containing Rare-Earth Ions for White Light-Emitting Diodes with High Color Rendering Indices – J. Heo and S. Yi (Pohang University of Science and Technology)

14:50 **3967** High Color Rendering White LED Based on Silicate/Dye-Bridged Siloxane Hybrid Phosphor Encapsulant – B. Bae (Korea Advanced Institute of Science ad Technology (KAIST)), S. Kwak, N. Kim, and H. Im (KAIST)

New Concepts – 15:10 – 15:30
Co-Chair: Anant Setlur

15:10 **3968** Hybrid Solid-State Lighting Design – W. Hertog, C. Hunt, and J. Carreras (Catalonia Institute for Energy Research (IREC))

Tuesday, October 9

09:00h..... Technical Exhibit

09:00h..... Professional Development Series: Career Fair

09:30h..... Technical Session Coffee Break

12:00h..... Student Poster Award Presentation

14:00h..... Professional Development Series: Resume Workshop

18:00h..... General Poster Session & Technical Exhibit

18:00h..... Professional Development Series: Career Fair

A2 Nanotechnology General Session

All Divisions / New Technology Subcommittee

313C, Level 3, Hawaii Convention Center

Applications of Nanomaterials – 08:00 – 12:00
Co-Chairs: Oana Leonte and N. Kobayashi

08:00 **249** Graphene Nanocomposites for Electrochemical Applications – L. Niu (Chinese Academy of Sciences)

08:20 **250** Three Dimensional PtRh Alloy Porous Nanostructures: Tuning the Atomic Composition and Controlling the Morphology for the Application of Direct Methanol Fuel Cell – Y. Zhang (Shanghai University), C. Liu (National Central University), M. Janyasupab (Case Western Reserve University), J. Xu (Shanghai University), and C. Liu (Case Western Reserve University)

08:40 **251** Cesium Transfer from Granule Conglomerate Using Water Containing Nano-Sized Air Bubbles – Y. Ueda, Y. Tokuda (Kyoto University), S. Fujimura (Fukushima Agricultural Technology Centre), and T. Oka (Sunstar Engineering Inc.)

09:00 **252** Scalable Non-Volatile Memory and Switch Device for High-Density Bipolar ReRAM Applications – D. Lee, M. Lee, and U. Chung (Samsung Advanced Institute of Technology)

09:20 **253** Storage Properties of Surfaces and Interfaces: Enhanced Nonstoichiometry of Thin Silver Sulfide and Gold/Silver Sulfide Films – A. Rein, B. Luerßen (Justus Liebig University), and J. Janek (Justus Liebig University Gießen)

09:40 Intermission (20 Minutes)

10:00 **254** Fabrication of Hollow Spheres with Ordered Porous Structures by Anodizaiton of Small Metal Particles – T. Yanagishita, S. Ueno, K. Nishio, and H. Masuda (Tokyo Metropolitan University)

10:20 **255** Building 3D Nanostructured Supports for Pt Nanoparticles Used in Electrocatalytic Applications – C. Hu (Chongqing University)

10:40 **256** Molecular Electronic Devices Based on Self-Assembled Multilayer Films Bearing Redox-Active Ru Complexes – M. Haga, T. Nakabayashi, H. Ozawa, T. Suzuki (Chuo University), T. Joke, and K. Nakazato (Nagoya University)

11:00 **257** Micropatterned MnO_2/CNT MEA Ultracapacitors – S. Raina, S. Hsu, W. Kang, and J. Huang (Vanderbilt University)

11:20 **258** Formation of a Vertically Oriented Anodic TiO_2 Nanotube Film on a Transparent Conductive Oxide Layer and Its Application to a Dye-Sensitized Solar Cell – R. Kojima, T. Ma, Y. Kimura, and M. Niwano (Tohoku University)

11:40 **259** Synthesis of ZnO Nano-Sheets and Their Application in UV-Detector – S. Sahoo, S. Barik, A. Gaur, R. Katiyar, and R. Katiyar (University of Puerto Rico)

Synthesis of Nanomaterials – 14:00 – 17:20
Co-Chairs: Oana Leonte and Guoliang Xiao

14:00 **260** Colloidal Synthesis of Semiconducting Ag_2ZnSnS_4 Nanoparticle and Their Visible-Light-Driven Photoresponse – T. Sasamura, T. Osaki, T. Kameyama, K. Okazaki (Nagoya University), A. Kudo (Tokyo University of Science), S. Kuwabata (Osaka University), and T. Torimoto (Nagoya University)

14:20 **261** A Novel Surface Nano-Structure Design for SiGe/Si Type-II Hetero-Junction Solar Cell with Superior Performance – M. Liao, C. Chen, L. Chang, C. Yang (National Taiwan University), C. Hsieh (Industrial Technology Research Institute), and M. Lee (National Taiwan Normal University)

14:40 **262** Evolution of Germanium Quantum Dots Migration in Si Bearing Layer Mediated by Thermal Oxidation – K. Chen, I. Chen, C. Chien, C. Wang (National Central University), T. George (Zyomed Corporation), and P. Li (National Central University)

15:00 **263** Fe-Co Alloy Nanoparticles and Nanowires Prepared by Electroless Deposition – M. Kawamori (Kyoto University), S. Yagi (Osaka Prefecture University), and E. Matsubara (Kyoto University)

15:20 **264** Adhesion Energy and Etching-Free Renewable Transfer of Graphene As-Grown on Copper – T. Yoon, W. Shin, T. Kim, J. Mun, B. Cho, and T. Kim (KAIST)

15:40 Intermission (20 Minutes)

16:00 **265** Preparation and Characteristics of Proton Conducting Oxide Nano-Particles Using Planetary Bead-Mill – T. Sakai, Y. Okuyama, T. Ishihara, and H. Matsumoto (Kyushu University)

16:20 **266** Low Temperature Synthesis of Nanoscaled Carbon Thin Films by Chemical Vapor Deposition Using Solid Carbon Source – S. Vijapur, D. Wang, and G. G. Botte (Ohio University)

16:40 **267** Deterministic Placement of Doping Atoms on Silanol Surfaces – L. Mathey, L. Veyre (CNRS), H. Fontaine, V. Enyedi, K. Yckache, J. Guerrero, F. Martin, J. Barnes, F. Bertin (CEA-LETI), C. Thieuleux, and C. Copéret (CNRS)

17:00 **268** Optimization of Electrochromic Materials by Molecular Design: The Naphthalenediimide-Functionalized EDOT – R. Ruffo, M. Sassi, M. M. Salamone, and L. Beverina (University of Milano Bicocca)

B1 Batteries and Energy Technology Joint General Session – In Honor of James McBreen

Battery / Energy Technology

Coral 1, Mid-Pacific Conference Center, Hilton Hawaiian Village

Emerging Battery Technologies – 08:00 – 12:20
Co-Chairs: A. Manivannan and P. Kumta

08:00 **353** Electrochemical Behavior of Nanocrystalline $MgMnO_3$ Cubic Defect Spinel Cathode for Rechargeable Magnesium Battery – P. Saha, M. Datta (University of Pittsburgh), A. Manivannan (U.S. Department of Energy), and P. N. Kumta (University of Pittsburgh)

08:20 **354** A Novel Boron-Based Electrolyte System for Rechargeable Mg Batteries – Y. Guo, J. Yang, F. Zhang, and F. Wang (Shanghai Jiao Tong University)

08:40 **355** Electrochemical Stability of Metal Electrodes for Reversible Magnesium Deposition/Dissolution in Tetrahydrofuran – S. Yagi, A. Tanaka (Osaka Prefecture University), T. Ichitsubo, and E. Matsubara (Kyoto University)

09:00 **356** Electrochemical Performances of Tetrathiafulvalene Polymer (TTF) as a Cathode Material for Nonaqueous Secondary Batteries – N. Hojo, T. Tsukagoshi, Y. Inatomi, and H. Yoshizawa (Panasonic Corporation)

09:20 **357** A Review of Secondary Magnesium Battery R&D at The Dow Chemical Company – T. D. Gregory (The Dow Chemical Company)

09:40 Intermission (20 Minutes)

10:00 **358** Magnesium Electrolyte Based on $EMImBF_4$ and δ-$[MgCl_2]_n$ for Secondary Magnesium Batteries – V. Di Noto, F. Bertasi, E. Negro, and S. Lavina (Università di Padova)

10:20 **359** Beta-Battery Based on ^{63}Ni/Macroporous Silicon – A. Dolgyi, S. Redko, H. Bandarenka, A. Shapel, and V. Bondarenko (Belarussian State University of Informatics and Radioelectronics)

10:40 **360** Developing Novel Electrolytes for Rechargeable Mg Batteries – J. Muldoon and C. B. Bucur (Toyota Research Institute of North America)

11:00 **361** Improvement of Sulfone-Based Electrolyte for Aluminum Rechargeable Battery – Y. Nakayama, Y. Senda (Sony Corporation), H. Kawasaki (KRI, Inc.), S. Chung (The University of Tokyo), N. Koshitani, S. Hosoi, Y. Kudo, and H. Morioka (Sony Corporation)

11:20 **362** A Conjugated Sulfidepolymer Battery with Variable Capacitance Controlled by Redox Reaction – J. Sakata (Toyota Central R&D Labs., Inc.)

11:40 **363** Building a Robust Liquid Metal Battery – P. J. Burke, B. H. Chung, A. D. LaDelpha, and D. R. Sadoway (Massachusetts Institute of Technology)

12:00 **364** Electrode Kinetics of Low Cost, High-Rate Tolerant, Engineering-Scale Liquid Metal Batteries – B. H. Chung, A. D. LaDelpha, and D. R. Sadoway (Massachusetts Institute of Technology)

Coral 2, Mid-Pacific Conference Center, Hilton Hawaiian Village

Aqueous Battery – 08:00 – 12:20
Co-Chairs: S. Narayan and Y. Meng

08:00 **365** Barium Hydroxide and the Rechargeable Performance of the Alkaline γ-MnO_2 Electrode – M. R. Bailey and S. W. Donne (University of Newcastle)

08:20 **366** **Optimizing Heat Treatment Environment and** Atmosphere of Electrolytic Manganese Dioxide for Primary Li/MnO_2 Batteries – W. M. Dose and S. W. Donne (University of Newcastle)

08:40 **367** Current Collectors for Secondary Zinc Electrodes – P. J. Bonnick and J. Dahn (Dalhousie University)

09:00 **368** Comparison of Pocket Plate and Sintered Plate Ni Electrodes Used in NiFe Cells for PV Back up Applications – I. Mabbett, J. Malone, and D. A. Worsley (Swansea University)

09:20 **369** Development of a Zinc-Based Battery System for Grid-Scale Energy Storage and Application of Flexographic Printing for the Fabrication – Z. Wang, R. Winslow, B. Kim, J. W. Evans, and P. K. Wright (University of California at Berkeley)

09:40 Intermission (20 Minutes)

10:00 **370** Effect of Substitution of Cobalt by Manganese on the Properties of Calcium-Doped Lanthanum Cobalt Oxide for Oxygen Evolution Reaction in Alkaline Medium – P. Trinh, S. Malkhandi, N. Moreno, A. Manohar, G. Prakash, S. Narayanan (University of Southern California), and A. Manivannan (U.S. Department of Energy)

10:20 **371** Mechanism of Formation of Carbonyl Iron Electrodes in Alkaline Batteries – A. Manohar, C. Yang, S. Malkhandi, B. Yang, G. Prakash, and S. Narayanan (University of Southern California)

10:40 **372** Exploring the Role of Ionic Interfaces of the High Voltage Lead Acid-Metal Hydride Hybrid Battery – G. Weng, C. V. Li, and K. Chan (The University of Hong Kong)

11:00 **373** Zinc Electrodeposition in Zinc-Nickel Flow-Assisted Batteries – X. Wei, A. Couzis, and S. Banerjee (The City College of New York)

11:20 **374** Modeling and Simulation of an Aqueous Li-Ion Battery with a Complex Electrolyte – A. Yermukhambetova, J. H. Pu, and Z. Bakenov (Nazarbayev University)

11:40 **375** A High Voltage Grid-Tied Stationary Energy Storage Demonstration Based on The Aqueous Hybrid Ion Battery System – J. F. Whitacre (Carnegie Mellon University), S. Shanbhag, D. Blackwood, W. Campbell, W. Yang, J. Gulakowski (Aquion Energy), A. Mohamed (Carnegie Mellon University), M. Sibenac, J. Weber, and T. Wiley (Aquion Energy)

12:00 **376** Elucidating Failure Mechanisms in the Soluble Lead- Acid Flow Battery – Formation of PbO_2 at the Cathode – M. Verde, K. Carroll, D. Keogh, A. Sathrum (University of California, San Diego), and Y. Meng (University of California San Diego)

Coral 5, Mid-Pacific Conference Center, Hilton Hawaiian Village

Li Battery Cathodes – 10:00 – 12:20
Co-Chairs: H. Arai and Manickam Minakshi

10:00 **377** Measurements of Effective Electronic and Ionic Conductivities in Porous Li-Ion Electrodes – S. Harris, N. Zacharias, C. Skelton, K. Knackstedt, D. Stephenson, Y. Wen, and D. R. Wheeler (Brigham Young University)

10:20 **378** Nanostructured CFx Provides Breakthrough in Performance of Li-CFx Cells – D. Meshri (Advance Research Chemicals, Inc.), E. Shembel (Enerize Corporation), S. Meshri, N. C. Mathur, R. Adams (Advance Research Chemicals, Inc.), V. Redko, T. Pastushkin (Enerize Corporation), I. Maksyuta, A. Markevich, L. Neduzko (Ukrainian State Chemical Technology University), V. Mitkin, and L. Levchenko (Russian Academy of Sciences)

10:40 **379** Structure and Electrochemistry of Olivine-Inorganic Composites for Lithium Batteries – I. Belharouak, G. Koenig (Argonne National Laboratory), and R. R. Shahbazian-Yassar (Michigan Technological University)

11:00 **380** Graphene as a Conductive Additive to Improve the Performance of Layered $LiNi_{0.66}Co_{0.17}Mn_{0.17}O_2$ Cathode for Lithium-Ion Batteries – C. Venkateswara Rao, J. Shojan, and R. Katiyar (University of Puerto Rico)

11:20 **381** Olivine type $LiMn_{1/3}Co_{1/3}Ni_{1/3}PO_4$ Cathode for Secondary Battery Applications – M. Minakshi and P. Singh (Murdoch University)

11:40 **382** Effects of LLTO Coating on High Temperature Cycle Life Performance of $LiMn_2O_4$ Cathode Material – M. Reddy, M. Prabu (National University of Singapore), S. Selvasekarapandian (Material Research Centre), G. Subba Rao, and B. Chowdari (National University of Singapore)

12:00 **383** Damage Evaluation of Solid Cells by Intelligent Information Processing on Acoustic Emission Events – D. Inaba, K. Fukui (Osaka University), K. Sato, J. Mizusaki, N. Kuwata, J. Kawamura (Tohoku University), and M. Numao (Osaka University)

Coral 1, Mid-Pacific Conference Center, Hilton Hawaiian Village

Supercapacitor – 14:00 – 17:00
Co-Chairs: A. Manivannan and Christina M. Johnston

14:00 **384** Advanced Proton Conducting Membrane for Solid Electrochemical Capacitors – H. Gao and K. Lian (University of Toronto)

14:20 **385** Nanostructured Transition Metal Nitride Supercapacitors: Effects of Composition, Structure, and Electronic Properties on Supercapacitor Response – P. Jampani Hanumantha (University of Pittsburgh), A. Manivannan (U.S. Department of Energy), and P. N. Kumta (University of Pittsburgh)

14:40 **386** Influence of Chemical Composition of the Electrolyte and Room-Temperature Ionic Liquids on the Electrical Double Layer Structure and Supercapacitor Characteristics – E. Lust, H. Kurig, A. Laheäär, I. Tallo, V. Ivaništšev, L. Siinor, C. Siimenson, A. Jänes, T. Thomberg, K. Lust, and J. Eskusson (University of Tartu)

15:00 **387** Carbon /MnO_2 Core-Shell Nanofibers for Supercapacitors – M. Zhi (West Virginia University), A. Manivannan, F. Meng (U.S. Department of Energy), and N. Wu (West Virginia University)

15:20 **388** Distortion of Solvated Structures by Microporous Structures of Carbon Materials – N. Ide, J. Nishioka, K. Urita, H. Furukawa, H. Yamada, and I. Moriguchi (Nagasaki University)

15:40 Intermission (20 Minutes)

16:00 **389** Bio-Enabled, Nanostructured Electrodes for Electrochemical Energy Storage Devices – M. Song and M. Liu (Georgia Institute of Technology)

16:20 **390** Polymorphic Behavior and Morphology of Electrospun Poly(Vinylidene Fluoride) Separator Materials for Non-Aqueous Based Electric Double Layer Capacitors – K. Tõnurist, T. Thomberg, T. Romann, A. Jänes, and E. Lust (University of Tartu)

16:40 **391** Conducting Polymers Based on Natural Membranes and Eu^{3+} – R. Leones (University of Minho), M. Fernandes (University of Trás-os-Montes e Alto Douro), R. A. Ferreira (Universidade de Aveiro), F. Sentanin, A. Pawlicka (Universidade de São Paulo), L. D. Carlos (Universidade de Aveiro), V. De Zea Bermudez (University of Trás-os-Montes e Alto Douro), and M. M. Silva (Universidade do Minho)

Coral 2, Mid-Pacific Conference Center, Hilton Hawaiian Village

Flow Battery Cell – 14:00 – 17:40
Co-Chairs: Adam Weber and Trung Nyugen

14:00 **392** Performance Improvement of a Hydrogen-Bromine Flow Battery – K. Cho, A. Weber, Q. He, P. Ridgway, V. Battaglia, and V. Srinivasan (Lawrence Berkeley National Laboratory)

14:20 **393** Recent Progress in Redox Flow Battery Research and Development at Pacific Northwest National Lab – W. Wang, Q. Luo, Z. Nie, M. Vijayakumar, X. Wei, B. Li, F. Chen, B. Chen, Y. Shao, G. Xia, L. Li, and Z. Yang (Pacific Northwest National Laboratory)

14:40 **394** New Discharge/Charge Performance Data for a H_2-Br_2 Flow Battery – V. Yarlagadda and T. V. Nguyen (The University of Kansas)

15:00 **395** Halogen Flow Batteries for Grid-Scale Electricity Storage – B. Huskinson, S. Mondal, J. Rugolo, and M. J. Aziz (Harvard School of Engineering and Applied Sciences)

15:20 **396** Grid-Scale Energy Storage Requirements and the Potential for Halogen-Based Flow Batteries – J. Rugolo, B. Huskinson, and M. J. Aziz (Harvard School of Engineering and Applied Sciences)

15:40 Intermission (20 Minutes)

16:00 **397** Aqueous Semi-Solid Flow Cell – Z. Li, P. Limthongkul, W. Carter, and Y. Chiang (Massachusetts Institute of Technology)

16:20 **398** Hydrogen Bromine Redox Flow Battery Cell Performance Study – Y. Bai (The University of Tennessee Knoxville), A. B. Papandrew, and T. A. Zawodzinski Jr. (The University of Tennessee)

16:40 **399** Characterization of Vanadium Redox Flow Batteries: An AC Impedance Spectroscopy Study – C. Sun (Oak Ridge National Laboratory), D. S. Aaron (The University of Tennessee Knoxville), A. Papandrew, and T. A. Zawodzinski Jr. (The University of Tennessee)

17:00 **400** Performance Enhancement, Limitations, and Diagnostics of Vanadium Redox Flow Batteries – J. T. Clement, A. M. Pezeshki, Q. Liu, A. B. Papandrew, A. Turhan, T. A. Zawodzinski Jr., and M. M. Mench (The University of Tennessee)

17:20 **401** Coulombic Efficiency of a Vanadium Redox Flow Cell – X. Gao, R. Lynch, M. Leahy (University of Limerick), and D. Buckley (Materials & Surface Science Institute, University of Limerick)

B2 Electrochemical Capacitors

Battery / Physical and Analytical Electrochemistry
South Pacific 4, Mid-Pacific Conference Center, Hilton Hawaiian Village

Carbon I – 08:00 – 09:40
Co-Chairs: N. L. Wu and S. Donne

08:00 **501** Electrochemical Characteristics and Application of Linear Carbon for Electrochemical Capacitors – S. Park (Chungbuk National University), J. Yang (Chunghuk National University), H. Kim, and H. Kimm (PureEchem Co. Ltd.)

08:40 **502** Chemical Modification of Carbons with Quinones by the Diazonium Chemistry for Application in Electrochemical Capacitors – M. Weissmann, A. Le Comte, G. Pognon, C. Cougnon (Université du Québec à Montréal), T. Brousse (University of Nantes), and D. Bélanger (Université du Québec à Montréal)

09:00 **503** Nitrogen Doped Graphene a High Efficient Electrode for Next Generation Supercapacitors – A. Yu, F. M. Hassan, Z. Chen, and V. Chabot (University of Waterloo)

09:20 **504** Fine-Tuning the Carbon – Electrolyte Interface for Designing High Energy Density Double Layer Capacitors – P. Simon, B. Daffos, R. Lin, P. Taberna (Université Paul Sabatier), and Y. Gogotsi (Drexel University)

Carbon II – 10:00 – 12:00
Co-Chairs: Y. Gogotsi and K. Lian

10:00 **505** Performance Limits of 2 V C/C Supercapacitors in Alkali Sulfate Aqueous Media – F. Béguin, K. Fic, P. Ratajczak, K. Jurewicz, Q. Abbas, G. Lota (Poznan University of Technology), G. Gao, L. Demarconnay, E. Raymundo (CRMD University), and E. Frackowiak (Poznan University of Technology)

10:20 **506** Diameter Dependent Doping of Single-Walled Carbon Nanotube Used as Electrical Double Layer Capacitor Electrode – A. Al-zubaidi, Y. Ishii, T. Matsushita, and S. Kawasaki (Nagoya Institute of Technology)

10:40 **507** Three Dimentional Graphene-MWNTs Foam Architectures for Electrochemical Capacitors – W. Wang, S. Guo, M. Ozkan, and C. Ozkan (University of California, Riverside)

11:00 **508** Effect of Additives on the Hydrothermal Synthesis of Carbon Nano- and Micro-Spheres and Their Performance in Double-Layer Capacitors – I. Kunadian, R. Chen, S. M. Lipka, C. R. Swartz, and F. Rogers (University of Kentucky)

11:20 **509** First Principles-Inspired Design Strategies for Carbon Aerogel Supercapacitors – B. C. Wood, T. Ogitsu, J. Lee (Lawrence Livermore National Laboratory), M. Otani (National Institute of Advanced Industrial Science and Technology), T. Baumann, M. Stadermann, M. A. Worsley, A. Wittstock, M. Merrill, and J. Biener (Lawrence Livermore National Laboratory)

11:40 **510** Temperature effects in Activated Carbon Supercapacitors – D. W. Kirk (University of Toronto)

Electrolytes – 14:00 – 15:40
Co-Chairs: M. Morita and P. Kulesza

14:00 **511** Redox Active Electrolytes for Electrochemical Capacitors – E. Frackowiak, K. Fic, M. Meller, and G. Lota (Poznan University of Technology)

14:40 **512** Mixed Ionic Liquid Electrolytes and Electrochemical Double Layer Capacitors – E. T. Fox, J. S. Dickmann, J. E. Weaver, J. L. Allen, and W. A. Henderson (North Carolina State University)

15:00 **513** Electrochemical Capacitor Using a Highly Conductive Ionic Plastic Crystal – R. Taniki, K. Matsumoto, T. Nohira, and R. Hagiwara (Kyoto University)

15:20 **514** Influence of the Organic Solvent Additives on the Properties of 1-Ethyl-3-Methylimidazolium Tetrafluoroborate as Supercapacitor Electrolyte – R. Palm, H. Kurig, A. Jänes, and E. Lust (University of Tartu)

B4 Intercalation Compounds for Rechargeable Batteries

Battery
South Pacific 2, Mid-Pacific Conference Center, Hilton Hawaiian Village

Advanced Characterization – 08:20 – 12:20
Co-Chairs: Nina Balke and Jordi Cabana

08:20 **634** High Resolution Chemical Imaging of Phase Transformations during Intercalation Reactions – J. Cabana (Lawrence Berkeley National Laboratory)

09:00 **635** Time Resolved XRD and XAFS Study on Phase Transition Dynamics in Li_xFePO_4 – Y. Orikasa, T. Maeda, Y. Koyama, H. Murayama, H. Tanida, H. Arai, E. Matsubara, Y. Uchimoto, and Z. Ogumi (Kyoto University)

09:20 **636** Scanning Near-Field Infrared Microscopy of a $LixFePO_4$ Single Particle – I. T. Lucas (Lawrence Berkeley National Laboratory), J. S. Syzdek (Lawerence Berkeley National Laboratory), S. F. Lux, N. S. Norberg, A. S. McLeod (Lawrence Berkeley National Laboratory), Z. Fei, D. N. Basov (University of California), and R. M. Kostecki (Lawrence Berkeley National Laboratory)

09:40 Intermission (20 Minutes)

10:00 **637** Nanoscale Single Crystal Electrochemistry as a Diagnostic Tool for Li-Ion Batteries – J. S. Syzdek (Lawerence Berkeley National Laboratory), I. T. Lucas, J. Elangbam, A. Bagnato, and R. M. Kostecki (Lawrence Berkeley National Laboratory)

10:20 **638** *In Situ* TEM-EELS Studies of Degradation and Thermal Stability of High-Energy Cathodes for Li-Ion Batteries – F. Wang (Brookhaven National Laboratory), S. Bo (Stony Brook University), L. Zhang, C. Ma (Brookhaven National Laboratory), G. Clare, P. Khalifah (Stony Brook University), Y. Zhu, and J. Graetz (Brookhaven National Laboratory)

10:40 **639** *In Situ* TEM Studies of Capacity Fading Mechanisms of Nano-Structured Anode and Cathode for Lithium-Ion Battery – C. Wang, M. Gu, Z. Wang, X. Li, S. Hu, W. Xu, F. Gao, J. Liu, J. Zhang, S. Thevuthasan, and D. Baer (Pacific Northwest National Laboratory)

11:00 **640** *In Situ* Small-Angle Neutron Scattering Studies of Electrodes for Lithium-Ion Batteries – C. A. Bridges, X. Sun, J. Zhao, M. Paranthaman, and S. Dai (Oak Ridge National Laboratory)

11:20 **641** Interest of Auger Electron Spectroscopy to Study Silicon Electrodes Used in Li-Ion Batteries – E. Radvanyi, E. De Vito, W. Porcher, and S. Jouanneau (CEA/LITEN)

11:40 **642** Local Probing of Activation Energy of Ionic Transport in Cathode Materials for Li-Ion Batteries – N. Balke, S. Kalnaus, S. Jesse, N. J. Dudney, C. Daniel, and S. Kalinin (Oak Ridge National Laboratory)

12:00 **643** Use of *In Situ* XAS to Elucidate Surface Structural Changes and Capacity Loss during Electrochemical Cycling of nanoscale $LiCoO_2$ – C. J. Patridge (NRC/NRL Cooperative Research Associate), C. T. Love (U.S. Naval Research Laboratory), and D. E. Ramaker (The George Washington University)

Cathode II – 14:00 – 17:20
Co-Chairs: Yong Yang and Atsuo Yamada

14:00 **644** Toward Safe and Long-Cycle Life Li-Ion Batteries: New Polyanion-Cathode and Their Reaction Mechanism – Y. Yang (Xiamen University)

14:40 **645** Bimetallic Sulfates $A_xM_y(SO_4)_z.xH_2O$ (A = Li, Na and M = 3d Metal): New Electrode Materials for Li- and Na-Ion Batteries – M. Reynaud, M. Ati (Université de Picardie Jules Verne CNRS UMR7314), M. Sougrati (Institut Charles Gerhardt, CNRS UMR5253), B. Melot (Université de Picardie Jules Verne CNRS UMR7314), G. Rousse (Institut de Minéralogie et de Physique des Milieux Condensées, Université Pierre et Marie Curie CNRS UMR7590), J. Chotard, and J. Tarascon (Université de Picardie Jules Verne CNRS UMR7314)

15:00 **646** Revisiting the Lithium Metal Borate ($LiMBO_3$; M= Fe, Mn, Co) Cathode Systems: Synthetic and Electrochemical Findings – Y. Yamashita, P. Barpanda, S. Chung, Y. Yamada, S. Nishimura, and A. Yamada (The University of Tokyo)

15:20 Intermission (20 Minutes)

15:40 **647** Reaction Mechanism of Pyrophosphate Cathode Material $Li_2(Mn_yFe_{1-y})P_2O_7$ – S. Nishimura, N. Furuta, D. Shimizu, P. Barpanda, Y. Yamada, and A. Yamada (The University of Tokyo)

16:00 **648** A Cooperative Mechanism for the Diffusion of Li^+ Ions in $LiMgSO_4F$ – D. Marrocchelli (Trinity College Dublin), M. Salanne (Universite Pierre et Marie Curie), and G. W. Watson (Trinity College Dublin)

16:20 **649** Novel Electrode Materials for Li-Ion Batteries – M. Reddy and B. Chowdari (National University of Singapore)

16:40 **650** Tracking Disorder in $LiFePO_4$ with Electrochemical Lithium Insertion/Extraction – C. T. Love (U.S. Naval Research Laboratory), A. Korovina, D. E. Ramaker (The George Washington University), and K. Swider-Lyons (U.S. Naval Research Laboratory)

17:00 **651** Distinct Configuration of Antisite Defects in Olivine Phosphates: Comparison between $LiFePO_4$ and $LiMnPO_4$ – S. Chung (Korea Advanced Institute of Science & Technology) and S. Choi (Korea Institute of Materials Science)

B5 Interfaces and Interphases in Battery Systems

Battery / Energy Technology
Honolulu 1, Tapa Conference Center, Hilton Hawaiian Village

Interfaces and Interphases in Battery Systems III – 08:00 – 12:00
Co-Chairs: Takeshi Abe and Takeyuki Doi

08:00 **732** Ionic and Electronic Transport in Metal Fluoride Conversion Electrodes – J. Graetz, F. Wang, Y. Zhu (Brookhaven National Laboratory), H. Yu, A. Van Der Ven, K. Thornton (University of Michigan), N. Pereira, and G. G. Amatucci (Rutgers – The State University of New Jersey)

08:40 **733** *In Situ* Neutron Reflectometry Analysis of $Li_4Ti_5O_{12}$/Electrolyte Interface Using Two-Dimensional Model Electrode – M. Hirayama, K. Suzuki, K. Kim, S. Taminato, R. Kanno (Tokyo Institute of Technology), N. Yamada, and M. Yonemura (High Energy Accelerator Research Organization)

09:00 **734** Electrode Architectures for Conversion-Based Cathodes: Case of Iron Fluorides and Oxyfluorides – S. K. Martha, J. Nanda, J. Idrobo, S. Pannala, S. Dai, N. J. Dudney (Oak Ridge National Laboratory), J. Wang, and P. V. Braun (University of Illinois)

09:20 **735** Time-Dependent Determination of HF Formation in $LiPF_6$-Containing Electrolytes by Spectroscopic Ellipsometry – S. F. Lux, I. T. Lucas, J. Chevalier, T. J. Richardson, and R. M. Kostecki (Lawrence Berkeley National Laboratory)

09:40 Intermission (20 Minutes)

10:00 **736** *In Situ* ECAFM and Raman Study on Interfacial Reactions between Graphite and PC-Based Solutions in Lithium Secondary Batteries – S. Jeong, H. Song (Soonchunhyang University), T. Abe (Kyoto University), M. Inaba (Doshisha University), and Z. Ogumi (Kyoto University)

10:40 **737** Polyimide Gel Polymer Electrolyte-Directed Nanoscale Wrapping of High-Voltage $LiNi_{1/3}Co_{1/3}Mn_{1/3}O_2$ Cathode Active Materials for Lithium-Ion Batteries – J. Park, J. Cho, and S. Lee (Kangwon National University)

11:00 **738** *In Situ* Raman Imaging Applied to the Observation of Li Transport in a $LiCoO_2$ Cathode – T. Nishi, H. Nakai, and A. Kita (Sony Energy Devices Corporation)

11:20 **739** *In Situ* Electrochemical X-ray Absorption Spectroscopy of Mg Deposition – T. S. Arthur (Toyota Research Institute of North America), P. Glans-Suzuki (Lawrence Berkeley National Laboratory), M. Matsui, R. Zhang (Toyota Research Institute of North America), J. Guo (Lawrence Berkeley National Laboratory), and F. Mizuno (Toyota Research Institute of North America)

11:40 **740** *In Situ* Observation of Sn Thin-Film Anode / Electrolyte Interface by X-ray Reflectivity – K. Shimada, T. Kawaguchi, T. Ichitsubo, E. Matsubara, K. Fukuda, Y. Uchimoto, and Z. Ogumi (Kyoto University)

Interfaces and Interphases in Battery Systems IV – 14:00 – 17:00
Co-Chairs: Soon Ki-Jeong and Yue Qi

14:00 **741** Spectroscopic and Spectrometric Studies of the SEI and Its Interaction with Anode Electrode Surfaces – A. A. Gewirth, H. Tavassol, B. R. Long, J. W. Buthker, and L. Huff (University of Illinois)

14:40 **742** Porous Silicon Impregnated Carbon Nano-Spheres for S-Block Metal Ion Battery Negative Electrodes – S. Polisski and T. Abe (Kyoto University)

15:00 **743** Study on Solid Electrolyte Interphase Layer on Si Anode by Surface Modification – C. Jung, W. Jeon, H. Han (Samsung Advanced Institute of Technology), H. Choi, and S. Jeong (Soonchunhyang University)

15:20 **744** Inelastic Shape Changes in Contacting Silicon Particles and Binder Failure in Composite Lithium-ion-battery Electrodes – H. Wang, V. A. Sethuraman, P. R. Guduru, and V. B. Shenoy (Brown University)

15:40 Intermission (20 Minutes)

16:00 **745** Studies of Interfacial Reactions on Silicon-Based Film Electrode in Ionic Liquid Battery Electrolyte – C. Nguyen (Chungnam National University), S. Woo (LG Chem Ltd.), and S. Song (Chungnam National University)

16:20 **746** Mechanism of SEI Layer Formation on the Si Electrodes Studied by XPS and ToF-SIMS – C. Pereira-Nabais, J. Swiatowska (CNRS Chimie ParisTech), A. Chagnes (Chimie ParisTech (ENSCP)), P. Tran-Van (Renault Research Department), M. Cassir (Chimie ParisTech (ENSCP)), and P. Marcus (CNRS Chimie ParisTech)

16:40 **747** *In Situ* Stress Measurements in Composite Lithium-Ion-Battery Electrodes during Charge/Discharge Processes – V. A. Sethuraman, A. Nguyen, S. P. Nadimpalli (Brown University), D. P. Abraham (Argonne National Laboratory), A. F. Bower, V. B. Shenoy, and P. R. Guduru (Brown University)

Interfaces and Interphases in Battery Systems Poster Session – 18:00 – 20:00

- **748** Interface Modification for Advanced 5V-Class All-Solid-State Lithium Batteries – A. Omori (Shizuoka University), C. Yada, H. Yamasaki (Toyota Motor Corporation), F. Sagane, and Y. Iriyama (Shizuoka University)
- **749** Reduction of the Interfacial Resistance at the $Li_7La_3Zr_2O_{12}/LiCoO_2$ by Interface Modification – T. Kato (Shizuoka University), T. Hamanaka (Japan Fine Ceramics Center), F. Sagane (Shizuoka University), K. Yamamoto, T. Hirayama (Japan Fine Ceramics Center), and Y. Iriyama (Shizuoka University)
- **750** Enhanced Electrochemical Properties of $Li_4Ti_5O_{12}$ Epitaxial Thin Film Electrode with Surface Modification – K. Kim, K. Suzuki, S. Taminato (Tokyo Institute of Technology), K. Tamura, J. Mizuki (Japan Atomic Energy Agency), J. Son (Japan Synchrotron Radiation Research Institute), M. Hirayama, and R. Kanno (Tokyo Institute of Technology)
- **751** Silicon and Porous Silicon/Carbon Nanocomposites for Rechargeable Li- and Mg-Ion Batteries – S. Polisski and T. Abe (Kyoto University)
- **752** Effects of Initial Charging Temperature on Electrochemical Properties if Solid Electrolyte Interphase Formed upon Graphite Anodes – J. Choi, T. Lee, S. Kim, J. Ko, and Y. Lee (Hanbat National University)
- **753** Interfacial Reaction on Li_3PO_4/Li_2RuO_3 Thin-Film Electrode – S. Taminato, K. Suzuki, K. Kim (Tokyo Institute of Technology), J. Son (Japan Synchrotron Radiation Research Institute), K. Tamura, J. Mizuki (Japan Atomic Energy Agency), M. Hirayama, and R. Kanno (Tokyo Institute of Technology)
- **754** Fundamental Investigations of Mechanical and Chemical Degradation Mechanisms in Lithium-Ion Battery Materials – V. A. Sethuraman, V. B. Shenoy, A. F. Bower (Brown University), L. Wang, B. L. Lucht, A. Bose (The University of Rhode Island), W. Euler (University of Rhode Island), and P. R. Guduru (Brown University)
- **755** Capacity Fading Mechanism of Graphite Negative-Electrodes in Electrolytes Containing Trialkyl Phosphates – H. Nakagawa, M. Ochida, S. Tsubouchi, Y. Domi, T. Yamanaka, T. Doi, T. Abe, and Z. Ogumi (Kyoto University)
- **756** Depth-Resolved X-ray Absorption Spectroscopic Study on Nanoscale Observation of the Electrode-Electrolyte Interface for All Solid State Lithium-Ion Batteries – T. Ina (Kyoto University), T. Okumura (National Institute of Advanced Industrial Science and Technology (AIST)), T. Nakatsutsumi, Y. Orikasa, H. Arai (Kyoto University), Y. Iriyma (Shizuoka University), T. Uruga (Japan Synchrotron Radiation Research Institute), H. Tanida, Z. Ogumi, and Y. Uchimoto (Kyoto University)

B6 Lithium-Ion Batteries

Battery / Energy Technology
Coral 3, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Cathodes II (Lithium NMC-Based Systems) – 08:00 – 09:40
Co-Chairs: Daniel Abraham and Ilias Belharouak

08:00 **804** Synthesis of $0.5Li_2MnO_3$•$0.5LiMO_2$ (M = Mn, Ni, Co) Layered-Layered Integrated Cathode Electrode Materials with Mechanochemical Process – S. Kim, K. Chung, and B. Cho (Korea Institute of Science and Technology)

08:20 **805** Composition Optimization of xLi_2MnO_3·(1-x) $LiMO_2$ Electrodes (M= Mn, Ni, Co) Prepared via Spray Pyrolysis Process – M. Lengyel (Washington University in St. Louis), X. Zhang (Argonne National Laboratory), G. Atlas (Washington University in St. Louis), D. Elhassid (X-tend Energy LLC), I. Belharouak (Argonne National Laboratory), and R. Axelbaum (Washington University in St. Louis)

08:40 **806** Structure Evolution and Its Relation to the Voltage Fade Behavior in Li-Rich Layered $Li_{1.2}Ni_{0.15}Co_{0.1}Mn_{0.55}O_2$ Cathode Material during Cycling: X-ray Diffraction and Absorption Spectroscopy Study – X. Yu, K. Nam, E. Hu (Brookhaven National Laboratory), D. P. Abraham (Argonne National Laboratory), and X. Yang (Brookhaven National Laboratory)

09:00 **807** Effect of Precursor Synthesis Atmosphere on Morphology and Electrochemical Performance of $Li_{1.20}Ni_{0.16}Mn_{0.56}Co_{0.8}O_2$ and $Li_{1.17}Ni_{0.25}Mn_{0.58}O_2$ – J. Camardese, R. Shunmugasundaram, and J. Dahn (Dalhousie University)

09:20 **808** Synthesis and Morphological Analysis of Carbonate Based Precursors for Lithium-Ion Battery Cathode Materials – R. Shunmugasundaram, T. Byrne, and J. Dahn (Dalhousie University)

Coral 4, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Electrolytes I – 08:00 – 09:40
Co-Chairs: Brett Lucht and Marshall Smart

08:00 **809** Development of All-Solid-State Lithium-Ion Rechargeable Battery Using Quasi-Solidified Glyme – Li-Salt Complexes as Electrolytes – A. Unemoto, T. Matsuo, Y. Gambe, and I. Honma (Tohoku University)

08:20 **810** Nanocrystalline Solid Electrolyte: β-Li_3PS_4 – Z. Liu, W. Fu, Z. Lin, N. J. Dudney, E. Payzant, and C. Liang (Oak Ridge National Laboratory)

08:40 **811** Development of Li-Ion Technology Based on Aqueous Electrolytes – S. Martinet, L. Crepel-Marchal (CEA-LITEN), F. Alloin, and J. Lepretre (LEPMI, Grenoble-INP)

09:00 **812** Topological Analysis of Lithium Migration Paths: Application to Solid Electrolytes – L. Miara, M. Aryanpour (Samsung Electronics), S. Ong, Y. Mo, G. Ceder (Massachusetts Institute of Technology), and H. Lee (Samsung Electronics)

09:20 **813** The Effect of Microstructure on the Lithium Ion Conduction of the $LiBH_4$-LiI Solid Solution – D. Sveinbjornsson, D. Blanchard, M. Mogensen, P. Norby, and T. Vegge (Technical University of Denmark)

Coral 3, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Cathodes II (Lithium NMC-Based Systems) – 10:00 – 12:20
Co-Chairs: Ilias Belharouak and Daniel Abraham

10:00 **814** The Effect of $LaMeO_3$ as Stabilizer Phase in $0.5[Li_{0.33}Mn_{0.67}]O_2$•$0.5Li[Ni_{0.33}Co_{0.33}Mn_{0.33}]O_2$ Cathode Material – M. Kim, K. Park, J. Yoon, M. Park, J. Park (Samsung Electronics), W. Yoon (Sungkyunkwan University), and S. Doo (Samsung Electronics)

10:20 **815** Effect of Carbon Coating on $Li[Li_{1/3}Mn_{2/3}]O_2$-$LiMO_2$ Cathode Materials for Lithium Ion Batteries – Y. Wu (General Motors), X. Wang (Optimal, Inc.), and Z. Liu (General Motors)

10:40 **816** Transition Metal Dissolution on Mixed $LiNi_{1/3}Co_{1/3}Mn_{1/3}O_2$-$LiMn_2O_4$ Cathodes for Li-ion Batteries – L. Liu, A. Drews, and R. Kudla (Ford Motor Company)

11:00 **817** Optimizing $LiNi_{1/3}Mn_{1/3}Co_{1/3}O_2$ Capacity by Controlling Cathode Porosity through Calendaring – J. Li, J. Kiggans, C. Daniel, and D. L. Wood (Oak Ridge National Laboratory)

11:20 **818** Root Cause for Rapid Growth of Cell Impedance in Li-Ion High Energy Cells Having Overlithiated Cathodes and Graphite Negatives – C. Ma, R. Staniewicz, B. Deveney, S. Hafner (SAFT America Inc), R. Bugga (California Institute of Technology), W. C. West, M. C. Smart, and J. Soler (Calfornia Institute of Technology)

11:40 **819** Structure Studies of Reaction Mechanism for Surface-Modified $LiNi_{1/3}Co_{1/3}Mn_{1/3}O_2$ Epitaxial Thin-Film Electrode – M. Abe (Toyota Motor Corporation), K. Suzuki, H. Minamishima, M. Hirayama, R. Kanno (Tokyo Institute of Technology), K. Tamura, and J. Mizuki (Japan Atomic Energy Agency)

12:00 **820** Improvement of Elevated Temperature Performance of Li-Rich Cathode Material with Ionic Liquids Electrolyte for Lithium-Ion Batteries – J. Li, S. Jeong (University of Muenster), R. Klöpsch, M. Winter, and S. Passerini (University of Münster)

Coral 4, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Electrolytes I – 10:00 – 12:20
Co-Chairs: Marshall Smart and Brett Lucht

10:00 **821** Electrochemical Intercalation of Lithium-Ion in Propylene Carbonate Based Electrolytes — Effect of Addition of Bivalent-Ions — – S. Takeuchi, F. Sagane, K. Miyazaki, T. Fukutsuka, and T. Abe (Kyoto University)

10:20 **822** Investigation of Temperature Dependent Stability of Ethylene Carbonate and Propylene Carbonate in multicomponent Electrolytes for Lithium Ion batteries – C. L. Foss (Norwegian University of Science and Technology), A. Svensson, E. Sheridan (SINTEF Materials and Chemistry), S. Sunde, and F. Vullum-Bruer (Norwegian University of Science and Technology)

10:40 **823** Advanced Electrolytes for Lithium Ion Batteries in High Voltage Systems – J. Li and M. Payne (Novolyte Technologies)

11:00 **824** Examination of Applying Fluorinated Phosphate Ester to Electrolyte Solvent of the Batteries with $LiNi_{0.5}Mn_{1.5-x}TixO_4$ Cathode – T. Noguchi, M. Uehara, Y. Katoh, H. Sasaki, and K. Utsugi (NEC corporation)

11:20 **825** Effect of Electrolyte Solvents on Low-Temperature Performance of Li-Ion Batteries – J. Eom, L. Cao, and C. Wang (The Pennsylvania State University)

11:40 **826** Influences of Molecular Interactions on Battery Electrolyte Properties and Processes – K. L. Gering (Idaho National Laboratory)

12:00 **827** Novel IL Based Electrolytes for Secondary Lithium Ion Batteries – H. Srour (Laboratoire de Chimie Organométallique de Surface), H. Rouault (CEA), and C. Santini (CNRS)

Coral 3, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Cathodes II (Lithium NMC-Based Systems) – 14:00 – 15:40
Co-Chairs: Doron Aurbach and Jun Liu

14:00 **828** (ECS Battery Division Technology Award Presentation) Case Studies in Developing Battery Technologies – Y. Chiang (Massachusetts Institute of Technology)

14:40 **829** Relaxation Phase Analysis for Li inserted Li-Mn-O Cathode Material – I. Seo, S. Park, and T. Yao (Kyoto University)

15:00 **830** Study on the Transport Properties of $LiNi_{0.8}Co_{0.15}Al_{0.05}O_2/LiMn_2O_4$ Blends with Different Compositions – H. Tran, C. Taeubert (Zentrum für Sonnenenergie und Wasserstoff-Forschung BW (ZSW)), and M. Wohlfahrt-Mehrens (ZSW-Center for Solar Energy and Hydrogen Research)

15:20 **831** Structural Modification and Electrochemical Characteristics of Co-substituted Hollandite-type Manganese Oxides using a Hydrothermal Method – Y. Kadoma, H. Watanabe, K. Ui, and N. Kumagai (Iwate University)

Coral 4, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Electrolytes I – 14:00 – 15:40
Co-Chairs: Wesley Henderson and Matthew Foley

14:00 **832** Conformal Electrodeposition of Copolymer Electrolyte into Self-Organized Titania Nanotubes for Lithium Ion Microbatteries – T. Djenizian (University of Aix-Marseille)

14:20 **833** Gelled Polymer Electrolyte Thin Films with Mechanical Integrity and Persistent Structure for Lithium Ion Batteries – S. Wang, C. Huang, P. Kuo, and H. Teng (National Cheng Kung University)

14:40 **834** Intensive Dry and Wet Mixing Enhancing the Electrochemical Performance of Secondary Lithium-Ion Battery Electrodes – H. Bockholt, L. Kleinfeldt, W. Haselrieder, and A. Kwade (TU Braunschweig)

15:00 **835** Structure, Disorder, and Crystallization; Lessons Learned from Analysis of Lithium Triflurormethanesulfonate – M. P. Foley (U.S. Naval Academy), C. Worosz, L. Haverhals, K. Sweely (U. S. Naval Academy), W. A. Henderson (North Carolina State University), H. De Long (AFRL/AFOSR), and P. Trulove (US Naval Academy)

15:20 **836** Synthesis and Characterization of Ionic Liquid for Lithium-Ion Batteries – X. Sun, C. Liao, and S. Dai (Oak Ridge National Laboratory)

Coral 3, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Cathodes III (Metal Oxide Systems) – 16:00 – 17:40
Co-Chairs: Ratnakumar Bugga and Ayyakkannu Manivannan

16:00 **837** Flux Growth of High-Quality $LiCoO_2$ Crystals for All-Crystal-State Lithium-Ion Rechargeable Batteries – Y. Mizuno, H. Wagata (Shinshu University), T. Ishizaki (Shibaura Institute of Technology), T. Sakaguchi, K. Kohama (Toyota Motor Corporation), K. Yubuta, T. Shishido (Tohoku University), S. Oishi, and K. Teshima (Shinshu University)

16:20 **838** The effects of Carbon Additive on Electrochemical Performance of High Voltage Spinel $LiNi_{0.5}Mn_{1.5}O_4$ – J. Zheng, J. Xiao, W. Xu, X. Li, and J. Zhang (Pacific Northwest National Laboratory)

16:40 **839** First Principles Calculation of Electronic Structures and Thermal Stability of Spinel $LiNi_2O_4$ – A. Kuwabara, C. Fisher, Y. Ikuhara, H. Moriwake (Japan Fine Ceramics Center), H. Oki (Toyota Motor Corporation), and Y. Ikuhara (The University of Tokyo)

17:00 **840** Investigations of the Phase Diagram of the Lithium-Manganese-Nickel Oxide System obtained at 800°C – E. McCalla and J. Dahn (Dalhousie University)

17:20 **841** Production of Manganese Oxide Nanowire Powders and Their Characterization for Li Ion Batteries and Capacitors – V. Vendra, A. Thapa, S. Sunkara (University of Louisville), T. Nguyen (Univeristy of Louisville), and M. K. Sunkara (University of Louisville)

Coral 4, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Cell Design Aspects – 16:00 – 18:00
Co-Chairs: Daniel Abraham and Fikile Brushett

16:00 **842** Designing Long-Life, High Energy Lithium-Ion Cells – D. P. Abraham (Argonne National Laboratory), Y. Li (University of Rochester), M. Bettge, and Y. Zhu (Argonne National Laboratory)

16:20 **843** Electrochemical Characterization of Semi-Solid Li-Ion Electrodes – N. Baram, W. Carter, and Y. Chiang (MIT)

16:40 **844** Influence of Anode/Cathode Balancing on Cycling Stability of Lithium Ion Cells – M. D. Wilka, A. Hoffmann, R. Stern (Center for Solar Energy and Hydrogen Research), and M. Wohlfahrt-Mehrens (ZSW-Center for Solar Energy and Hydrogen Research)

17:00 **845** Evaluation of Effective Electrical Conductivity of Carbon Electrode with Porous Metal Collector – G. Inoue (Kyoto University), S. Abe, Y. Fan, Y. Matsukuma, and M. Minemoto (Kyushu University)

17:20 **846** VGCF Cloth for Thin, Flexible Electrodes for Advanced Conformal Batteries – D. J. Burton (Applied Sciences, Inc.), N. J. Dudney (Oak Ridge National Laboratory), G. Nazri (Wayne State University), S. K. Martha (Oak Ridge National Laboratory), G. Nazri (Wayne State University), and J. Howe (Oak Ridge National Laboratory)

17:40 **847** Effects of Volume Expansion and Fluid-Solid Stress Interaction within Lithium-Ion Batteries – C. Zhang (The Ohio State University), A. Conlisk, G. Rizzoni (Ohio State University), and J. Marcicki (The Ohio State University & Ford Motor Company)

B7 Metal-Air Batteries

Battery / Energy Technology / Fullerenes, Nanotubes, and Carbon Nanostructures
Nautilus 1, Mid-Pacific Conference Center, Hilton Hawaiian Village

Electrolyte – 08:00 – 12:00
Co-Chairs: Yangchuan Xing and Jie Xiao

08:00 **1113** (Invited) Dual-Electrolyte Lithium-Air Batteries with Buffer Catholytes – A. Manthiram (The University of Texas at Austin), L. Li, and Y. Fu (University of Texas at Austin)

08:40 **1114** Investigations of Li-O_2 Batteries Using Polyethylene Oxide in Structured Three-Phase Electrodes – J. R. Harding, Y. Lu, P. T. Hammond, and Y. Shao-Horn (Massachusetts Institute of Technology)

09:00 **1115** Recent Developments in Solid Li-Ion Electrolytes – V. Thangadurai (University of Calgary)

09:20 **1116** The Effects of Electrolyte Salts on the Performance of Li-Air Batteries – E. Nasybulin, W. Xu, M. H. Engelhard, Z. Nie, J. Hu, J. Xiao, M. Gross, and J. Zhang (Pacific Northwest National Laboratory)

09:40 Intermission (20 Minutes)

10:00 **1117** (Invited) A Reversible Lithium-Air Battery with Low Charge Polarization using Ether-Based Electrolytes – K. Amine (Argonne National Laboratory), J. Lu (Argonne National Lab), H. Jung (Hanyang University), K. C. Lau, Z. Zhang, J. Schlueter, P. Du, R. Assary, J. Greeley, G. Ferguson, H. Wang (Argonne National Laboratory), J. Hassoun (University of Rome Sapienza), H. Iddir (Argonne National Laboratory), Y. Sun, B. Scrosati (Hanyang University), and L. A. Curtiss (Argonne National Laboratory)

10:40 **1118** A Long Life, High Capacity, High Rate Lithium-Air Battery Using a Stable Glyme Electrolyte – H. Jung, J. Park, H. Kim (Hanyang University), J. Hassoun (University of Rome Sapienza), C. Yoon, B. Scrosati, and Y. Sun (Hanyang University)

11:00 **1119** Stability of Li-Salts during the Discharge Reaction in a Li-O_2 Cell – G. M. Veith, J. Nanda, and N. J. Dudney (Oak Ridge National Laboratory)

11:20 **1120** Stability of Pyr_{14}TFSI Ionic Liquid in Li-O_2 Cells and Its effect on the Cycling Behavior – M. Piana, N. Tsiouvaras, S. Meini, I. Buchberger, J. Wandt, H. A. Gasteiger (Technische Universität München), and A. Garsuch (BASF SE)

11:40 **1121** Electrochemical Performance of All-Solid-State Lithium-Air Batteries – H. Kitaura and H. Zhou (National Institute of Advanced Industrial Science and Technology)

Catalyst – 13:20 – 17:00
Co-Chairs: V. Thangadurai and Zheng Li

13:20 **1122** (Invited) Investigation of ORR and OER in Non-Aqueous (and Aqueous) Li-O_2 Cells Using Metal Oxide Catalysts – B. D. Adams, S. Oh, R. W. Black, A. Baran- Harper, and L. F. Nazar (University of Waterloo)

14:00 **1123** Metal Nitrides as Alternative Catalyst for Air Cathodes – C. Pozo-Gonzalo, A. A. Torriero, P. Howlett, M. Forsyth (Deakin University), A. M. Glushenkov, O. Kartachova, and Y. Chen (Geelong Technology Precinct)

14:20 **1124** Role of Manganese Oxides in the Oxygen Electrode for Li-Air Batteries – I. Bae (Duracell Technology Center) and K. Nam (Brookhaven National Laboratory)

14:40 **1125** Highly Performance and Stable Core-corona Bifunctional Catalyst for Rechargeable Metal-air Batteries – Z. Chen, Z. Chen, D. Higgins, and A. Yu (University of Waterloo)

15:00 Battery division student research award address-held jointly with B4 (20 Minutes)

15:20 **1126** Graphene-Metal Oxide Catalysts for Li-O_2 Batteries – R. W. Black, J. Lee, B. D. Adams, A. Baran- Harper, and L. F. Nazar (University of Waterloo)

15:40 **1127** The effect of the Surface Area of $LaNiO_3$ Support on the Oxygen Reduction/Evolution Activity of Air Electrode for Rechargeable Metal-Air Batteries – M. Yuasa, H. Imamura, T. Kida, and K. Shimanoe (Kyushu University)

16:00 **1128** Graphene/Metal Oxide Catalyst Based High Capacity Cathode for Li-O_2 Batteries – R. S. Kalubarme, C. Ahn, and C. Park (Chonnam National University)

16:20 **1129** Activated and Nitrogen Doped Carbon Nanofibers as Oxygen Reduction Electrode Materials for Zinc-Air Batteries – D. C. Higgins, Y. Liu, Z. Chen, and Z. Chen (University of Waterloo)

16:40 **1130** Nickel Cobalt Oxide Nanostructures on Graphene as an Active Bifunctional Electrocatalyst – D. Lee, A. Yu, H. Park, and Z. Chen (University of Waterloo)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

B7 – Poster Session – 18:00 – 20:00
Co-Chairs: Nobuyuki Imanishi and V.Thangadual

- **1131** Cyclic Voltammetry of Zn/Zn(II) Couple in Dycyanamide Anion and Bis-(trifluoromethylsulfonyl)Imide Anion Based Ionic Liquids – M. Xu, D. Ivey (University of Alberta), Y. Bing, Z. Xie, and W. Qu (National Research Council Canada)
- **1132** Carbon Air Electrodes for Alkaline Aqueous Electrolyte Lithium/Air Secondary Batteries – H. Ohkuma, I. Uechi, N. Imanishi, Y. Takeda, and O. Yamamoto (Mie University)
- **1133** Microwave-Assistanted Synthesis of Ag-MnO_2/SWNT Electrocatalyst for Metal-Air Cells – G. Zhang and Y. Jiang (Yangtze Normal University)
- **1134** Carbon Sphere Dotted with Co_3O_4 and RuO_2 Nano Particles for Rechargeable Li/Air Batteries – C. Park and Y. Park (Kyonggi University)
- **1135** Synthesis and Properties of Garnet-Type $Li_{7-x-y}La_3Zr_{2-y}Nb_yO_{12-0.5x}$ – K. Ishiguro, Y. Nakata, N. Imanishi, A. Hirano, Y. Takeda, and O. Yamamoto (Mie University)
- **1136** Air Electrode with Oxide Catalyst for Aqueous Lithium-Air Rechargeable Batteries – S. Sunahiro, H. Ohkuma, I. Uechi, N. Imanishi, Y. Takeda, and O. Yamamoto (Mie University)
- **1137** Lithium Nitride Formation on Lithium Metal – N. Futamura, T. Ichikawa, N. Imanishi, Y. Takeda, and O. Yamamoto (Mie University)
- **1138** Role of Metal Decoration in the Catalytic Activity of Urchin-Like MnO_2 for Oxygen Reaction in Aqueous Lithium-Oxygen Batteries – K. Jung, J. Lee, A. Riaz, S. Lee, T. Lim, S. Park, R. Song, and K. Shin (Korea Institute of Energy Research)
- **1139** Tape-Cast Lithium Conducting Solid Electrolyte $Li_{1.4}Ti_{1.6}Al_{0.4}(PO_4)_3$ for Aqueous Lithium-Air Batteries – K. Takahashi, N. Imanishi, Y. Takeda, and O. Yamamoto (Mie University)
- **1140** Rechargeable, All-Solid Li-Air Battery – W. Chang (Industrial Technology Research Institute), D. Hallinan (Lawrence Berkeley National Laboratory), Y. Lee (Industrial Technology Research Institute), T. Yen (CPC), and C. Yang (Industrial Technology Research Institute)
- **1141** Mesoporous Nitrogen Doped Carbon as Cathode Materials for High Capacity Lithium-Air Batteries – A. Zahoor, M. Christy, Y. Hwang, J. Choi, and K. Nahm (Chonbuk National University)
- **1142** An Effort to Understand the Basic Characteristics of Hybrid Li-air Cell Performance – D. Yoon, K. Kim (SK Innovation), M. Park (SK Innovation, Battery R&D), S. Kim, and H. Sun (SK Innovation)
- **1143** Electrodeposited Manganese Oxide Catalysts for Oxygen Reduction Aqueous Alkaline Media – S. H. Pulukadang and S. W. Donne (University of Newcastle)
- **1144** Electrochemical Properties of Graphene Based Catalyst for Rechargeable Li/O_2 Batteries – C. Ahn, R. S. Kalubarme, and C. Park (Chonnam National University)
- **1145** Effects of Nb_2O_5 Addition on the Electrochemical Properties of $Li_{1.5}Al_{0.5}Ge_{1.5}P_3O_{12}$ Glass Ceramic for Li-Air Batteries – T. Kim, R. S. Kalubarme, and C. Park (Chonnam National University)
- **1146** Rechargeable Li/O_2 Cell Based on a LiTFSI-DMMP/PFSA-Li Composite Electrolyte – H. Wang (Shanghai Jiao Tong University), X. Liao (Shanghai Jiaotong University), L. Li, and Z. Ma (Shanghai Jiao Tong University)
- **1147** MnO_2-Based Nanostructures as Catalysts for Oxygen Oxidation-Reduction Reaction in Rechargeable Lithium-Oxygen Battery – B. Huang (Shanghai Jiao Tong University), X. Liao (Shanghai Jiaotong University), and Z. Ma (Shanghai Jiao Tong University)
- **1148** Multifunctional Carbon Nanoarchitectures as Air-Breathing Cathodes for Rechargeable Zn-Air and Li-Air Batteries – C. N. Chervin, J. W. Long, M. J. Wattendorf, N. W. Kucko, and D. R. Rolison (U.S. Naval Research Laboratory)
- **1149** Modeling of Bifunctional Electrode in Metal Air Battery – D. Chan (LeeMing Institute of Technology), K. Hsueh (National United University), C. Wu, and W. Chang (Industrial Technology Research Institute)
- **1150** Inhibiting Ability of Chelating Agent on Aluminum Corrosion in Alkaline Solution and Testing of Aluminum-Air Single Cell – C. Wu, C. Chung (Industrial Technology Research Institute), K. Hsueh (National United University), and W. Chang (Industrial Technology Research Institute)
- **1151** The Kinetic Reaction of Aluminum-Air Battery in Different Aqueous Solution – C. Wang, K. Hsueh (National United University), and C. Hsieh (Institute of Nuclear Energy Research)
- **1152** Manganese Oxide Nanosheets: Applications in High Energy Density Zn-Air Batteries – Y. Korenblit (Ulsan National Institute of Science & Technology), G. Yushin (Georgia Institute of Technology), and J. Cho (Ulsan National Institute of Science & Technology)

B8 Non-Aqueous Electrolytes for Lithium Batteries

Battery / Energy Technology / Physical and Analytical Electrochemistry

South Pacific 3, Mid-Pacific Conference Center, Hilton Hawaiian Village

Solid Electrolytes, Polymer – 08:00 – 09:40
Co-Chairs: Dr. Henderson and Dr. Ue

08:00 **1201** Nanostructured Solid Electrolytes for Lithium Batteries – N. P. Balsara (Lawrence Berkeley National Laboratory)

08:40 **1202** Block Copolymer-Ceramic Nanocomposites as Solid Electrolytes for Lithium Batteries – I. Gurevitch, J. Cabana, and N. P. Balsara (Lawrence Berkeley National Laboratory)

09:00 **1203** Conductivity of Electronic and Ionic Conducting Block Copolymer Electrolytes through Electrochemical Doping in the Solid-State – S. N. Patel, A. E. Javier (University of California – Berkeley), and N. P. Balsara (Lawrence Berkeley National Laboratory)

09:20 **1204** High Temperature Cycling of Solid Polymer Lithium Batteries – Q. Hu, A. Caputo, and D. R. Sadoway (Massachusetts Institute of Technology)

Liquid Electrolytes, Gel and Composite – 10:00 – 12:00
Co-Chairs: Dr. Jow and Dr. Winter

10:00 **1205** Preparation, Performance in Various Cell Configurations and Limitations of Novel Electrolyte Components for Liquid and Gel Polymer Electrolytes – R. Schmitz, E. Krämer, R. Müller, R. W. Schmitz, J. Kasnatscheew, R. Wagner, M. Amereller, P. Janßen (Westfälische Wilhelms-University Münster), P. Bieker, T. Placke, O. Fromm, H. Meyer (University of Münster), P. Isken, A. Lex-Balducci, I. Profatilova, T. Langer, A. Schmitz, C. Stock, U. Vogl, T. Schedlbauer, H. Gores (Westfälische Wilhelms-University Münster), S. Passerini (University of Münster), and M. Winter (Westfälische Wilhelms-University Münster)

10:40 **1206** Organoboron Ion-Gel Electrolytes as Lithium-Ions Transport Media – N. Matsumi (Japan Advanced Institute of Science and Technology)

11:00 **1207** Design of Borosilicate Type Organic-Inorganic Hybrid Ion-Gel Electrolytes – K. S. Smaran and N. Matsumi (Japan Advanced Institute of Science and Technology)

11:20 **1208** 3D Hybrid Clay-CNT Nanofillers for Polymer Electrolytes in Lithium-Ion Batteries – H. Ardebili (University of Houston), C. Tang (Sichuan University), K. Hackenberg (Rice University), Q. Fu (Sichuan University), and P. Ajayan (Rice University)

11:40 **1209** Electrochemical Characterization of Ionic Liquid Based Composite Electrolytes for Lithium-Ion Batteries – N. Krawczyk, K. Sann (Justus Liebig University Gießen), S. Kraas, A. Schlifke, J. Vogel (University of Hamburg), B. Luerßen (Justus Liebig University), M. Fröba (University of Hamburg), and J. Janek (Justus Liebig University Gießen)

Liquid Electrolytes, Ionic Liquid 1 – 14:00 – 15:40
Co-Chairs: Dr. Winter and Dr. Ishikawa

14:00 **1210** FSI-Based Ionic Liquid Electrolyte and Its Specific Effects with Other Component Materials on Li Battery Performance – M. Ishikawa and M. Yamagata (Kansai University)

14:40 **1211** Lithiated Block Copolymer Electrolytes with Ionic Liquids for Batteries – A. S. Fisher, M. B. Khalid, and P. Kofinas (University of Maryland)

15:00 **1212** Improving the Cathode/Electrolyte Interface Using Ionic Liquids – A. Caputo, Q. Hu, and D. R. Sadoway (Massachusetts Institute of Technology)

15:20 **1213** Cycle Performance of Lithium-Ion Batteries Containing Ionic Liquids with Improved Reduction Stability – T. Itakura, K. Ito, R. Yokoi, J. Ishikawa, H. Inoue, H. Kadoma, J. Momo, T. Moriwaka, K. Nanba, M. Takahashi, and S. Yamazaki (Semiconductor Energy Laboratory Co., Ltd.)

Liquid Electrolytes, Ionic Liquid 2 – 16:00 – 17:40
Co-Chairs: Dr. Ishikawa and Dr. Trulove

16:00 **1214** Application of Electroactive Ionic Liquids to Improve the Safety of Lithium-Ion Batteries – J. C. Forgie, D. Rochefort, S. El Khakani, and D. MacNeil (Université de Montréal)

16:20 **1215** Transport Properties for Ionic Liquids and Implications for Li-Ion Battery Design – V. L. George and T. F. Fuller (Georgia Institute of Technology)

16:40 **1216** Exploring Solvents toward Stable Electrolyte for Li-Air Battery – K. Takechi, T. Shiga, S. Higashi (Toyota Central Research & Develop Labs. Inc.), H. Nakamoto (Toyota Motor Corporation), F. Mizuno (Toyota Research Institute of North America), H. Nishikoori, H. Iba (Toyota Motor Corporation), and T. Asaoka (Toyota Central R&D Labs., Inc.)

17:00 **1217** Li^+ Cation Diffusion in Ionic Liquid Electrolyte and Rate Capability of Lithium Secondary Battery – K. Yoshida, N. Tachikawa, K. Ueno, K. Dokko, and M. Watanabe (Yokohama National University)

17:20 **1218** Compatibility of Room Temperature Ionic Liquid Electrolytes with Sulfur Cathode for Lithium Secondary Batteries – J. Park, N. Tachikawa, K. Ueno, K. Dokko, and M. Watanabe (Yokohama National University)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

B8 – Poster Sesison – Electrolytes – 18:00 – 20:00
Co-Chairs: Dr. Ue, Dr. Ishikawa, and Dr. Henderson

• **1219** First-Principles Study on Li Diffusion in Solid Electrolyte Lithium Lanthanum Titanates(LLTO) – Y. Tanaka and T. Ohno (National Institute for Materials Science)

- **1220** Application of Nonflammable Gel Electrolytes Containing Fluorinated Alkylphosphates to Lithium-Ion Batteries – N. Yoshimoto, Y. Abiru, M. Egashira (Yamaguchi University), M. Aoki, H. Mimura, H. Eguchi (TOSOH F-TECH, Inc.), and M. Morita (Yamaguchi University)
- **1221** Ion Transport Behavior in Polymerized Imidazolium Ionic Liquids – J. Lee, M. Kim, J. Lee, S. Hong, and C. Koo (Korea Institute of Science and Technology)
- **1222** Highly Stable Cycling of Si-C Composite Anode for Lithium-Ion Batteries by Using FSI-Based Ionic Liquid – K. Koga (Kansai University), T. Sugimoto, M. Kikuta (Dai-ichi Kogyo Seiyaku Co., Ltd.), T. Higashizaki, M. Kono (Elexcel Co., Ltd.), M. Yamagata, and M. Ishikawa (Kansai University)

B9 Polymer Electrolyte Fuel Cells 12 (PEFC 12)

Energy Technology / Corrosion / Physical and Analytical Electrochemistry / Battery / Industrial Electrochemistry and Electrochemical Engineering

Tapa 1, Tapa Conference Center, Hilton Hawaiian Village

A-1.1 Modeling 1 – 08:00 – 12:00
Co-Chairs: Partha Mukerjee, David Harvey, and Scott Calabrese Barton

08:00 **1282** Modeling and Diagnostics in Biological Fuel Cells – H. Wen, D. Chakraborty, P. Kar, and S. Calabrese Barton (Michigan State University)

08:40 **1283** Modelling of Water Droplet Dynamics in PEM Fuel Cell Flow Channels – T. Wu and N. Djilali (University of Victoria)

09:20 **1284** Modeling Oxygen Concentration Oscillation in the Gas Channel of Polymer Electrolyte Fuel Cells: A Comparison between Numerical and Analytical Approaches – P. Guillemet (University of Nantes), G. Maranzana, J. Mainka (Nancy University), O. Lottin (Lorraine University-CNRS), J. Dillet, and A. Lamibrac (Nancy University)

09:40 Intermission (20 Minutes)

10:00 **1285** A Two-Phase Pressure Drop Model Incorporating Local Water Balance in PEM Fuel Cell Gas Channels – E. J. See and S. Kandlikar (Rochester Institute of Technology)

10:20 **1286** Diffusive – Kinetic Evaporation Models for Fuel Cells – E. Medici, D. Frtiz, and J. S. Alllen (Michigan Technological University)

10:40 **1287** A Map to Start PEFC under Freezing Temperature -Theoretical Analysis of Super-cooled State in Cell- – Y. Ishikawa (NIPPON SOKEN, INC), K. Ito (Kyushu University), M. Shiozawa (Nippon Soken, Inc.), and M. Kondo (Toyota Motor Corporation)

11:00 **1288** Numerical Modeling of a Non-Flooding Hybrid Polymer Electrolyte Fuel Cell – B. McNealy and J. L. Hertz (University of Delaware)

11:20 **1289** Statistical Simulation of the Performance and Degradation of a PEMFC Membrane Electrode Assembly – D. B. Harvey (Queen's University), A. Bellemare-Davis (Ballard Power Systems), K. Karan, B. Jayansankar (Queen's University), J. Pharoah (Queen's-RMC Fuel Cell Research Centre), V. Colbow, A. Young, and S. Wessel (Ballard Power Systems)

11:40 **1290** Multi-Scale First-Principles Modeling of Three-Phase System of Polymer Electrolyte Membrane Fuel Cell – G. Brunello, J. Choi, S. Jang (Georgia Institute of Technology), and D. B. Harvey (Queen's University)

Tapa 3, Tapa Conference Center, Hilton Hawaiian Village

B-1.1 Contamination Effects – 08:00 – 12:00
Co-Chairs: Balsu Lakshmanan and Doug Hansen

08:00 **1291** Missions and Progressions of Impurities WG under NEDO's PEFC Residential CHP System Project – K. Kobayashi (Fuel Cell Research Center, Daido University), Y. Oono, and M. Hori (Daido University)

08:20 **1292** Characterizing Leachant Contaminants from Fuel Cell Assembly Aids, a Prelude to Effects on Performance – C. S. Macomber, J. Christ, H. Wang, B. S. Pivovar, and H. N. Dinh (National Renewable Energy Laboratory)

08:40 **1293** Understanding the Effects of Contaminants from Assembly Aids Materials used as Balance of Plant Materials on PEMFCs -*In Situ* Studies – M. S. Opu, M. Ohashi, H. Cho (University of South Carolina), C. S. Macomber, H. N. Dinh (National Renewable Energy Laboratory), and J. Van Zee (University of South Carolina)

09:00 **1294** The Impact of Operating Conditions on the Performance effect of Selected Airborne PEMFC Contaminants – Y. Zhai, M. Angelo, and J. St-Pierre (University of Hawaii)

09:20 **1295** The Contamination Behavior of Organic Compounds on PEMFC – H. Cho, M. S. Opu, M. Ohashi, and J. Van Zee (University of South Carolina)

09:40 Intermission (20 Minutes)

10:00 **1296** Liquid Water Scavenging of PEMFC Contaminants – B. Wetton (University of British Columbia) and J. St-Pierre (University of Hawaii)

10:20 **1297** The Poisoning and Recovery of Pt/VC Electrocatalysts Contaminated with Glycol-Based Coolant Formulations – Y. Garsany (EXCET/NRL), S. Dutta (Dynalene), and K. Swider-Lyons (Naval Research Laboratory)

10:40 **1298** Evaluation of PEMFC System Contaminants on the Performance of Pt Catalyst via Cyclic Voltammetry – H. Wang, C. S. Macomber, J. Christ, G. Bender, B. S. Pivovar, H. N. Dinh (National Renewable Energy Laboratory), R. Reid, B. Lakshmanan, K. O'Leary (General Motors Corporation), M. Das, M. Ohashi, and J. Van Zee (University of South Carolina)

11:00 **1299** The Influence of NaCl Aerosol on the Performance of a PEM Fuel Cell Cathode – O. A. Baturina (Naval Research Laboratory), P. Northrup (Stony Brook University), and K. Swider-Lyons (Naval Research Laboratory)

11:20 **1300** Effect of Cationic Contaminants on PEM Fuel Cell Performance – J. Qi, X. Wang, U. Pasaogullari, L. Bonville, and T. Molter (University of Connecticut)

11:40 **1301** The Impact of Low Levels of NH_3 in an Operating Polymer Electrolyte Fuel Cell as the Platinum Loading/Ionomer is Varied – T. Rockward, C. Quesada, K. C. Rau, and F. H. Garzon (Los Alamos National Laboratory)

Honlulu 2, Tapa Conference Center, Hilton Hawaiian Village

C-1.1 Perfluorosulfonic Acid Membranes 1 – 08:00 – 12:00
Co-Chairs: Mark Edmundson and Deborah Jones

08:00 **1302** Advances in Proton Exchange Membrane Technology – S. Banerjee, D. Prugh, and S. Frisk (DuPont Company)

08:40 **1303** Nanofiber Composite Membranes Using Low EW PFSA – J. Ballengee and P. Pintauro (Vanderbilt University)

09:00 **1304** Novel System for Characterizing Electro-Osmotic Drag Coefficient of Proton Exchange Membranes – H. Xu, J. Ma, and C. Mittelsteadt (Giner Inc.)

09:20 **1305** Mechanism of Perfluorsulfonic Acid Membrane Chemical Degradation Under Low RH Conditions – F. D. Coms (General Motors Company), H. Xu, T. McCallum, and C. Mittelsteadt (Giner Inc.)

09:40 Intermission (20 Minutes)

10:00 **1306** Challenges to High-Volume Production of Fuel Cell Materials: Quality Control – M. Ulsh (National Renewable Energy Laboratory), B. Sopori, N. Aieta (NREL), and G. Bender (National Renewable Energy Laboratory)

10:40 **1307** Polymer Electrolyte Membrane Durability -Local degradation at pinholes – S. Kreitmeier (Paul Scherrer Institut), A. Wokaun (Paul Scherrer Institute), and F. Büchi (Paul Scherrer Institut)

11:00 **1308** Nafion Polymer Backbone Degradation Mechanism in PEM Fuel Cell from Quantum Mechanics Calculations – T. Yu, Y. Sha, W. Liu, B. V. Merinov (California Institute of Technology), P. Shirvanian (Ford Motor Co.), and W. Goddard III (California Institute of Technology)

11:20 **1309** Modeling of Side Chain Degradation in PEMFC Membranes – K. Wong, P. Melchy, M. Eikerling (Simon Fraser University), M. Lauritzen (Ballard Power Systems), and E. Kjeang (Simon Fraser University)

11:40 **1310** Investigation of PEM Degradation Kinetics and Degradation Mitigation Using *In Situ* Fluorescence Spectroscopy and Real-Time Monitoring of Fluoride-Ion Release – V. Prabhakaran, C. G. Arges, and V. Ramani (Illinois Institute of Technology)

Tapa 2, Tapa Conference Center, Hilton Hawaiian Village

D-1.1 Durability of Pt-Based Cathodes 1 – 08:00 – 12:00
Co-Chairs: David A. Muller and Yu Morimoto

08:00 **1311** Imaging Catalyst Degradation at the Atomic Scale – D. A. Muller, Y. Yu, H. Xin, D. Wang, and H. D. Abruña (Cornell University)

08:40 **1312** 3-D Tracking and Visualization of Hundreds of Fuel Cell Nanocatalysts during Electrochemical Aging – Y. Yu, H. Xin, R. Hovden, D. Wang, J. Mundy, D. A. Muller, and H. D. Abruña (Cornell University)

09:00 **1313** Correlating Catalyst and Catalyst-Support Structures with Observed Degradation in PEM Fuel Cell – K. L. More, D. A. Cullen, J. Idrobo, K. A. Perry, and K. Reeves (Oak Ridge National Laboratory)

09:20 **1314** Quantifying Catalyst Losses in Polymer Electrolyte Membrane Fuel Cells – D. A. Cullen and K. L. More (Oak Ridge National Laboratory)

09:40 Intermission (20 Minutes)

10:00 **1315** Catalyst Degradation: Nanoparticle Population Dynamics and Kinetic Processes – S. G. Rinaldo (Simon Fraser University), W. Lee (Automotive Fuel Cell Cooperation Corporation, 9000 Glenlyon Parkway Burnaby, B.C. Canada V5J 5J8), J. Stumper (Automotive Fuel Cell Cooperation Corp.), and M. Eikerling (Simon Fraser University, 8888 University Drive, Burnaby, B.C. Canada V5A 1S6)

10:20 **1316** Study of the Cathode Catalyst Layer Degradation Mechanisms in PEM Fuel Cell – P. Urchaga, S. Goli (Tennessee Technological University), and C. A. Rice (Tennessee Tech University)

10:40 **1317** *In Situ* Anomalous Small-Angle X-ray Scattering Study of Fuel Cell Catalyst Degradation in Aqueous and Membrane Electrode Assembly Environments – J. Gilbert (University of Wisconsin – Madison), N. Kariuki, A. Kropf (Argonne National Laboratory), D. Morgan (University of Wisconsin-Madison), D. J. Myers (Argonne National Laboratory), S. Ball, J. Sharman, B. Theobald, and G. Hards (Johnson Matthey Technology Center)

11:00 **1318** Cathode Catalysts Degradation Mechanism from Liquid Electrolyte to Polymer Electrolyte Membrane Fuel Cells – A. A. Marcu and G. Toth (Daimler AG)

11:20 **1319** Rotating Disk Electrode Techniques Designed to Simulate Fuel Cell Startup/Shut-Down Transient Conditions – D. A. Stevens, J. Harlow, R. J. Sanderson, T. C. Crowtz, J. Dahn (Dalhousie University), G. D. Vernstrom, L. L. Atanasoska, G. M. Haugen, and R. T. Atanasoski (3M Company)

11:40 **1320** The Influence of Experimental Conditions on the Catalyst Degradation in the Accelerated Durability Test using a Rotating Disk Electrode – T. Nagai, H. Murata (TOYOTA CENTRAL R&D LABS., INC.), and Y. Morimoto (Toyota Central R&D Labs, Inc.)

Honolulu 3, Tapa Conference Center, Hilton Hawaiian Village

E-1.1 Alkaline Electrocatalysis – 08:00 – 12:00
Co-Chairs: Karen Swider-Lyons and Elena Baranova

08:00 **1321** Electrocatalysis of Small Organic and Inorganic Molecules for Direct Oxidation Fuel Cells – E. A. Baranova, A. Allagui, and B. Middleton (University of Ottawa)

08:40 **1322** Reaction Mechanism of Ethanol Oxidation over Gold Catalyst under Alkaline Environment – M. Koyama, Y. Amano, S. Liu, and T. Ishimoto (Kyushu University)

09:00 **1323** Rh Porphyrin-Based Electrocatalysts for the Oxidation of Alcohols – S. Yamazaki, M. Yao, N. Fujiwara, Z. Siroma, M. Asahi, and T. Ioroi (National Institute of Advanced Industrial Science and Technology)

09:20 **1324** Ethanol Electro-Oxidation on Pt/C and Pd/C Catalysts in Alkaline Media – L. Ma (IUPUI), H. He, A. Hsu (Wright State University), D. Chu (U.S. Army Research Laboratory), and R. Chen (IUPUI)

09:40 Intermission (20 Minutes)

10:00 **1325** Enhanced O2 Reduction Kinetics by Tuning Electrochemical Interface of Carbon or Ag/C Electrodes with Metallophthalocyanine Molecules in Alkaline Media – R. Chen, J. Guo, H. He, J. Zhou (iupui), and D. Chu (U.S. Army Research Laboratory)

10:40 **1326** Catalysts for Alkaline Direct Ethanol and Direct Formate Fuel Cells – A. M. Bartrom, G. Ognibene, J. Ta, J. Tran, and J. L. Haan (California State University, Fullerton)

11:00 **1327** Development of Electrocatalyst for Anion-type Polymer Electrolyte Fuel Cell using KOH-doped Polybenzimidazole – T. Fujigaya and N. Nakashima (Kyushu University)

11:20 **1328** Pt-Free Catalysts for Alkaline Direct Ethanol Membrane Electrode Assemblies – A. Stadlhofer, M. Bodner, H. Schröttner, and V. Hacker (Graz University of Technology)

11:40 **1329** High Performance Pt on Composite Ni-Pb / C Support for Methanol Oxidation in Alkaline Media – M. Lee, B. Mikes, D. Abbott, and S. Mukerjee (Northeastern University)

Tapa 1, Tapa Conference Center, Hilton Hawaiian Village

A-1.2 Modeling 2 – 14:00 – 18:00
Co-Chairs: Shawn Litster and Aimy Bazylak

14:00 **1330** Network Formation and Ion Conduction in Ionomer Membranes – K. Promislow, A. Christlieb, J. Jones (Michigan State University), Z. Xu (Michigan Technological University), and N. Gavish (Michigan State University)

14:40 **1331** On Water Transport in Polymer Electrolyte Membranes during the Passage of Current – T. Berning (Aalborg University)

15:00 **1332** Molecular Simulation of Proton and Water Transport in Hydrated Nafion Membrane – T. Mabuchi and T. Tokumasu (Tohoku University)

15:20 **1333** Understanding Water Management as a Function of Catalyst-Layer Thickness – P. K. Das and W. Adam (Lawrence Berkeley National Laboratory)

15:40 **1334** Numerical Simulation of the Interfacial Oxygen Transport Resistance for a PEMFC Cathode Incorporating Water Coverage – M. Koz and S. Kandlikar (Rochester Institute of Technology)

16:00 Intermission (20 Minutes)

16:20 **1335** Molecular Dynamics Study of Water Transport Property in Micro Hydrophobic Pore – A. Fukushima (Tohoku University), T. Mima, I. Kinefuchi (University of Tokyo), and T. Tokumasu (Tohoku University)

16:40 **1336** 3D Modeling of One and Two Component Gas Flow in Fibrous Microstructures in Fuel Cells by Using the Lattice-Boltzmann Method – J. Brinkmann, D. Froning, U. Reimer (Forschungszentrum Jülich GmbH), V. Schmidt (Ulm University), W. Lehnert, and D. Stolten (Forschungszentrum Jülich GmbH)

17:00 **1337** Lattice Boltzmann Modeling of the Effective Thermal Conductivity of an Anisotropic PEMFC GDL with Residual Water – J. Yablecki and A. Bazylak (University of Toronto)

17:20 **1338** Numerical Determination of Transport Properties of Gas Diffusion Layers in Wet Conditions – Z. TAYARANI YOOSEFABADI (Simon Fraser University), D. B. Harvey (Queen's University), and E. Kjeang (Simon Fraser University)

17:40 **1339** A Case Study of Validation of Multiphase PEMFC Computer Models Using Through-Plane Liquid Water Measurements – B. Carnes, K. Chen (Sandia National Labs), D. Spernjak (Los Alamos National Laboratory), G. Luo, L. Hao, and C. Wang (The Pennsylvania State University)

Tapa 3, Tapa Conference Center, Hilton Hawaiian Village

B-1.2 MEA Degradation – 14:00 – 17:00
Co-Chairs: Tom Fuller and Kazuhiko Shinohara

14:00 **1340** Effect of N-doping on Performance and Durability of Supported PtRu Direct Methanol Fuel Cell Catalyst – S. Pylypenko, A. Corpuz (Colorado School of Mines), T. Olson, A. Dameron (National Renewable Energy Laboratory), K. Wood, P. Joghee (Colorado School of Mines), K. Hurst, S. Christensen, D. Ginley, B. S. Pivovar (National Renewable Energy Laboratory), R. M. Richards (Colorado School of Mines), H. N. Dinh, T. Gennett (National Renewable Energy Laboratory), and R. O'Hayre (Colorado School of Mines)

14:20 **1341** Performance and Durability of HT-PEFCs with Customized Flow Field Plates – F. Liu (Forschungszentrum Jülich GmbH), M. Kvesić (Forschungszentrum Juelich), K. Wippermann, U. Reimer, and W. Lehnert (Forschungszentrum Jülich GmbH)

14:40 **1342** Impact of Polymer Electrolyte Membrane Degradation Products on the Activity of the Oxygen Reduction Reaction on Platinum Catalysts – J. M. Christ (Colorado School of Mines), K. Neyerlin, H. Wang (National Renewable Energy Laboratory), R. M. Richards (Colorado School of Mines), and H. N. Dinh (National Renewable Energy Laboratory)

15:00 **1343** Internal Currents, CO_2 Emissions and Decrease of the Pt Electrochemical Surface Area during Fuel Cell Start-Up and Shut-Down – A. Lamibrac (Lorraine University-CNRS), J. Durst (Grenoble INP-CNRS), D. Spernjak (Los Alamos National Laboratory), G. Maranzana, J. Dillet, S. Didierjean, O. Lottin (Lorraine University-CNRS), F. Maillard, L. Dubau, M. Chatenet (Grenoble INP-CNRS), R. Mukundan, and R. L. Borup (Los Alamos National Laboratory)

15:20 **1344** MEA Design for Improved Cathode Durability under Startup Shutdown Automotive Conditions – J. Roberts, F. Berretta, H. Haas, A. Yang, S. Ronasi, S. Kundu, A. Leow (Automotive Fuel Cell Cooperation Corp.), Z. Moreland (McGill University), G. Orha, Y. Hsieh (Automotive Fuel Cell Cooperation Corp.), and N. Barsan (Steinbeis AO Action)

15:40 **1345** Relation between Local Loss of Performances in a Segmented PEMFC and Local Degradations of the Pt/C Cathode Catalyst – J. Durst (Grenoble INP-CNRS), A. Lamibrac (Lorraine University-CNRS), L. Dubau, F. Maillard, M. Chatenet (Grenoble INP-CNRS), J. Dillet, G. Maranzana, and O. Lottin (Lorraine University-CNRS)

16:00 Intermission (20 Minutes)

16:20 **1346** Study on Protocols for Evaluating Mechanical and Chemical Durability of PEFC Electrolyte Membranes – Y. Oono, Y. Yamaguchi (Daido University), K. Kobayashi (Fuel Cell Research Center, DAIDO University), A. Daimaru, and M. Hori (Daido University)

16:40 **1347** Membrane Durability Testing for Heavy Duty Bus Fuel Cells – N. MACAULEY (SFU), M. Watson (Ballard Power Systems), M. Cruickshank, C. Lim, A. Tavassoli, G. Wang, X. Feng (SFU), M. Lauritzen, J. Kolodziej, S. Knights (Ballard Power Systems), and E. Kjeang (Simon Fraser University)

Honolulu 2, Tapa Conference Center, Hilton Hawaiian Village

C-1.2 Sulfonated Polyaromatic Polymers and Membranes – 14:00 – 18:00
Co-Chairs: Paul Kohl and Shoibal Banerjee

14:00 **1348** Cross-linked Aromatic Polymers for High Durability PEM Membranes: Materials and Methods – M. Di Vona (University of Roma Tor Vergata)

14:40 **1349** Cross-Linked poly(arylene Ether Ketone) Membranes Sulfonated on both Backbone and Pendant Position for High Proton Conducting and Low Water Uptake – H. Dang and D. Kim (Sungkyunkwan University)

15:00 **1350** Poly(Arylene Ether Sulfone) Ionomers with Different Acidity Strengths and Fuel Cell Membrane Properties – Y. Chang (University of Nevada Las Vegas), G. Brunello (Georgia Institute of Technology), M. Disabb-Miller (The Pennsylvania State University), M. Hawley, Y. Kim (Los Alamos National Laboratory), M. Hickner (The Pennsylvania State University), S. Jang (Georgia Institute of Technology), and C. Bae (University of Nevada Las Vegas)

15:20 **1351** Synthesis and Characterization of Sulfonated Poly(Arylene Ether-1,3,4-Oxadiazole) Derivatives – I. Hajdok and J. A. Kerres (University of Stuttgart)

15:40 **1352** Effect of Humidity and Temperature on Durability of Sulfonated Poly(arylene ether sulfone ketone) Multiblock Copolymer Membranes in PEFC Operation – Y. Sakiyama (Toray Research Center, Inc), H. Uchida, M. Kondo, K. Miyatake, M. Uchida, M. Watanabe (University of Yamanashi), and Y. Nakagawa (Toray Research Center, Inc.)

16:00 Intermission (20 Minutes)

16:20 **1353** Proton Mobility in Hydrated Acidic Polymers: Consequences for Optimization of Proton Conductivity – P. Knauth (Aix-Marseille University) and M. Di Vona (University of Roma Tor Vergata)

16:40 **1354** PFG-NMR and SANS Studies in Cation Exchange Membranes based on Sulfonated Polyphenylene Multiblock Copolymers – M. Yoshida (Sophia University), Y. Zhao (Japan Atomic Energy Agency), M. Yoshizawa-Fujita (Sophia University), A. Ohira (AIST), Y. Takeoka (Sophia University), S. Koizumi (Ibaraki University), and M. Rikukawa (Sophia University)

17:00 **1355** Proton Conductive Paths on Polymer Electrolyte Membranes Detected by AFM under Controlled Hydrogen Atmosphere – J. Inukai, M. Hara (University of Yamanashi), D. Hattori (U.Yamanashi), B. Bae (U. Yamanashi), K. Miyatake, and M. Watanabe (University of Yamanashi)

17:20 **1356** Synthesis of Polyethylene-Based Proton Exchange Membranes Containing PE Backbone and Sulfonated Poly(arylene ether sulfone) Side Chains for Fuel Cell Applications – H. Kim, S. N. Lvov, and T. Chung (The Pennsylvania State University)

17:40 **1357** New Ionically and Covalently Cross-Linked Polyaromatic Membranes for Fuel Cells and Electrolysis – J. A. Kerres (University of Stuttgart)

Tapa 2, Tapa Conference Center, Hilton Hawaiian Village

D-1.2 Durability of Pt-Based Cathodes 2 – 14:00 – 17:40
Co-Chairs: Christophe Coutanceau and Katsuyoshi Kakinuma

14:00 **1358** Studies on the Platinum Dissolution Reaction in PEMFC Electrocatalysts – The Effect of Temperature on catalyst degradation – P. Sivasubramanian and R. Mohtadi (Toyota Research Institute of North America)

14:20 **1359** Degradation of Platinum Cathode Electrocatalysts in Sulphuric Acid Solution under Thermal Stress Induced by Linear Sweep Cyclic Thermammetry – G. T. Burstein and G. Smith (University of Cambridge)

14:40 **1360** A Study of Electrochemical Ostwald Ripening in Pt and Ag Catalysts Supported on Carbon – P. Parthasarathy and A. V. Virkar (The University of Utah)

15:00 **1361** Particle Size Effect on Electrocatalyst Stability – C. Wang, N. M. Markovic, and V. R. Stamenkovic (Argonne National Laboratory)

15:20 **1362** Performance, Degradation and Structural Changes Associated with Pt Cathode Catalyst Layer Design – V. Colbow, M. Dutta, A. Young, Z. Ahmad, E. Rogers (Ballard Power Systems), D. B. Harvey (Queen's University), and S. Wessel (Ballard Power Systems)

15:40 **1363** Mitigation of Catalyst Layer Degradation under Automotive Fuel Cell Operations – J. Li, K. Wang, Y. Yang, Y. Zou, and R. Vohra (Automotive Fuel Cell Cooperation)

16:00 Intermission (20 Minutes)

16:20 **1364** PtCo Alloy Stability in PEMFCs under Automotive Cyclic Conditions – C. Chuy, M. Davis, M. Guenther (AFCC Automotive Fuel Cell Cooperation Corp.), H. Haas (Automotive Fuel Cell Cooperation Corp.), D. Susac (AFCC), C. Talpalaru, and H. Zhang (AFCC Automotive Fuel Cell Cooperation Corp.)

16:40 **1365** Durable, OER-Active Compositions of Pt, Ir, and Ru for PEM Fuel Cell Start-Stop Protection – J. Harlow, D. A. Stevens, R. Sanderson, T. C. Crowtz, J. Dahn (Dalhousie University), G. M. Haugen, L. L. Atanasoska, G. D. Vernstrom, and R. T. Atanasoski (3M Company)

17:00 **1366** Effect of Nanosheet Size on Activity and Durability of RuO_2 Nanosheet Pt/C Catalyst – C. Chauvin, T. Saida, K. Lokesh, and W. Sugimoto (Shinshu University)

17:20 **1367** Time Resolved Corrosion of Electrode Supports in PEM Fuel Cells – J. D. Fairweather, D. Spernjak, R. Mukundan (Los Alamos National Laboratory), R. K. Ahluwalia, S. Arisetty (Argonne National Laboratory), and R. L. Borup (Los Alamos National Laboratory)

Honolulu 3, Tapa Conference Center, Hilton Hawaiian Village

E-1.2 Alkaline Membranes I – 14:00 – 18:00
Co-Chairs: Dario Dekel and Young-Woo Choi

14:00 **1368** Alkaline Membrane Fuel Cell (AMFC) materials and system improvement – State-of-the-Art – D. R. Dekel (CellEra)

14:40 **1369** A Raman Spectroscopy Investigation into the Alkaline Stabilities of Hydrated Anion-Exchange Head-Groups Relevant to Alkaline Membrane Fuel Cells – J. R. Varcoe, H. Herman, and D. K. Whelligan (University of Surrey)

15:00 **1370** Engineering the van der Waals Interaction in Cross-Linking-Free Hydroxide Exchange Membranes for Low-Swelling and High-Conductivity – S. Gu (University of Delaware), J. Skovgard (University of California, Riverside), and Y. Yan (University of Delaware)

15:20 **1371** Catalytic Advances and Electrolyte Stability for Carbonate Exchange Membrane Fuel Cells – W. E. Mustain (University of Connecticut)

15:40 **1372** Molecular Dynamics Simulations of Hydroxide Solvation and Transport in Anionic Exchange Membranes – G. E. Lindberg, C. Knight, and G. A. Voth (The University of Chicago)

16:00 Intermission (20 Minutes)

16:20 **1373** Anion Conducting Pore-Filling Membranes for Solid Alkaline Fuel Cells – Y. Choi, M. Lee, C. Kim, T. Yang, and S. Park (Korea Institute of Energy Research)

17:00 **1374** Evaluating the Contribution of Direct vs. Indirect Carbonate Production in Anion Exchange Membrane Fuel Cells – M. Ignatowich, G. Crettol, M. Chhiv, and W. E. Mustain (University of Connecticut)

17:20 **1375** Fundamental Studies of Alkaline Exchange Membranes Towards Optimization in a Fuel Cell Environment – A. Herring (Colorado School of Mines), E. Coughlin (University of Massachusetts, Amherst), D. Knauss (Colorado School of Mines), G. A. Voth (The University of Chicago), T. Witten (University of Chicago), M. Liberatore (Colorado School of Mines), and Y. Yan (University of Delaware)

17:40 **1376** Development of Alkaline Exchange Ionomers for use in Alkaline Polymer Electrolyte Fuel Cells – S. D. Poynton, R. Zeng, J. Kizewski, A. Ong, and J. R. Varcoe (University of Surrey)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

B9 – Poster Session – 18:00 – 20:00
Co-Chairs: Jim Fenton, Pezhman Shirvanian, and Thomas Schmidt

- **1377** Electrochemical Performance of Pt Extended Network Catalysts from Spontaneous Galvanic Displacement in MEAs – K. Neyerlin, B. A. Larsen, S. S. Kocha, and B. S. Pivovar (National Renewable Energy Laboratory)
- **1378** Effect and Development of Cathode Catalyst on PEFC Cell Performance under Low and High Relative Humidity – H. Nakajima and K. Matsutani (Tanaka Kikinzoku Kogyo K.K.)
- **1379** Subzero Degradation Analysis of Membrane Electrode Assemblies Fabricated Using Two Common Techniques – A. Pistono (Tennessee Technological University), C. A. Rice (Tennessee Tech University), J. Lewis, and V. Ramani (Illinois Institute of Technology)
- **1380** Application of Electrospinning Technique in the Fabrication of a Composite Electrode for PEMFC – J. J. Sightler, E. McPherson (USC), W. A. Rigdon (University of South Carolina), and X. Huang (USC)
- **1381** Verification of Durability Test Methods of an MEA for Automotive Application – Y. Hashimasa, T. Shimizu, Y. Matsuda, D. Imamura, and M. Akai (Japan Automobile Research Institute)
- **1382** Structural Change of the Pt/C Electrocatalyst in Humidified Air Observed by *In Situ* TEM – T. Shimizu, D. Imamura (Japan Automobile Research Institute), T. Yaguchi, T. Kanemura, and T. Kamino (Hitachi High-Technologies Corporation)
- **1383** Effects of Pt Loading in Anode Electrode on the Degradation of MEA for PEMFCs during Startup/Shutdown Cycling – E. Cho, K. Eom, T. Lim, J. Jang, and H. Kim (Korea Institute of Science and Technology)

- **1384** Evaluation of Pt/C Catalysts and MEA's Fabricated by Carbon Materials with Different Nanostructures for Polymer Electrolyte Fuel Cells – X. Zhao, Z. Noda, A. Hayashi, and K. Sasaki (Kyushu University)
- **1385** Real-time CO_2 Detection from Carbon Support Oxidation in PEM Fuel Cell Cathodes During Potential Cycling – E. Niangar, T. Han, N. Dale, and K. Adjemian (Nissan Technical Center North America)
- **1386** Investigation of Role of Cathode Microporous Layers in PEMFC – E. Nishiyama (Fukui University of Technology), M. Hara (Fukui University of Techonology), and T. Murahashi (Fukui University of Technology)
- **1387** Multi-Analytical Study of Gas Diffusion Layers PTFE Content Variation – K. Artyushkova, P. Atanassov (The University of New Mexico), T. V. Reshetenko (University of Hawaii at Manoa), and J. St-Pierre (University of Hawaii)
- **1388** Using Plasmas to Modify Gas Diffusion Layers to Enhance the Long Term Stability of PEMFCs – C. Walter, V. Brüser, A. Quade, and K. Weltmann (INP Greifswald)
- **1389** Dynamic SIMS Analysis of PEMFC Catalyst Layer/Solid Electrolyte Membrane Interface – T. Ebihara, M. Nojima, T. Kondo, and M. Yuasa (Tokyo University of Science)
- **1390** Numerical Investigation of effect of Oxygen and Water Distribution on PEM Fuel Cell Performance – M. Yoneda and H. Motegi (Mizuho Information and Research Institute, Inc.)
- **1391** Reactive Molecular Dynamics Simulations of Proton Exchange Membranes – J. Savage and G. A. Voth (The University of Chicago)
- **1392** Thermo-Fluid Dynamics Simulation of Passive Type PEFC by COMSOL Multiphysics – Y. Nakajima (Chiba Institute of Technology Graduate school), J. Otsuka, and E. Ejiri (Chiba Institute of Technology)
- **1393** The Mechanism of the Improvement in Catalytic Activity of Ir Modified by V Compared to Pure Ir/C – B. Li, D. Yang, R. Lin, Z. Yu, and J. Ma (Tongji University)
- **1394** Analysis of Non-Steady State Electrochemical Gas Permeability Measurements for PEM Fuel Cells and Electrolysers – D. Bessarabov (Northwest University), I. Beckman, and I. Buntseva (Lomonosov Moscow State University)
- **1395** Interfacial Contact Resistance of Tantalum Coated Construction Materials for High Temperature Steam Electrolysers and Fuel Cells – A. H. Jensen, E. Christensen, and J. Von Barner (Technical University of Denmark)
- **1396** Hydrogen Generation from Aluminum Corrosion in Aqueous Solutions – Y. Chiu, C. Chen, K. Hsueh, and J. Hung (National United University)
- **1397** Fabrication of Mg-Ni Alloys for the Purpose of Fast Hydrogen Generation from the Hydrolysis in Neutral Aqueous NaCl solution – S. Oh (Korea Advanced Institute of Science and Technology), K. Eom (Korea Institute of Science and Technology), J. Kyung, D. Kim (Yonsei University), and H. Kwon (Korea Advanced Institute of Science and Technology)
- **1398** Computer Modeling of a kW Combined Heat and Power Fuel Cell Unit – P. Ho, W. Wang, C. Dai (National United University), Y. Chang, W. Chang (Industrial Technology Research Institute), K. Hsueh, and J. Hung (National United University)
- **1399** Maximum Efficiency Point Tracking Type Power Control System for a Fuel Cell Power Generation System – K. Itako and H. Takahashi (Kanagawa Institute of Technology)
- **1400** A 3D Two-Phase Model for a Membraneless Fuel Cell Using Decomposition of Hydrogen Peroxide with Y-Shaped Microchannel – J. Peng, Z. Zhang, and H. Niu (Tsinghua University)
- **1401** A Study of Electrochemical Recycle for Noble Metals in PEFCs – H. Shiroishi, H. Matsumoto (Tokyo National College of Technology), M. Yonekawa (Tokyo Institute of Technology), R. Shoji, I. Kato (Tokyo National College of Technology), and M. Kunimatsu (Kanagawa Industrial Technology Center)
- **1402** Effects of Atmospheric Trace Species on Polymer Electrolyte Fuel Cell Performance: Analysis of Performance Deterioration Mechanism by Current Distribution Measurement – D. Imamura and K. Ohno (Japan Automobile Research Institute)
- **1403** Development of Methods to Estimate the Effects of Impurities on PEFC Performance II. Impact of Acrylonitrile Poisoning on Oxygen Reduction Reaction at Pt/C Catalysts – M. El-Deab, F. Kitamura, and T. Ohsaka (Tokyo Institute of Technology)
- **1404** Ammonium Polyphosphate Composite Based Electrolytes for Intermediate Temperature Fuel Cells – N. Kluy (TU München), B. Reeb (TUM CREATE Centre for Electromobility Singapore), O. Paschos (Technische Universität München), F. Maglia (University of Pavia), O. Schneider, U. Stimming (Technische Universität München), S. Angioni, and P. Righetti (University of Pavia)
- **1405** Flow Field Design for a Polymer Electrolyte Unitized Reversible Fuel Cell – C. Hwang, H. Ito, T. Maeda, A. Nakano (National Institute of Advanced Industrial Science and Technology (AIST)), A. Kato (Takasago Thermal Engineering Co., Ltd.), and T. Yoshida (Daiki Ataka Engineering Co., Ltd.)
- **1406** A New Design of PEMFC Bipolar Plate for Corrosion Study – Y. Hitoshi, T. Ichikawa, S. Chu (Iwate University), M. Kumagai (Taiyo Stainless Spring Co., Ltd.), and S. Myung (Sejong University)
- **1407** DMFC Performance of Cross-Linked Sulfoethylcellulose/Poly(Vinyl Alcohol) Blend Electrolyte Membranes – Y. Kasai, T. Okayama (Aomori Prefectural Industrial Technology Research Center), G. Guan, and A. Abudula (Hirosaki University)
- **1408** Investigation of Power Efficiency from the Microbial Biofuel Cell System with the Photosynthetic Bacteria, Rhodopseudomonas Sphaeroides – M. Syu and Y. Chang (National Cheng Kung University)

- **1409** Immobilization of Enzymes onto the Carbon Paper Electrode by the Conducting Polymer/ Carbon Nanotubes Composite for the Investigation of the Biofuel Cell System – M. Syu and C. Lin (National Cheng Kung University)
- **1410** Designing a Highly Ordered Nanowire with High Proton Conductivity for Polymer Membrane and Catalyst Layer of PEFC – T. Kim (KIER), Y. Choi (Korea Institute of Energy Research), and S. Yim (KIER)
- **1411** Electrochemical and Raman Spectroscopic Evaluation of Pt/GCB Durability for the Start/ Stop Operating Condition – M. Hara (University of Yamanashi), M. Lee (Northeastern University), Y. Yamashita, M. Uchida, H. Uchida, and M. Watanabe (University of Yamanashi)
- **1412** Investigation of Carbon Corrosion Resistance of CNT Containing Electrode – D. Larrabee, W. A. Rigdon (University of South Carolina), E. McPherson, J. J. Sightler, and X. Huang (USC)
- **1413** Investigation of the Corrosion of Carbon Supports in Polymer Electrolyte Fuel Cells Using Simulated Start-Up/Shut-Down Cycling – Y. Park, K. Kakinuma, M. Hara, M. Uchida, H. Uchida, and M. Watanabe (University of Yamanashi)
- **1414** Durability of Arc Plasma Synthesized Pt/C Nano-Catalyst – H. Joo (Yonsei University), J. Park (Sejong University), and H. Choi (Korea Institute of Industrial Technology)
- **1415** Kinetics and Mass Transport Investigation of Pt/Carbon Electrocatalyst by Rotating Disk Electrode – C. Wang (Nissan Technical Center North America, Inc), N. Dale, and K. Adjemian (Nissan Technical Center North America)
- **1416** Oxygen Reduction Reaction Activity and Durability of Electrocatalysts Supported on SnO_2 – T. Tsukatsune, Y. Takabatake, Z. Noda (Kyushu University), S. Taniguchi (International Research Center for Hydrogen Energy), Y. Shiratori, A. Hayashi, and K. Sasaki (Kyushu University)
- **1417** Effects of Tin Dioxide Loading on ORR Activity and Durability of Pt/C Catalyst – N. Eguchi, T. Kinumoto, T. Tsumura, and M. Toyoda (Oita University)
- **1418** Durability Enhancement of Pt/C Catalysts via Support Functionalization with Silicotungstic Acid – K. S. Mason (Colorado School of Mines), K. Neyerlin (National Renewable Energy Laboratory), M. Kuo, K. Horning (Colorado School of Mines), S. S. Kocha, J. A. Turner (National Renewable Energy Laboratory), and A. Herring (Colorado School of Mines)
- **1419** Performance Evaluation of Pt-Deposited SiO_2 Composite Catalyst under Low Humidity Conditions – J. Yoo (University of Incheon), I. Choi (Seoul National University), S. Ahn (Korea Institute of Science and Technology), J. Kim (Seoul National University), and O. Kwon (University of Incheon)
- **1420** Durability of Au Core/Pt Shell Structured Catalyst – E. Maki, Y. Ikehata, T. Nishikawa, Y. Kirihata (Doshisha University), N. Aoki (ishi-huku metal industry), H. Inoue (Ishifuku Metal Industry Co., Ltd), H. YAMADA (Nara National College of Technology), H. Daimon, and M. Inaba (Doshisha University)
- **1421** Electrochemical Stability of Pt ML on Au/ QC Electrode – H. Yamada, A. Kawamura, T. Kobayashi, K. Katakura (Nara National College of Technology), and M. Inaba (Doshisha University)
- **1422** Electrochemical Stability for Pt-Enriched Ni/ Pt(111) Topmost Surface Prepared by Molecular Beam Epitaxy – N. Todoroki, Y. Iijima, R. Takahashi, K. Matsumoto, Y. Yamada, T. Hayashi, and T. Wadayama (Tohoku University)
- **1423** Platinum Dissolution in Nitrogen Oxides-Containing $HClO_4$ Solution Studied by Electrochemical Quartz Crystal Microbalance – Y. Uchiyama, T. Abe, T. Morita, and S. Imabayashi (Shibaura Institute of Technology)
- **1424** Poly(Benzimidazole)-Functionalized Graphene Supported Pt Electrocatalyst and Its Application in High Temperature PEM Fuel Cells – A. A. Permyakova, J. Jensen, Q. Li, and N. Bjerrum (Technical University of Denmark)
- **1425** Evaluation of the Pt/C Catalyst for Fuel Cells Prepared by a Nano Particle Formation Technique Using a Pulsed Arc Plasma Source – Y. Agawa (ULVAC RIKO, Inc.), S. Endo, M. Matsuura, and Y. Ishii (ULVAC-RIKO, Inc.)
- **1426** Controlled Pt Coverage for Extended Thin Film Catalyst ORR Studies via Templated Gas Phase Synthesis – J. Bult, K. Neyerlin, S. Christensen, A. Dameron, B. S. Pivovar, and K. Hurst (National Renewable Energy Laboratory)
- **1427** Synthesis and Characterization of Au-Decorated Pt Surface for Oxygen Reduction Reaction – J. Ahn, H. Lee, H. Kim (Korea Institute of Industrial Technology), Y. Shul, and H. Kim (Yonsei University)
- **1428** Synthesis of Alkanetiol Stabilized Au/C and Durability of Au Core/Pt Shell Structured Catalyst – N. Aoki (ishihuku metal industry), H. Inoue (ishifuku metal industry), T. Kirihata, E. Maki, H. Daimon, and M. Inaba (Doshisha University)
- **1429** Various Types of Tubular Carbon Nanofibers as a Support Material of Catalysts for Fuel Cell – J. Kim (University of Science & Technology), S. Lim (Korea Institute of Energy Research), M. Seo, B. Kim, S. Yoon (Kyushu University), and D. Jung (Korea Institute of Energy Research)
- **1430** High-Performance Pt catalysts Supported on High-Surface-Area Graphene Composites for PEFCs – L. Sun (1Department of Mechanical Engineering, Purdue School of Engineering and Technology, Indiana University-Purdue University Indianapolis (IUPUI)), H. Zhang, L. Stanciu (Weldon School of Biomedical Engineering and School of Materials Engineering), J. Ilavsky (Argonne National Laboratory), and J. Xie (Indiana University Purdue University Indianapolis)
- **1431** Platinum Yttrium Alloy Nanocrystals as Oxygen Reduction Reaction Electrocatalysts – Z. Zhuang (University of Delaware), Y. Zhang (University of Delware), and Y. Yan (University of Delaware)
- **1432** Oxygen Reduction on Pt-Pd Electrode for PEFC Cathode – A. Hyono, Y. Sugawara, M. Ueda, and T. Ohtsuka (Hokkaido University)

- **1433** Improvement in Activity of Highly Durable Silica-Coated Pd/CNT Cathode Catalysts for PEFC by Addition of Cu – S. Takenaka, H. Miyata, T. Tsukamoto, H. Matsune, and M. Kishida (Kyushu University)
- **1434** Preparation of Highly Active Zr Oxide-Based Oxygen Reduction Electrocatalysts as PEFC Cathode – S. Yin, A. Ishihara (Yokohama National University), M. Matsumoto, M. Arao, H. Imai (NISSAN ARC Ltd.), K. Matsuzawa, S. Mitsushima, and K. Ota (Yokohama National University)
- **1435** Highly Active Titanium Oxide-Based Electrocatalyst for Oxygen Reduction Reaction for PEFC – K. Suito (Green Hydrogen Resaerch Center), A. Ishihara (Yokohama National University), M. Matsumoto, M. Arao, H. Imai (Nissan Arc Ltd.), K. Matsuzawa, S. Mitsushima, and K. Ota (Yokohama National University)
- **1436** Surface Reaction Analysis of Tantalum-Oxide Oxygen-Reduction Catalysts by Using X-ray Photoelectron Spectroscopy – M. Matsumoto, H. Imai (NISSAN ARC Ltd.), T. Miyazaki, S. Fujieda (NEC Corporation), A. Ishihara, and K. Ota (Yokohama National University)
- **1437** Development of Tantalum Boride Thin Film Catalysts for Oxygen Reduction Reaction Using an RF Magnetron Sputtering Deposition – K. Kushibe, K. Iyatani, Y. Horiuchi, and M. Matsuoka (Osaka Prefecture University)
- **1438** Preparation and Electrochemical Performance of Nitrogen-doped Graphene by Intermittent Microwave-assisted Heating for Fuel Cells – J. Liu, Y. Xin, Y. Zhou, and Z. Zou (Nanjing University)
- **1439** Characteristics of Oxygen Adsorption on Nitrogen Doped HOPG Revealed by X-ray Absorption Spectroscopy – H. Kiuchi (The University of Tokyo), T. Kondo, M. Sakurai (University of Tsukuba), H. Niwa, M. Kobayashi, Y. Harada (The University of Tokyo), T. Ikeda (Japan Atomic Energy Agency), K. Terakura (Tokyo Institute of Technology), J. Nakamura (University of Tsukuba), and M. Oshima (The University of Tokyo)
- **1440** Nitrogen-doped Graphene for Oxygen Reduction Reaction in Air Electrodes – D. Lee, A. Yu, and Z. Chen (University of Waterloo)
- **1441** NH_3-Pyrolyzed Fe-Impregnated Polyaniline for the use as a Cathode Catalyst for Polymer Electrolyte Fuel Cells – K. Nahm, S. Kim, and P. Kim (Chonbuk National University)
- **1442** Characterization of High-Performance Non-precious Metal Catalysts for Oxygen Reduction Reaction (ORR) – N. Ranjbar Sahraie, D. Wilhelm (Technical University of Berlin), and P. Strasser (Technische Universität Berlin)
- **1443** Highly Active Tetracyanoethylene Derived Non-precious Metal Catalyst for Oxygen Reduction Reaction in PEM Fuel Cell – J. Choi and Z. Chen (University of Waterloo)
- **1444** Carbon Supported Copper Phthalocyanine (CuPc/C) as Novel Cathode Catalyst for Polymer Electrolyte Membrane Fuel Cells ---Effect of Nafion Ionomer as for Alkaline Electrolyte – L. Ding, L. Xu (Donghua University), B. Tian (Pearl Hydrogen Technology Co., Ltd.), S. Ibrahim, Y. Liu (Tohoku University), and J. Qiao (Donghua University)
- **1445** RRDE Studies of Oxygen Reduction Reaction at Various Catalysts in Alkaline Solution – J. Choi (Kyungil University) and H. Jung (Kangwon National University)
- **1446** Analysis of Mechanism of Oxygen Reduction Reaction on Non-Noble Metals in Alkaline Solution by Scanning Electrochemical Microscopy – R. Teranishi, E. Higuchi, M. Chiku, and H. Inoue (Osaka Prefecture University)
- **1447** FePc/C and CoPc/C Catalysts for the Oxygen Reduction Reaction as Cathode Catalysts for Alkaline Direct Methanol Fuel Cell – J. Jang (University of Science and Technology), S. Kim, S. Lim, D. Peck, and D. Jung (Korea Institute of Energy Research)
- **1448** New Manganese Oxide-based Cathode Catalysts for Anion-Exchange Membrane Fuel Cells – T. Kenko, M. Hagiwara, T. Takakuwa, M. Saito, H. Daimon, A. Tasaka, M. Inaba (Doshisha University), Y. Kadoma, N. Kumagai (Iwate University), H. Shiroishi (Tokyo National College of Technology), T. Hatai, and J. Kuwano (Tokyo University of Science)
- **1449** Enhanced Electrocatalytic Performance for Methanol Oxidation via Insertion of Ruthenium Oxide Particles into Pt and Polyaniline-Poly(Acrylic Acid-co-Maleic Acid) Composite Electrode – C. Kuo (National Kaohsiung University of Applied Sciences), Z. Kuo (Department of Chemical and Materials Engineering, National Kaohsiung University of Applied Sciences, Kaohsiung 80778, Taiwan, ROC), T. Wu (National Yunlin University of Science and Technology), J. Chen, and W. Li (Department of Chemical and Materials Engineering, National Kaohsiung University of Applied Sciences, Kaohsiung 80778, Taiwan, ROC)
- **1450** Methanol Oxidation Performance of Electrocatalysts Prepared by the Polygonal Barrel-Sputtering Method – M. Inoue, C. Hiromi, K. Hirakawa, and T. Abe (University of Toyama)
- **1451** Quantitative Analysis of CO_2 Generation during Ethanol Electrooxidation on Pt-Sn/C and Pt-SnO_2/C – S. Kaneda, K. Matsuzawa, and S. Mitsushima (Yokohama National University)
- **1452** The Distribution of Products of Ethanol Electrooxidation on Carbon-Supported Noble Metals Catalysts in Direct Ethanol Fuel Cell – J. Seweryn and A. Lewera (University of Warsaw)

- **1453** The Graphene-Supported Palladium and Palladium-yttrium Nanoparticles for the Ethanol Oxidation Reactions: Experimental and Theoretical Modeling – M. Seo (Daegu Gyeongbuk Institute of Science and Technology (DGIST)), S. Choi (Gwangju Institute of Science and Technology (GIST)), J. Seo, S. Noh (Daegu Gyeongbuk Institute of Science and Technology (DGIST)), W. Kim (Gwangju Institute of Science and Technology (GIST)), and B. Han (Daegu Gyeongbuk Institute of Science and Technology (DGIST))
- **1454** Studies of the Catalytic Activity of Unsupported Pt-Based Anodes Modified with CeO_2 for the Electro-Oxidation of Ethylene Glycol in Acid Electrolyte – A. Chávez Villanueva, A. Ramírez (Universidad de la Ciénega de Michoacán de Ocampo), G. Vargas Gutiérrez, and F. Rodríguez Varela (Cinvestav Unidad Saltillo)
- **1455** Investigation of Electrocatalytic Activity of the Nanostructured Au-Cu Catalyst Deposited on the Titanium Surface towards Borohydride Oxidation – L. Tamašauskaitė-Tamašiūnaitė, A. Balčiūnaitė, A. Vaiciukevičienė, I. Stankevičienė, A. Selskis, and E. Norkus (Institute of Chemistry, Center for Physical Sciences and Technology)
- **1456** Catalytic Activity of Pt/MWCNT for the Electro-Oxidation of Ethylene Glycol in Alkaline Media – Y. Verde-Gomez, B. Escobar (Instituto Tecnologico de Cancun), A. Chávez Villanueva (Universidad de la Ciénega de Michoacán de Ocampo), and F. Rodríguez Varela (Cinvestav Unidad Saltillo)
- **1457** Chemisorption Studies of Dissolved Pt Species on RuO_2 nanosheet – L. K. Sannegowda, C. Chauvin, and W. Sugimoto (Shinshu University)
- **1458** Electro-Oxidation of Borohydride by Rh Porphyrins – S. Yamazaki, H. Senoh, N. Fujiwara, M. Yao, Z. Siroma, K. Yasuda, and T. Ioroi (National Institute of Advanced Industrial Science and Technology)
- **1459** Enhanced Performance of MEAs Using Non-Platinum Catalyst for Direct Alcohol Alkaline Fuel Cell – T. Mizukami, S. Suzuki, J. Kawaji, O. Taigo, and K. Yamaga (Hitachi, Ltd.)
- **1460** Fabrication and Electrochemical Properties of Electro-Spun RuO_2-Carbon Nanofibers Supported Pt Nanoparticles – G. An and H. Ahn (Seoul National University of Science and Technology)
- **1461** Synthesis and Characterization of Cross-Linked Polyethyleneimine Based Membranes for Alkali Anion Exchange Fuel Cells – A. M. Maes, M. Vandiver, A. Krosovski, J. L. Horan, and A. Herring (Colorado School of Mines)
- **1462** Alkaline Membrane Fuel Cells with Several Alternative Fuels – K. Fukuta, T. Negishi, Y. Kikkawa, K. Oda, S. Watanabe, and H. Yanagi (Tokuyama Corp.)
- **1463** Synthesis and Characterization of Perfluoro Quaternary Ammonium Ion Exchange Membranes for Fuel Cell Applications – M. A. Vandiver, M. Liberatore, and A. Herring (Colorado School of Mines)
- **1464** Transport properties of Plasma Polymerized Anion Exchange Membrane for Direct Methanol Alkaline Fuel Cells – T. Kurozumi, Y. Okajima, H. Nagai, and M. Sudoh (Shizuoka University)
- **1465** Investigation of Mechanical Properties of Alkaline Exchanges Membranes for Fuel Cell Applications – B. R. Caire, M. A. Vandiver, S. Lustgraaf, A. Herring, and M. Liberatore (Colorado School of Mines)
- **1466** Preparation and Characterization of Anionic Binder Based Electrodes for Anion-Exchangeable Membrane Fuel Cells – M. Shin, Y. Byun, J. Park, M. Kang (Sangmyung University), and Y. Kim (Chungbuk National University)
- **1467** 13C PGSTE NMR Diffusion and Conductivity Measurements on Tetraalkyl Ammonium Cations – H. N. Sarode and A. Herring (Colorado School of Mines)
- **1468** Chemical Degradation Mechanism of Membranes for Alkaline Membrane Fuel Cells – Y. Choe (National Institute of Advanced Industrial Science & Technology), N. J. Henson, and Y. Kim (Los Alamos National Laboratory)
- **1469** Novel Nanostructured High-Performance Anion Exchange Ionomers for Anion Exchange Membrane Fuel Cells – J. Zhou, L. Sun, J. Guo (IUPUI), D. Chu (U.S. Army Research Laboratory), and R. Chen (IUPUI)
- **1470** Radio-Chemically Pore-Filled Anion Exchange Membranes for Solid Alkaline Fuel Cells (SAFC) – T. Sherazi (COMSATS Institute of Information Technology), D. Hwang (Hanyang University), J. Sohn (Korea Atomic Energy Research Institute), M. Guiver (National Research Council Canada), and Y. Lee (Hanyang University)
- **1471** Ionic Conductivity of [dema][TfO]/Solid Acid-Base Composite Membrane – A. Fujisawa, K. Matsuzawa, and S. Mitsushima (Yokohama National University)
- **1472** A Proton Conductive Silicate-Nanoencapsulated Polyimide Nonwoven as a Novel Porous Substrate for a Reinforced Sulfonated Poly(Arylene Ether Sulfone) Composite Membrane – J. Seol, J. Won (Kangwon National University), M. Lee (Kolon Central Research Park), Y. Hong (Korea Research Institute of Chemical Technology), and S. Lee (Kangwon National University)
- **1473** Relationship Between Morphology and Proton Conductivity of Aromatic Diblock Copolymer Electrolytes – T. Oshima, K. Umezawa, M. Yoshizawa-Fujita (Sophia University), A. Ohira (AIST), Y. Takeoka, and M. Rikukawa (Sophia University)
- **1474** Synthesis of Hydrocarbon Ionomer Materials and Evaluations of MEA – S. Miura, T. Oshima, K. Umezawa, M. Yoshizawa-Fujita (Sophia University), A. Ohira (AIST), Y. Takeoka, and M. Rikukawa (Sophia University)
- **1475** Nano-Composite Ion-Conducting Polymer Electrolytes (ICPEs) for Fuel Cell Application – H. Zarrin, M. Fowler, A. Yu, and Z. Chen (University of Waterloo)
- **1476** Polyvinyl Alcohol Based Nanocomposite Membranes Containing Aluminum Hydroxide Gel – O. I. Radionova, I. Y. Prokhorov, and G. Y. Akimov (DonPTI NAS Ukraine)

- **1477** Radiolytic Preparation and Characterization of Silane-Crosslinked ETFE-g-PSSA/PTMSPM Membrane for Proton Exchange Membrane Fuel Cell – J. Sohn, J. Song, Y. Nho, and J. Shin (Korea Atomic Energy Research Institute)
- **1478** Cross-Linked Poly(Arylene Ether Ketone) Membranes Containing Pendant Sulfonic Acid Groups for Fuel Cell Applications – H. Dang and D. Kim (Sungkyunkwan University)
- **1479** Electron Beam-Induced Crosslinked SPEEK Membrane for PEMFC – J. Song (Korea Atomic Energy Research Institute), D. Shin (Hanyang University), J. Sohn, Y. Nho (Korea Atomic Energy Research Institute), Y. Lee (Hanyang University), and J. Shin (Korea Atomic Energy Research Institute)
- **1480** The Compatibility of the Composite Membrane Based on Sulfonated Poly(Ether Ether Ketone) (sPEEK) / Poly(Vinylidenefluoride) (PVdF) / Urethane Acrylate Non-Ionomer (UAN) for a Unitized Regenerative Fuel Cell (URFC) – H. Jung (Kangwon National University) and J. Choi (Kyungil University)
- **1481** Catalyst Coated PBI Membrane High Temperature Assemblies – N. Sephane, A. Kreisz, N. Donzel, J. Bernard d'Arbigny, D. J. Jones, and J. Rozière (University Montpellier 2)
- **1482** Microelectrode Analysis of Oxygen Permeation through Nafion® Thin Films – A. Oda, H. Okada, H. Daimon, A. Tasaka, and M. Inaba (Doshisha University)
- **1483** Water Uptake and Transport in Nafion® – G. Hwang, D. Parkinson, A. Kusoglu, A. MacDowell, and A. Weber (Lawrence Berkeley National Laboratory)
- **1484** Theoretical Study on the Degradation Mechanism of Polymer Electrolyte Membrane – H. Motegi and M. Yoneda (Mizuho Information and Research Institute, Inc.)
- **1485** Membrane Science for Liquid Organic Fuel Cells – K. T. Clark (Lawrence Berkeley National Laboratory), L. Krishnan (GE Global Research), G. W. Yeager (General Electric), and J. Kerr (Lawrence Berekeley National Laboratory)

B10 Renewable Fuels from Sunlight and Electricity

Energy Technology / High Temperature Materials / Physical and Analytical Electrochemistry / New Technology Subcommittee

Nautilus 2, Mid-Pacific Conference Center, Hilton Hawaiian Village

Carbon Dioxide Conversion in Liquid – 08:00 – 09:50
Co-Cairs: Xiao-Dong Zhou and A. Manivannan

08:00 **1729** The Electrocatalytic Conversion of CO_2 to Fuels and Chemicals – T. F. Jaramillo, K. P. Kuhl, E. R. Cave, and D. N. Abram (Stanford University)

08:30 **1730** Graphene-Supported Copper Catalysts for Electrochemical Reduction of Carbon Dioxide – S. Huang and P. Fedkiw (North Carolina State University)

08:50 **1731** Room Temperature Electrochemical Conversion of CO_2 to Fuels – X. Zhou, J. Wu, and F. Risalvato (University of South Carolina)

09:10 **1732** Photoreduction of CO_2 over Morphology Controlled TiO_2 or Nanocomposite System of g-C_3N_4 and WO_3 – T. Ohno and N. Murakami (Kyushu Institute of Technology)

09:30 **1733** Photoelectrochemical Enzyme Biofuel Cell with the Function of CO_2 Conversion to Formic Acid – Y. Amao (Oita University Dannoharu), Y. Sakai (Oita University), and N. Shuto (Oita Unversity)

New Materials for Solar Energy and Fuels – 10:00 – 12:20
Co-Chairs: Gregory Jackson and Ravi Subramanian

10:00 **1734** Upconversion Nanocrystals: A New Class of Energy Materials – X. Liu (National University of Singapore)

10:30 **1735** Photoelectrochemical Water Splitting Using Electrodes Prepared by Particle Transfer Method – T. Minegishi, N. Nishimura, J. Kubota, and K. Domen (The University of Tokyo)

11:00 **1736** Graphite Oxide Modified by Ammonia as Photocatalyst for Water Oxidation under Visible Light Illumination – T. Yeh and H. Teng (National Cheng Kung University)

11:20 **1737** Hydrogen Production Promoted by Visble Light-Responsive MOF (Metal-Organic Framework) Photocatalyst – T. Toyao, M. Saito, Y. Horiuchi (Osaka Prefecture University), K. Mochizuki, M. Iwata, H. Higashimura (Sumitomo-Chemical Co., Ltd.), and M. Matsuoka (Osaka Prefecture University)

11:40 **1738** Electrospun Ceria-Based Fibers for Renewable Fuel Production from Concentrated Sunlight – W. T. Gibbons and G. S. Jackson (University of Maryland)

12:00 **1739** Role of Electrocatalysts in Photoelectrochemical Water Oxidation of Oxide Semiconductor Electrodes – S. Choi, T. Jeon, U. Kang, H. Jeong, and H. Park (Kyungpook National University)

Photoelectrochemical Cells – 14:00 – 15:40
Co-Chairs: Heli Wang and Teruhisa Ohno

14:00 **1740** Fabrication of Efficient Nanostructured Photoelectrodes for Photoelectrochemical Hydrogen Production from Water – J. Lee (Pohang University of Science & Technology)

14:30 **1741** Performance and Limits of 2.2 eV Copper Tungstate ($CuWO_4$) Mineral for Photoelectrochemical Hydrogen Production – N. M. Gaillard (University of Hawaii at Manoa)

15:00 **1742** Performance Limiting Factors in Co-Pi Catalyzed, Spray-Deposited $BiVO_4$ Photoanodes – F. F. Abdi, N. Firet, and R. Van de Krol (Delft University of Technology)

15:20 **1743** Photoelectrolysis on p-$GaInP_2$; Extended Durability by Nitrogen Ion Implantation – T. G. Deutsch, A. Welch (National Renewable Energy Laboratory), M. Bär, L. Weinhardt, M. G. Weir, K. E. George, C. Heske (University of Nevada), and J. A. Turner (National Renewable Energy Laboratory)

Photoelectrochemical Cells – 16:00 – 18:00
Co-Chairs: Heli Wang and Jae-Joon Lee

16:00 **1744** Development of Nanostructured Photocatalysts for Hydrogen Generation by Water Splitting under Visible Light – Y. Wang, J. Hong, S. Goh, and R. Xu (Nanyang Technological University)

16:30 **1745** Co-Alloying Approach for Bandgap Engineering of Metal Oxides for Improved Photoelectrochemical Water Splitting – Y. Yan (The University of Toledo)

17:00 **1746** Corrosion Protection of p-$GaInP_2$ for Durable Photoelectrochemical Water Splitting – H. Wang, T. G. Deutsch, A. Welch, and J. A. Turner (National Renewable Energy Laboratory)

17:20 **1747** Photoelectrochemical Modeling of a Multi-Junction Architecture for Artificial Photosynthesis – A. Berger and J. Newman (University of California, Berkeley)

17:40 **1748** Toward a General Strategy for Chemical Stabilization of Non-Oxide Photoanodes for Water Oxidation – N. C. Strandwitz and N. S. Lewis (California Institute of Technology)

B12 Solid State Ionic Devices 9 – Ion Conducting Thin Films and Multilayers

High Temperature Materials
South Pacific 1, Mid-Pacific Conference Center, Hilton Hawaiian Village

Ion Conducting Thin Film Electrolytes 2 – 08:00 – 10:00
Co-Chairs: Jennifer Rupp and Joshua Hertz

08:00 **1890** Enhanced Oxygen Surface Exchange Kinetics in Surface Modified Yttria Stabilized Zirconia by Atomic Layer Deposition – J. Park (Lawrence Berkeley National Laboratory), C. Chao, X. Tian (Stanford University), J. Shim (Korea University), and F. Prinz (Stanford University)

08:20 **1891** Thin Film Electrolyte Membranes of Yttria-Stabilized Zirconia Prepared by Aerosol Assisted Chemical Vapor Deposition – M. V. Schlupp (ETH Zurich), J. Courbat, D. Briand, N. De Rooij (EPFL Lausanne), M. Prestat, and L. Gauckler (ETH Zurich)

08:40 **1892** Ion Conduction in Nanoscale Yttria-Stabilized Zirconia Thin Films Fabricated by Atomic Layer Deposition – K. Son, M. Bae, K. Bae, J. Ha, and J. Shim (Korea University)

09:00 **1893** Atomic Resolution Imaging of Oxygen Columns in Oxide Ion Conductor Using HRTEM – J. An, A. Koh (stanford University), J. Park (Department of Mechanical Engineering, 440 Escondido Mall Bldg 530-226, Stanford, CA94305, USA), H. Jung, T. M. Gür, and F. B. Prinz (Stanford University)

09:20 **1894** Detecting Li-Ion Currents on the Nanoscale through a Thin Film Battery – N. Balke, S. Jesse, A. Tselev, N. J. Dudney, and S. Kalinin (Oak Ridge National Laboratory)

09:40 Intermission (20 Minutes)

Ion Conducting Thin Film Multilayers and Devices – 10:00 – 12:00
Co-Chairs: Noriko Sata and Michel Prestat

10:00 **1895** Lateral Oxygen Tracer Diffusion in a Multilayered SDC/PNCG Film Displaying Enhanced Electrical Conductivity – S. N. Cook (Imperial College London), J. Druce (International Institute for Carbon Neutral Research), T. Ishihara (Kyushu University), and J. A. Kilner (Imperial College London)

10:20 **1896** Analysis of Lateral Diffusion of Oxide Ions along YSZ-MgO(100) Interface – K. Bae (Korea University), J. Park (Department of Mechanical Engineering, 440 Escondido Mall Bldg 530-226, Stanford, CA94305, USA), F. B. Prinz (Stanford University), J. Son, and J. Shim (Korea University)

10:40 **1897** Electrochemical Performance of Free-standing Micro-Solid Oxide Fuel Cell Membranes using De-alloyed Pt-Y-Al Electrodes – R. Tölke, M. Prestat, H. Galinski, J. Martynczuk, and L. Gauckler (ETH Zurich)

11:00 **1898** Thin Pulsed Laser Deposited Bilayer Electrolytes in Anode-Supported SOFCs – J. S. Hardy (Pacific Northwest National Laboratory), Z. Lu (Praxair Inc.), J. W. Templeton, and J. W. Stevenson (Pacific Northwest National Laboratory)

11:20 **1899** Morphological and Compositional Changes on YSZ/GDC Bi-layered SOFC Electrolytes in Various Temperature and Reducing Environments – Y. Jee (Seoul National University), J. An (Stanford University), J. Choi, T. Park, G. Cho (Seoul National University), M. Lee (University of California, Merced), F. B. Prinz (Stanford University), and S. Cha (Seoul National University)

11:40 **1900** Cation Interdiffusion Model for Enhanced Oxygen Kinetics at Oxide Heterostructure Interfaces – M. Gadre (University of Wisconsin-Madison), Y. Lee (Massachusetts Institute of Technology), and D. Morgan (University of Wisconsin-Madison)

Ion Conducting Thin Film Electrodes – 14:00 – 16:40
Co-Chairs: Daniele Pergolesi and Bilge Yildiz

14:00 **1901** Nanostructured $La_{0.6}Sr_{0.4}CoO_{3-\delta}$ Cathodes Prepared by Spray Pyrolysis for Thin Film SOFC – M. Prestat, Z. Yáng, O. Pecho (ETH Zurich), L. Holzer (Zurich University of Applied Sciences), J. Martynczuk, A. Evans, L. Gauckler (ETH Zurich), T. Hocker (Zurich University of Applied Sciences), J. Hwang (Korea Institute of Science and Technology), and J. Son (Korea University)

14:20 **1902** Cation Segregation and Electrochemical Activity of Ruddlesden Popper Phase Cobalt Oxides in Oxygen Reduction and Oxygen Evolution – Z. Cai, Y. Chen, and B. Yildiz (Massachusetts Institute of Technology)

14:40 **1903** *In Situ* Ambient Pressure X-ray Photoelectron Spectroscopy of Epitaxial Strontium Substituted Lanthanum Cobalt Oxides Near Operating Conditions Under Applied Potentials – E. J. Crumlin, E. Mutoro (Massachusetts Institute of Technology), Z. Liu (Lawrence Berkeley National Laboratory), M. D. Biegalski (Oak Ridge National Laboratory), W. T. Hong (Massachusetts Institute of Technology), H. M. Christen (Oak Ridge National Laboratory), H. Bluhm (Lawrence Berkeley National Laboratory), and Y. Shao-Horn (Massachusetts Institute of Technology)

15:00 **1904** Hard X-ray Surface Composition and Electronic Structure Measurements of Heteroepitaxial Solid Oxide Fuel Cell Cathode Material – J. N. Davis (Boston University), L. Saraf, T. Kaspar (PNNL), S. Gopalan, U. B. Pal (Boston University), J. Woicik (National Institute of Standards and Technology), S. Basu, and K. F. Ludwig (Boston University)

15:20 **1905** Spray Pyrolysis Deposition and Electrochemistry of $La_{0.5}Sr_{0.5}Mn_{0.5}Co_{0.5}O_{3-\delta}$ Thin Film Anodes for Solid Oxide Fuel Cells – Z. Yáng, S. Bisig, M. Prestat, and L. Gauckler (ETH Zurich)

15:40 **1906** Synthesis and Characterization of Ruthenium – Gadolinia-doped Ceria Composite Thin Film Anode for Direct Methane SOFCs – Y. Takagi (SONY Corporation) and S. Ramanathan (Harvard University)

16:00 **1907** Nanostructured Vanadium Oxide Anodes for Thin Film Solid-Oxide Fuel Cells – Q. Van Overmeere and S. Ramanathan (Harvard University)

16:20 Intermission (20 Minutes)

Modeling and Devices – 16:40 – 18:20
Co-Chairs: Dane Morgan and Keith Duncan

16:40 **1908** Atomistic Investigation of Oxygen Vacancy Induced Volume Changes in CeO_2 Grain Boundaries – S. Kim and V. B. Shenoy (Brown University)

17:00 **1909** Obtaining Mixed Ionic/Electronic Conductivity in Perovskite Oxides at Anodic Solid Oxide Fuel Cell Conditions: A Computational Approach – S. Suthirakun, S. C. Ammal, and A. Heyden (University of South Carolina)

17:20 **1910** Electrochromic Films Produced by Ultrasonic Spray Deposition of Mesoporous Tungsten Oxide – C. Li, F. Lin, R. M. Richards (Colorado School of Mines), R. Tenent, A. Dillon (National Renewable Energy Laboratory), and C. Wolden (Colorado School of Mines)

17:40 **1911** Development of Safe All Inorganic Li-Ion Batteries – L. Castro (CEMES/CNRS), G. Jouan (LRCS/CNRS), A. Kubanska (MADIREL/CNRS), V. Seznec (LRCS/CNRS), L. Tortet (MADIREL/CNRS), M. Morcrette, V. Viallet (LRCS/CNRS), R. Bouchet (MADIREL/CNRS), and M. Dollé (CEMES/CNRS)

18:00 **1912** Stabilization of NASICON-Type $LiZr_2(PO_4)_3$ at Room Temperature – L. Castro (CEMES/CNRS), A. Kubanska, L. Tortet, R. Bouchet (MADIREL/CNRS), and M. Dollé (CEMES/CNRS)

C2 Bioengineering Based on Electrochemistry

Organic and Biological Electrochemistry / Sensor
324, Level 3, Hawaii Convention Center

Co-Chairs: K. Sode, M. Meyerhoff, K. Kerman, I. Hsing, I. Kubo, and E. Tamiya

08:00 **2011** Recent R&D on Disposable Electrochemical Biosensors – H. Nam, G. Cha (Kwangwoon University), M. Kim, M. Lee, and S. Chung (i-sens, inc.)

08:40 **2012** Floated Electrochemical Cell for On-Line Electrospray Mass Spectrometry for Detection of Biological Radical Reactions – D. Looi, I. Iftikhar (University of Florida), G. Garbellini (São Paulo State University), and A. Brajter-Toth (University of Florida)

09:00 **2013** High Efficient Glucose Oxidation by Ordered Molecular Assembly inside Carbon Nanotube Forests – S. Yoshino, T. Miyake, H. Kaji (Tohoku University), T. Yamada, K. Hata (National Institute of Advanced Industrial Science and Technology), and M. Nishizawa (Tohoku University)

09:20 **2014** Evaluation of Electrochemical Disinfection of Feline Calicivirus in Aqueous Conditions – N. Shionoiri, T. Tanaka (Tokyo University of Agriculture and Technology), T. Sato, Y. Fujimori, T. Nagao, T. Nakayama (NBC Meshtec inc.), and T. Matsunaga (Tokyo University of Agriculture and Technology)

09:40 Intermission (20 Minutes)

Co-Chairs: K. Sode, M. Meyerhoff, K. Kerman, I. Hsing, I. Kubo, and E. Tamiya

10:00 **2015** Electrochemistry-Based and Signal-Amplified Sensing Strategies for DNA-Based Point-of-Care Biosensors – I. Hsing (The Hong Kong University of Science and Technology)

10:40 **2016** Electrochemical and Physical Assessment on Electrode Coating Materials for Neuromodulation Application – A. Shi, B. Li, P. Cong, and D. Seeley (Medtronic Neuromodulation)

11:00 **2017** Mechanical Force-Based Probing of Cytoskeletal Proteins in Living Cells Using Antibody-Immobilized Nanoneedles – C. Nakamura (Tokyo University of Agriculture and Technology), Y. R. Silberberg, R. Kawamura (National Institute of Advanced Industrial Science and Technology), S. Mieda (Tokyo University of Agriculture and Technology), Y. Amemiya (National Institute of Advanced Industrial Science and Technology), T. Kihara (Osaka University), K. Fukazawa, K. Ishihara (The University of Tokyo), N. Nakamura (Tokyo University of Agriculture and Technology), and J. Miyake (Osaka University)

11:20 **2018** A Spatio and Temporal Gaseous Ethanol Visualization System for Real-Time Analysis from Human Breath and Body – T. Arakawa, X. Wang (Tokyo Medical and Dental Univerisity), T. Kajiro (Tokyo University of Technology), K. Miyajima, H. Kudo (Tokyo Medical and Dental Univerisity), K. Yano (Tokyo University of Technology), and K. Mitsubayashi (Tokyo Medical and Dental Univerisity)

11:40 **2019** Development of Human-Environment Interface by Sensing and Multivariate Analysis of Bio-Ecosystem – M. Koshiba, G. Karino, A. Seno, Y. Shirakawa, K. Mimura, T. Sagawa, W. Tsugawa, K. Sode, and S. Nakamura (Tokyo University of Agriculture and Technology)

Co-Chairs: K. Sode, M. Meyerhoff, K. Kerman, I. Hsing, I. Kubo, and E. Tamiya

14:00 **2020** Electrochemical Impedance Spectroscopy on Nanomaterial-Modified Surfaces – A. J. Veloso, X. Chen, V. Hung, N. Li, and K. Kerman (University of Toronto)

14:40 **2021** Second Generation Continuous Glucose Sensing System Employing Direct Electron Transfer Principle – W. Tsugawa (Tokyo University of Agriculture and Technology), K. Kojima (Ultizyme International Ltd.), and K. Sode (Tokyo University of Agriculture and Technology)

15:00 **2022** Engineering Fungi Derived FAD Glucose Dehydrogenase and Its Application for Glucose Sensor Strip Employing Screen Printed Carbon Electrode – Y. Onishi, M. Nakajima, W. Tsugawa (Tokyo University of Agriculture and Technology), K. Mori, K. Kojima (Ultizyme International Ltd.), and K. Sode (Tokyo University of Agriculture and Technology)

15:20 **2023** Profile of IgE and IgG4 Binding Epitopes in Cow's Milk Allergens Using Peptide Array – M. Okochi (Nagoya University), Y. Yoshida, and H. Honda (Nogoya University)

15:40 **2024** Fiber-Optic Fluoroimmunoassay System for On-Site Determination of the Indoor Allergen – K. Miyajima (Tokyo Medical and Dental Univerisity), K. Tamari, E. Kiyomiya (Bunkyo Gakuin University), M. Hayashi, T. Arakawa, H. Kudo (Tokyo Medical and Dental Univerisity), K. Shiba (Bunkyo Gakuin University), and K. Mitsubayashi (Tokyo Medical and Dental Univerisity)

16:00 Intermission (20 Minutes)

16:20 **2025** Self-Assembled Synthetic Protein Scaffolds: Biosynthesis and Applications – W. W. Su and Z. Han (University of Hawaii, Manoa)

17:00 **2026** Use of High Surface Area Electrodes for Safe Delivery of Direct Current for Nerve Conduction Block – T. Vrabec, J. Wainright, N. Bhadra, N. Bhadra, and K. Kilgore (Case Western Reserve University)

17:20 **2027** Electrochemical Approach to Fabricate Stacked Thick Cell Sheets – N. Mochiuzki, H. Suzuki, and J. Fukuda (University of Tsukuba)

17:40 **2028** Electrical Bioassay System Using a Hydrogel-Supported Skeletal Muscle Cells – K. Nagamine, H. Kaji, M. Kanzaki, and M. Nishizawa (Tohoku University)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

C2 – Poster Session – 18:00 – 20:00
Co-Chairs: K. Sode, M. Meyerhoff, K. Kerman, I. Hsing, I. Kubo, and E. Tamiya

- **2029** Fabrication of Semi-Invasive Micro-Needle Array Using Gradation Exposure – M. Yamaguchi, Y. Sasaki, Y. Kimura, and M. Sasaki (Iwate University)
- **2030** Higher Catalytic Activity by Fluctuation effect of Captured Enzyme Molecules in Designed Self-Organized Membrane on an Electrode Surface – Y. Takatsuji, R. Yamasaki, A. Iwanaga (Kyushu Institute of Technology), M. Lienemann, M. Linder (VTT Biotechnology), and T. Haruyama (Kyushu Institute of Technology)
- **2031** Nano-Structured Protein Layer on an Electrode Surface Taking Advantage of Self-Organized HFBI and Its Electrochemical Property – R. Yamasaki, Y. Takatsuji, A. Iwanaga (Kyushu Institute of Technology), M. Lienemann, M. Linder (VTT Biotechnology), and T. Haruyama (Kyushu Institute of Technology)
- **2032** Analysis of Cell Exfoliation Specifically Observed during the Formation of Spermine-Induced Multilayer Muscle Fiber Sheet – A. Ishida, N. Abe, H. Matsuoka, and M. Saito (Tokyo University of Agriculture and Technology)
- **2033** Quantitative Analysis of Cell Death Observed during the Formation of Spermine-Induced Multilayer Muscle Fiber Sheet – N. Abe, A. Ishida, H. Matsuoka, and M. Saito (Tokyo University of Agriculture and Technology)
- **2034** In Vivo Delivery of RNAi Reagents into a Mouse – M. Kaburagi, Y. Kakutani, H. Matsuoka, and M. Saito (Tokyo University of Agriculture and Technology)
- **2035** Surface Modification of Titanium Dioxide Nanoparticles with Gold Nanoparticles for Bio Fuel Cell Application – H. Park (Korea Institute of Science and Technology), S. Pyo, D. Lee, S. Kim, and H. Park (Chung-Ang University)
- **2036** Optimizing Functionalized Carbon Nanotube Matrix for Enhancing Direct Ethanol Fuel Cell Performance – L. Q. Hoa, H. Yoshikawa, M. Saito, and E. Tamiya (Osaka University)
- **2037** Evaluation of Activity of RNAi Against Diabetes Related Genes in MIN6 Cells – Y. Kakutani (Tokyo University A&T), M. Kaburagi, H. Matsuoka, and M. Saito (Tokyo University of Agriculture and Technology)
- **2038** Electrochemical Detection of Cell Membrane Proteins using Scanning Electrochemical Microscopy – Y. Matsumae, Y. Takahashi, K. Ino, H. Shiku, and T. Matsue (Tohoku University)
- **2039** Electrochemical Monitoring of Loop-Mediated Isothermal Amplification for Influenza Virus Detection – K. Yamanaka, M. Saito (Osaka University), N. Nagatani (Okayama University of Science), K. Ikuta, and E. Tamiya (Osaka University)
- **2040** Cell-Based Assay Using Cells Adjusted at a Specific Stage during Differentiation to β-Cells – N. Hanata, H. Matsuoka, and M. Saito (Tokyo University of Agriculture and Technology)

- **2041** Development of High-Throughput Toxicity Assay System Integrated with a Chemical Gradient Generator – Y. Sugamura (Tokyo Universitty of Agriculture and Technology), M. Hosokawa, A. Arakaki, T. Tanaka, and T. Matsunaga (Tokyo University of Agriculture and Technology)
- **2042** Detection of *E. coli* Using Electrochemical and Immunochromatographic Assay for Amplified Gene by PCR – Y. Ogido (Okayama University of Science), H. Ushijima (Biodevaicetechnology Ltd.), K. Yamanaka, M. Saito, E. Tamiya (Osaka University), S. Katayama, T. Miyahara, and N. Nagatani (Okayama University of Science)
- **2043** Suppression of an Oct3/4 Transcription Activity in ES Cells by Decoy DNA Femtoinjection – S. Oura (Tokyo University of Agriculture and Technology), H. Funabashi (Hiroshima University), M. Saito, and H. Matsuoka (Tokyo University of Agriculture and Technology)
- **2044** Production of a Differentiation Regulating Protein to Be Femtoinjected into ES Single-Cells – T. Tanaka (Tokyo University of Agriculture and Technology), H. Funabashi (Hiroshima University), M. Saito, and H. Matsuoka (Tokyo University of Agriculture and Technology)
- **2045** PEDOT Microelectrodes Anchored to Hydrogel for Efficient Cellular Electrical Stimulation – D. Takahashi, M. Sasaki, R. Suzuki, K. Nagamine, T. Miyake, H. Kaji, and M. Nishizawa (Tohoku University)
- **2046** Development of a Patch-Type Gel Sheet Sensor for Detection of Extracellular Metabolites – S. Otani, S. Ito, K. Nagamine, H. Kaji, and M. Nishizawa (Tohoku University)
- **2047** Dynamic Properties of Fluorescent Reporter Proteins Femtoinjected into ES Single-Cells – S. Hisatomi (Tokyo University of Agriculture and Trchnology), H. Funabashi (Hiroshima University), M. Saito, and H. Matsuoka (Tokyo University of Agriculture and Technology)
- **2048** Development of Cell Analysis Method by Using CMOS Sensor for High-Throughput Blood Cell Profiling – T. Saeki, M. Hosokawa (Tokyo University of Agriculture and Technology), T. Lim, K. Tomita, M. Harada (Malcom Co., Ltd.), T. Yoshino, T. Tanaka, and T. Matsunaga (Tokyo University of Agriculture and Technology)
- **2049** Flexible Biofuel Cell Using Enzyme-Modified Nanoengineered Carbon Fabric – T. Yamada, S. Yoshino, T. Ofuji, T. Miyake, H. Kaji, and M. Nishizawa (Tohoku University)
- **2050** Evaluating the Insertion Efficiencies of Silicon Nanoneedles into Living Single Cells – S. Ryu (Tokyo University of Agriculture and Technology), R. Kawamura (National Institute of Advanced Industrial Science and Technology), T. Kitagawa, N. Nakamura, and C. Nakamura (Tokyo University of Agriculture and Technology)
- **2051** Development of a Method to Modify Nanoneedle Arrays with Molecular Probes for the Analysis of Living Cells – M. Shimooku (Tokyo University of Agricuture and Technology), S. Ramachandra Rao, R. Kawamura (National Institute of Advanced Industrial Science and Technology), K. Ishihara, K. Fukazawa (The University of Tokyo), and C. Nakamura (Tokyo University of Agriculture and Technology)
- **2052** Feasibility Study of Dual-FRET Molecular Beacon for the Dynamic Analysis of Oct3/4 mRNA in ES Cells – H. Koike (Tokyo University of Agriculture and Technology), H. Funabashi (Hiroshima University), M. Saito, and H. Matsuoka (Tokyo University of Agriculture and Technology)
- **2053** Effect of Particle Size on the Electrochemical Responses of Cytcochrome *c* and Pyrroloquinoline Quinone Immobilised on Gold Nanoparticle-Modified Electrodes – M. Suzuki, K. Murata, N. Nakamura, and H. Ohno (Tokyo University of Agriculture and Technology)
- **2054** Hydrophilicity and Osteoconductivity of Ti Anodized in Various Aqueous Solutions – D. Yamamoto, K. Kuroda, R. Ichino, and M. Okido (Nagoya University)
- **2055** Effect of a Carbohydrate-Binding Domain on Electron Transfer between Proteins and Carbon Electrodes – H. Shimofusa, M. Inukai, M. Yoshida (Tokyo University of Agriculture and Technology), K. Igaraqshi, M. Samejima (The University of Tokyo), N. Nakamura, and H. Ohno (Tokyo University of Agriculture and Technology)
- **2056** Comparison of Quantitative Imaging Analysis and Electrochemical Sensing for the Beatings of Cardiomyocyte Derived from Mouse Embryonic Stem Cells – Y. Yamaguchi, E. Shimizu, T. Ikeuchi, A. Hashimoto, M. Saito, and E. Tamiya (Osaka University)
- **2057** Turning Glucose Oxidase into Essentially Dehydrogenase – Y. Horaguchi, S. Saito, S. Ferri (Tokyo University of Agriculture and Technology), K. Mori, K. Kojima (Ultizyme International Ltd.), W. Tsugawa, and K. Sode (Tokyo University of Agriculture and Technology)
- **2058** Enhancement of Wettability on Titanium Substrates by Femtosecond Laser Micron/Nano Machining – K. Fung, Y. Su, C. Liu, C. Ni (National Cheng Kung University), C. Lin, P. Wu, and C. Cheng (Industrial Technology Research Institute)
- **2059** Correlation between Spectroscope Absorbance and Biofilm to Anode Microbial Fuel Cell – R. J. Marassi, J. M. Santos, C. E. Teodoro, F. S. Santos, and G. C. Silva (Universidade Federal Fluminense)
- **2060** Assessment of Cell Behaviors on TiO_2 Nanotube Arrays by Using Atomic Force Microscopy, Raman Spectroscopy, Fluorescence Microscopy – R. Li, Q. Li, L. Xiao, S. Williams, E. Suasnavas, C. Isom, D. Larson, L. Rickords, and A. Zhou (Utah State University)
- **2061** Sucarcane Waste as Substrate for Microbial Fuel Cell – J. M. Santos, R. J. Marassi, C. E. Teodoro, F. S. Santos, and G. C. Silva (Universidade Federal Fluminense)
- **2062** Development of a POCT Diagnostic System for Periodontal Disease Using a Printed Electrode – T. Uenoyama (Department of Applied Physics, Graduate school of engineering, Osaka University), K. Yamanaka, M. Saitou, Y. Yamaguchi, M. Wada, and E. Tamaiya (Osaka University)

- **2063** Implantable Nerve Cuff Electrode Deposited with Electrospun Nanofiber to Control Drug Release for Long-Term Implantation – S. Lee, S. Park, S. Lim, K. Hwang, and J. Kang (Korea Institute of Science and Technology)
- **2064** Amino Acid Sensing Based on 2D-SPR Imaging – Y. Hida and H. Shinohara (University of Toyama)
- **2065** Non-FET Electrochemical DNA Detection Using Metal-Gap-Oxide-Silicon Structures – K. Kawai, Y. Doi, T. Furukawa, J. Uchikoshi, K. Arima, and M. Morita (Osaka University)

C4 New Synthetic and Mechanistic Approaches to Molecular Electroorganic Chemistry

Organic and Biological Electrochemistry

306B, Level 3, Hawaii Convention Center

Co-Chairs: M. Atobe and H. Shimakoshi

10:00 **2078** Synthesis of Multinuclear Metalladithiolenes and Control of Their Internuclear Electronic Communication – S. Tsukada, Y. Shibata, T. Kambe, R. Sakamoto, and H. Nishihara (The University of Tokyo)

10:20 **2079** Redox Active Dendronized Polymers Equipped with Peripheral Triarylamines – T. Nokami, N. Musya, T. Morofuji, K. Takeda, and J. Yoshida (Kyoto University)

10:40 **2080** Synthesis of Alkaloids Skeletons Using the Hyper-Valent Iodobenzene Oxidant – D. Kajiyama, T. Saitoh, S. Yamaguchi, and S. Nishiyama (Keio University)

11:00 **2081** Rapid Access to the Pyrene Cored Dendrimers Using Dendritic Diarylcarbenium Ion Pools – K. Takeda, T. Nokami, and J. Yoshida (Kyoto University)

11:20 **2082** Preparation of Nanoemulsion Using Tandem Acoustic Emulsification and Its Application to Templated Electropolymerization – K. Nakabayashi, T. Fuchigami, and M. Atobe (Tokyo Institute of Technology)

11:40 **2083** Electrochemical Nickel-Induced Fluoroalkylation – D. Y. Mikhaylov, Y. H. Budnikova, Y. B. Dudkina, T. V. Gryaznova, and O. G. Sinyashin (A.E.Arbuzov Institute of Organic and Physical Chemistry)

Co-Chairs: H. Nishihara and B. Ohtani

14:00 **2084** Synthesis and Properties of Nitrogen-Bridged Terthiophenes – K. Mitsudo, S. Shimohara, and S. Suga (Okayama University)

14:20 **2085** Regioselective Cross-Coupling Reaction of Azulene and α, β-Unsaturated Ketone by Electron Transfer from Magnesium – H. Maekawa, J. Honda (Nagaoka University of Technology), and R. Akaba (Gunma College of Technology)

14:40 **2086** Prediction of Reduction Potentials from Calculated Electron Affinities for Metal-Salen Compounds – J. A. Miranda, J. M. Yates, and B. F. Gherman (Sacramento State University)

15:00 **2087** Anodic Oxidation of Carbamates in the Presence of Solid-Supported Acids and Its Application to Carbon-Carbon Bond Forming Reactions – T. Tajima, A. Takabayashi, and K. Yamazaki (Shibaura Institute of Technology)

15:20 **2088** Paired Electrochemical Reaction of a Poly(Fluorenol) Derivative – H. Nagai, S. Inagi, and T. Fuchigami (Tokyo Institute of Technology)

15:40 Intermission (20 Minutes)

Co-Chairs: H. Maekawa and T. Nokami

16:00 **2089** Fabrication of Gradient Surface Using Bipolar Electrochemistry – N. Shida, Y. Ishiguro, S. Inagi, and T. Fuchigami (Tokyo Institute of Technology)

16:20 **2090** Synthetic Study of O-Methylthalibrine Using Anodic Oxidation – Y. Kawabata, Y. Naito, T. Saitoh, Y. Ishikawa, and S. Nishiyama (Keio University)

16:40 **2091** Preparation and Reaction of Titania Particles Encapsulated in Hollow Silica Shells as an Efficient Photocatalyst for Stereoselective Synthesis of Pipecolinic Acid – S. Chandren and B. Ohtani (Hokkaido University)

17:00 **2092** Electrochemical Oxidation of Poly(*p*-phenylene-vinylene) Derivatives Containing Tetraphenylethylene Units – S. Wakana, S. Inagi, T. Fuchigami, and I. Tomita (Tokyo Institute of Technology)

17:20 **2093** Voltammetry of Nitrofluorenes: Simulation – I. U. Haque (Leiden University) and A. Dar (University of Engineering and Technology Lahore)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

C4 – Poster Session – 18:00 – 20:00
Co-Chair: A. J. Fry

- **2094** The Electrochemical Oxidation of Pyrogallol: Formation of Long-Lived Oxygen Radicals and Application to Assess the Radical Scavenging Abilities of Antioxidants – S. Mu (Yangzhou University)

D2 Materials Degradation in Energy Systems: Corrosion and Hydrogen-Material Interactions

Corrosion / Battery / Energy Technology

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

D2 – Poster Session – 18:00 – 20:00
Co-Chair: N. Missert

- **2144** First-Principles Molecular Dynamics Simulation of the Chemical Degradation of Polymer Electrolyte Membranes – A. Kobayashi, T. Ishikawa, Y. Higuchi, N. Ozawa, T. Shimazaki, and M. Kubo (Tohoku University)
- **2145** Molecular Dynamics Study for Sintering Characterstics of Solid Oxide Fuel Cell Anode – K. Nakao, T. Ishimoto, and M. Koyama (Kyushu University)

- **2146** Density Functional Theory Study and Model Development on Pt Nano-Particles – G. Brunello, J. Choi, S. Jang (Georgia Institute of Technology), and D. B. Harvey (Queen's University)
- **2147** Density Functional Theory Study of Pt Dissolution at Water-Pt Interface – J. Choi, G. Brunello, S. Jang (Georgia Institute of Technology), and D. B. Harvey (Queen's University)

D3 Corrosion, Passivity, and Energy: A Symposium in Honor of Digby Macdonald

Corrosion

301B, Level 3, Hawaii Convention Center

Models – 08:00 – 09:45
Co-Chairs: Takumi Haruna and Dave Williams

08:00 **2199** Predicting the Steady State Thickness of Passive Films with the Point Defect Model in Fretting Corrosion Experiments – J. Geringer (ENSM-SE), M. L. Taylor, and D. D. Macdonald (The Pennsylvania State University)

08:15 **2200** Optimization of Impedance Models with Differential Evolution – M. L. Taylor, S. Sharifi, and D. D. Macdonald (The Pennsylvania State University)

08:30 **2201** Neural Network as a Data Mining Tool for Prediction of Corrosion Behavior – M. (. Kamrunnahar and M. Urquidi-Macdonald (The Pennsylvania State University)

08:45 **2202** Vacancy Formation and Electronic Structure on FeS_2 Surfaces – Model System for Iron Sulfide Corrosion Films – F. W. Herbert, A. Krishnamoorthy, K. J. Van Vliet, and B. Yildiz (Massachusetts Institute of Technology)

09:00 **2203** Deterministic Prediction of Localized Corrosion Damage in Oil and Gas Pipelines – G. R. Engelhardt (OLI Systems, Inc.), R. Wollam (BP), and D. D. Macdonald (The Pennsylvania State University)

09:15 **2204** Application of the Kramers-Kronig Relations to Impedance Spectroscopy – M. E. Orazem (University of Florida)

09:30 **2205** Microstructure-Influenced Numerical Modeling of Pitting Corrosion in 316 Stainless Steel – N. Kota (Science Applications International Corporation), S. Qidwai, and V. DeGiorgi (U.S. Naval Research Laboratory)

Models – 10:00 – 12:00
Co-Chairs: Jordi Abellà and Mike McKubre

10:00 **2206** The Role of MnS Inclusions and Passive Films in the Initiation of Pitting Corrosion of Stainless Steels – N. Hara, Y. Sugawara, and I. Muto (Tohoku University)

10:30 **2207** CPE Behavior of Oxide Layer Impedance – B. Tribollet, I. Frateur (CNRS), M. Musiani (IENI CNR), M. E. Orazem (University of Florida), and V. Vivier (CNRS)

10:45 **2208** A Spectroscopic and Electrochemical Investigation of the Structure of $Ni(OH)_2$ Materials – D. S. Hall (University of Ottawa), C. Bock, B. MacDougall (National Research Council Canada), D. J. Lockwood (National Research Council), and S. Poirier (National Research Council Canada)

11:00 **2209** Electrochemical and Surface Study of the Oxide Growth and Conversion on 316L Stainless Steel – Q. W. Knapp, J. J. Noël, and J. Wren (Western University)

11:15 **2210** Constant Phase Elements and Impedance of Rough Surfaces : A Numerical Study – M. Venkatraman, I. S. Cole (CSIRO Materials Science and Engineering), D. Sherwood (Central Electrochemical Research Institute), I. G. Bosco (CSIRO Materials Science and Engineering), and B. Emmanuel (Central Electrochemical Research Institute)

11:30 **2211** Mathematical Models for Under-Deposit Corrosion – Y. Chang and M. E. Orazem (University of Florida)

11:45 **2212** Weight Loss Model for Atmospheric Corrosion of Steel in Mexico Using Artificial Neural Networks – E. Bolanos Rodriguez (Universidad Auonoma del Estado de Hidalgo. Mexico) and J. González Islas (Universidad Tecnológica de Tulancingo. México)

Impedance – 13:45 – 15:30
Co-Chairs: Ignacio Gonzalez and Patrick Schmuki

13:45 **2213** Electrochemical Correlation Study of On-Line Corrosion Monitoring Probes – D. Bai (Harbin Institute of Technology, Shenzhen Graduate School), J. Wu (Harbin Institute of Technology Shenzhen Graduate School), and F. Chen (Shenzhen Grusen Technology Co., Ltd)

14:00 **2214** (Corosion Division H. H. Uhlig Award Presentation) Understanding of Passivity Due to the Application of Surface Methods, a Review – H. Strehblow (Heinrich-Heine-University Duesseldorf)

14:30 **2215** (Corrision Divisin Morris Cohen Award Presentation) Evaluation of Thiosulfate as a Substitute of Hydrogen Sulfide in Sour Corrosion Fatigue Studies – M. Kappes (University of Akron), G. Frankel (The Ohio State University), R. Thodla (DNV), N. Sridhar (Det Norske Veritas (USA) Inc.), and R. Carranza (Comisión Nacional de Energía Atómica)

15:00 **2216** Marine Biofilms Mimic Metal/Air Battery Current Enhancement Strategies: A Study of Peroxide Degradation via Manganese Dioxide Catalysis in Seawater – M. J. Strom (U.S. Naval Research Laboratory), G. W. Luther, and S. C. Dexter (University of Delaware)

15:15 **2217** Dissolution Behavior of Novel Lead Anodes for Copper Electrowinning – M. Clancy, C. Bettles, N. Birbilis (Monash University), and A. Stuart (Origma Pty Ltd.)

Energy – 15:30 – 18:15
Co-Chairs: Jing-Li Luo and Tim Burstein

15:30 **2218** Corrosion Behavior of High Level Waste (HLW) Storage Tank Materials – J. Grant and D. Chidambaram (University of Nevada Reno)

15:45 **2219** Nuclear Corrosion and Electrochemistry: Achievements and Challenges – D. Feron (CEA)

16:00 **2220** Probabilistic Model for SCC: Integration of the Several Environment and Fracture Processes – S. Jain, F. Ayello, J. A. Beavers, and N. Sridhar (Det Norske Veritas)

16:15 **2221** Chloride-Induced Stress Corrosion Cracking of Austenitic Stainless Steel for Dry Storage of Spent Nuclear Fuel – T. M. Ahn, G. Oberson, and S. DePaula (U.S. Nuclear Regulatory Commission)

16:30 **2222** Dynamic Polarization Behaviors of Stainless Steels in Water Film Simulating the Water Treatment Plants – Y. Kim (POSCO Technical Research Laboratory) and Y. Park (Waterworks Research Institute SMG)

16:45 **2223** Electrochemical Characterization of UNS S32760 and UNS S31603 Alloys in Presence of Fluoride and Bromide Solutions – E. Maya Visuet, A. Karayan, and H. Castaneda-Lopez (National Center for Corrosion Research and Education and Materials Performance, The University of Akron)

17:00 **2224** Determination of Kinetic Parameters for Water Reduction and Oxygen Reduction on Copper – S. Sharifiasl and D. D. Macdonald (The Pennsylvania State University)

17:15 **2225** *In Situ* Spectroscopic Ellipsometry and Electrochemical Studies of the Barrier Layer on Iron in Borate Buffer Solutions – Z. Lu (Ford Motor Company), S. Sharifiasl, and D. D. Macdonald (The Pennsylvania State University)

17:30 **2226** Copper Alloys Corrosion and Passivation Monitoring by Electrochemical Integrated Probes in Chlorinated Condenser Cooling Circuits – P. Cristiani, M. Carvalho (RSE- Ricerca sul Sistema Elettrico S.p.A.), and G. Perboni (CESI SpA)

17:45 **2227** State of Health Estimation of $LiFePO_4$/Graphite Cells – Y. Zhang and C. Wang (The Pennsylvania State University)

18:00 **2228** On the Stability of the Passive Film on Iron as Indicated by Electrochemical Impedance Spectroscopy – M. Urquidi-McDonald and D. D. Macdonald (The Pennsylvania State University)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

D3 – Poster Session – 18:00 – 20:00

- **2229** Density Functional Theory Calculations of Defects Formation Energies in Cr_2O_3 – B. Malki, B. Baroux, O. Le Bacq, and A. Pasturel (Grenoble INP)
- **2230** Electrical Microdischarge Characterization during Spark Anodization of Zirconium – J. S. Santos (Universidade Federal de Sao Carlos), S. G. Lemos (Universidade Federal da Paraiba), W. N. Gonçalves, O. M. Bruno (Universidade de Sao Paulo), and E. C. Pereira (Universidade Federal de Sao Carlos)
- **2231** Preparation of Pt-Ru/CNT/Carbon Cloth Catalysts by Electrodeposition Method for Use in Fuel Cell – Y. Lin, T. Yeh, and M. Tsai (National Tsing Hua University)
- **2232** Effect of Passivation Potential on Amount of Bound Water in Passive Film on Titanium – T. Haruna and S. Ito (Kansai University)
- **2233** Prediction of Stress Corrosion Cracking of Type304 Stainless Steel Weld Components Exposed to Chloride Environments – G. Nakayama and Y. Sakakibara (IHI Corporation)
- **2234** Electrochemical Studies of the Alloy Ti6Al4V after Being Subjected to UV-C Irradiation Treatment – M. Pacha-Olivenza (CIBER-BBN), A. Gallardo-Moreno, V. Vadillo-Rodríguez, M. González-Martín, C. Pérez Giraldo (University of Extremadura), and J. C. Galván (Centro Nacional de Investigaciones Metalúrgicas)
- **2235** Effects of Cu on the Localized Corrosion and Repassivation kinetics of Ferritic Stainless Steels – S. Ahn, K. Oh (KAIST), and H. Kwon (Korea Advanced Institute of Science and Technology)

D5 High Temperature Corrosion Materials Chemistry 10

High Temperature Materials / Corrosion
318A, Level 3, Hawaii Convention Center

Oxidation and Corrosion of Metallic Systems -1 – 08:00 – 12:00
Co-Chairs: P. Gannon and T. Maruyama

08:00 **2306** Fabrication of Vertically Aligned Nano-Oxide Arrays via Internal Oxidation of Dilute Alloys – M. Nanko and D. T. Do (Nagaoka University of Technology)

08:40 **2307** High-Temperature Oxidation Kinetics for Recovery of Mechanical Strength on Nano-Ni Dispersed Al_2O_3 Hybrid Materials – D. Maruoka and M. Nanko (Nagaoka University of Technology)

09:00 **2308** Early Oxidation Stages of Alumina Formers and the effect of the Additions: A Brief Survey – J. Jedliński (AGH University of Science and Technology)

09:20 **2309** The Influence of KCl(s) on the Oxidation of a FeCrAl Alloy at 600 °C in Dry and Wet Environment – N. Israelsson, L. Johansson, and J. Svensson (Chalmers University of Technology)

09:40 Intermission (20 Minutes)

10:00 **2310** Deposit-Induced Corrosion of Nickel-Base Alloys at Low Temperatures (650-750˚C) – B. S. Lutz, M. N. Task, N. M. Yanar, F. S. Pettit (University of Pittsburgh), G. R. Holcomb (National Energy Technology Laboratory), and G. H. Meier (University of Pittsburgh)

10:20 **2311** High-Temperature Corrosion Behavior of Sputtered Ni-Based Nanocrystalline Coating with Yttrium Addition in Chloride at 900°C – P. Yu (Shenyang University of Chemical Technology), W. Wang, F. Wang, and S. Zhu (Chinese Academy of Sciences)

10:40 **2312** Accelerated Corrosion of Low Alloy and Stainless Steel by $PbCl_2$-Containing Salt Mixtures – D. P. Bankiewicz, P. Yrjas, and M. Hupa (Åbo Akademi University)

11:00 **2313** An Electrochemical Impedance Spectroscopy Study on the effect of Condensate on Oxides Formed on a 25Cr/20Ni Cast Stainless Steel in Exhaust Environments – M. Ekström (Royal Institute of Technology), B. Zhu (Materials Technology, Scania CV AB), P. Szakalos, and S. Jonsson (Royal Institute of Technology)

11:20 **2314** The effect of Water Vapor on the Distribution of Oxide Precipitates during Internal Oxidation of Ni-5Cr Alloy at 1073 K – M. Ueda (Tokyo Institute of Technology), Y. Kurata (NGK Insulators Ltd.), K. Kawamura, and T. Maruyama (Tokyo Institute of Technology)

11:40 **2315** Oxidation Behaviour of Sanicro 25 in CO_2 and H_2O-Rich Environments – L. Intiso (Centro sviluppo Materiali), L. Johansson, and M. Halvarsson (Chalmers University of Technology)

Oxidation and Corrosion of Metallic Systems 2 – 14:00 – 15:20
Co-Chairs: P. Masset and G. Meier

14:00 **2316** Behaviors of SOFC Interconnect Steels and Coatings with Contacting Electrodes and Seals in Single and Dual Atmosphere Exposures – R. Amendola, A. Weinstein, S. Sofie, and P. Gannon (Montana State University)

14:20 **2317** Oxygen Activity Distribution from Atmosphere to Scale Surface on High Temperature Oxidation of Iron – K. Kawamura, S. Sonota, M. Ueda, and T. Maruyama (Tokyo Institute of Technology)

14:40 **2318** Kinetics and Mechanisms of Copper Catastrophic Oxidation in the Presence of Low-Melting Oxides – V. V. Belousov (Russian Academy of Sciences)

15:00 Intermission (20 Minutes)

High Temperature Electrochemistry – 15:20 – 16:40
Co-Chairs: G. Meier and P. Masset

15:20 **2319** The Activity of Rh_2O_3 in Boro-Silicate Glass at 1373 K – H. Kimura, S. Yamamoto, M. Ueda, K. Kawamura, T. Maruyama (Tokyo Institute of Technology), K. Minami, and E. Ochi (Japan Nuclear Fuel Limited)

15:40 **2320** High Temperature Electrolysis for Liquid Iron Production – G. Haarberg, E. Kvalheim (Norwegian University of Science and Technology), A. Martinez (SINTEF), S. Rolseth (SINTEF Materials and Chemistry), and H. Gudbrandsen (SINTEF)

16:00 **2321** Corrosion Behavior of Construction Materials for Intermediate Temperature Steam Electrolysers – A. V. Nikiforov (Technical University of Denmark), I. M. Petrushina (Technical Iniversity of Denmark), J. Jensen, and N. Bjerrum (Technical University of Denmark)

16:20 **2322** Evaluation of Electrode Materials for Electrolytic Reduction of Nuclear Fuels – A. Merwin and D. Chidambaram (University of Nevada Reno)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

D5 – Poster Session – 18:00 – 20:00
Co-Chairs: E. Opila and J. Fergus

- **2323** Fabrication of Nano-Rod Array Structure Used Aluminizing and Internal Oxidation of Alloy for Micro-Channel – T. Ishizaki, D. T. Do, and M. Nanko (Nagaoka University of Technology)
- **2324** Measuring Cr Volatility from Ferritic Stainless Steels: Novel and Conventional Methods Compared – J. J. Eziashi, C. Key, R. Smith, and P. Gannon (Montana State University)

D7 Pits and Pores 5: A Symposium in Honor of David Lockwood

Corrosion / Luminescence and Display Materials
323B, Level 3, Hawaii Convention Center

Optical, Magnetic and Electronic Properties – 08:00 – 10:00
Co-Chairs: D. Lockwood and N. Koshida

08:00 **2379** Tuning of Optical Properties of Silicon Photonic-Crystal Devices by Infiltration of Grooves and Pores with Liquid Crystals – T. S. Perova (Trinity College Dublin), V. Tolmachev (Ioffe Physical Technical Institute), and A. V. Baldycheva (Trinity College Dublin)

08:30 **2380** Size-Dependent Assessment of Fe_3O_4-Nanoparticles Loaded into Porous Silicon – P. Granitzer, K. Rumpf (Karl-Franzens-University Graz), Y. Tian, G. Akkaraju, J. L. Coffer (Texas Christian University), P. Poelt (University of Technology Graz), P. Morales (CSIC Madrid), and M. Reissner (Vienna University of Technology)

08:50 **2381** Magnetic Properties of an Iron Oxide/Porous Silicon System Controlled by Magnetic Interactions – K. Rumpf, P. Granitzer (Karl-Franzens-University Graz), P. Poelt (University of Technology Graz), P. Morales (CSIC Madrid), and M. Reissner (Vienna University of Technology)

09:10 **2382** The effects of Confinement and Coulomb Blockade on the Transport in Ensembles of Si Quantum Dots – I. Balberg (The Hebrew University)

09:40 Intermission (20 Minutes)

Pore Formation and Characterization – 10:00 – 15:20
Co-Chairs: P. Granitzer and T. S. Perova

10:00 **2383** Optical Characterization of Self-Assembled Systems: Nanoparticles and Monolayers – N. Rowell (National Research Council Canada)

10:30 **2384** XPS Analysis of Porous Silicon – D. Aureau (CNRS-UVSQ), J. Chazalviel, F. Ozanam (CNRS-Ecole polytechnique), and A. Etcheberry (CNRS-UVSQ)

10:50 **2385** Transient Surface Photovoltage Studies of Nano-Porous Silicon with Embedded Metal Nanoparticles – P. R. Chapagain, E. Davis, A. Nemashkalo, Y. Strzhemechny (Texas Christian University), P. Granitzer, K. Rumpf (Karl-Franzens-University Graz), and E. Nguyen (Paschal High School)

11:10 **2386** Enhanced Suppression of the Formation of Porous Silicon Based on Secondary Knocked-On effect in FIB – J. Wang, J. Jiao, P. Yan, M. Wang, W. Liu, D. Ge (Shanghai Institute of Microsystem and Information Technology), and J. Xu (Shanghai University)

11:30 **2387** Conversion Kinetics and Characterisation of Pt/Pb Nanoparticles on Fluorine Doped Tin Oxide Glass – K. Yliniemi (Aalto University), D. Wragg, T. M. Watson, D. A. Worsley, H. McMurray (Swansea University), B. P. Wilson (Aalto University), P. Schmuki (University of Erlangen-Nuremberg), and K. Kontturi (Aalto University)

11:50 **2388** Low-Lying Electronic Excitations and Optical Absorption Spectra of the Black Dye Sensitizer: A First-Principles Study – A. Delgado, S. Corni, and G. Goldoni (CNR-NANO S3 Center)

12:20 Lunch Break (90 Minutes)

13:50 Award Ceremony (90 Minutes)

Applications of Silicon and Metal Oxide Nanostructures – 15:20 – 18:10
Co-Chairs: F. Ozanam and B. Gelloz

15:20 **2389** Applications of Porous Silicon to Multicrystalline Silicon Solar Cells: State of the Art – C. Levy-Clement (CNRS)

15:50 **2390** Deposition of Ternary Alloys of Cadmium Seleno-Sulfide Thin Films on Nanoporous TiO_2 for Solar Cells Applications – A. Sepehrifard, A. Aushana, and S. Morin (York University)

16:10 **2391** Fabrication of Highly Ordered Porous Si and Its Application to Anodes in Lithium-Ion Battery – H. Masuda, S. Tagawa, and K. Nishio (Tokyo Metropolitan University)

16:30 **2392** Silicon and Porous Silicon/Carbon Nanocomposites for Rechargeable Li- and Mg-Ion Batteries – S. Polisski and T. Abe (Kyoto University)

16:50 **2393** Silicon Nanowires for Innovative Energy Applications – V. Sivakov, M. Kulmas (Institute of Photonic Technology), B. Hoffmann (Max Planck Institute for the Science of Light), F. Talkenberg (Institute of Photonic Technology), R. Kirchgeorg, C. Lee (Friedrich Alexander Universität), P. Schmuki (University of Erlangen-Nuremberg), and S. Christiansen (Max Planck Institute for the Science of Light)

17:10 **2394** Transition Metal Oxide Particles Deposited onto Titania Nanotubes as High Performance Electrodes for Li-Ion Microbatteries – N. Kyerematen and T. Djenizian (University of Aix-Marseille)

17:30 **2395** Designing Structure and Composition of Nanoporous Anodic Alumina for Optical Applications – D. Routkevitch (InRedox LLC)

17:50 **2396** Deposition of LaF_3 to Passivate the Pore-Walls of Porous Silicon Using a Simple Single-Source Chemical Bath Technique – A. Ismail (Rajshahi University), M. Rahman (Pabna Science & Technology University), M. Hossain, M. Nain, and S. Mou (Rajshahi University)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

D7 – Poster Session – 18:10 – 20:00
Co-Chairs: P. Schmuki, H. Masuda, and P. Granitzer

- **2397** Preparation and Characteristics of Anodic Aluminum Oxide Membranes with Mesosponge Structure – T. N. Nguyen, M. Kim, J. Ahn (Korea Electrotechnology Research Institute), J. Kaewsuk (Korean Electrotechnology Research Institute), J. Kim, and D. Jeong (Korea Electrotechnology Research Institute)
- **2398** Fabrication of Flexible Alumina Microlens Array by Laser Irradiation and Aluminum Anodizing – T. Kikuchi, Y. Wachi, T. Takahashi, M. Sakairi (Hokkaido University), and R. O. Suzuki (Eco-Processing)
- **2399** Formation of Self-Organized Nanoporous Anodic Films on Carbon Steels – S. Yang, Y. Konno, E. Tuji, Y. Aoki (Hokkaido University), H. Shoji (Nippon Steel Corporation), P. Skeldon, G. E. Thompson (The University of Manchester), and H. Habazaki (Hokkaido University)
- **2400** Metal Assisted Etching of Silicon in a V_2O_5 Plus HF Solution – W. B. Barclay and K. W. Kolasinski (West Chester University)
- **2401** Anodic Porous Etching of n-InP: A Chemical-Assisted Dissolution Process – L. Santinacci (CNRS – Aix-Marseille University), M. Bouttemy, and A. Etcheberry (University of Versailles -CNRS)
- **2402** Mathematical Model for <111>A Pore Propagation and Relation to Current for InP in Aqueous KOH Electrolytes – R. Lynch, N. Quill, C. O'Dwyer (University of Limerick), and D. Buckley (Materials & Surface Science Institute, University of Limerick)
- **2403** Differential Photoacoustic Electrochemical Cell to Study *In Situ* the Wetting Process in Different Materials – D. G. Espinosa-Arbelaez and M. Rodriguez-Garcia (Universidad Nacional Autónoma de México)
- **2404** Study of the Microstructural and Optical Properties of Porous Silicon Bragg Reflectors Obtained by Differential Photoacoustic Electrochemical Cell – M. Rodriguez-Garcia and D. G. Espinosa-Arbelaez (Universidad Nacional Autónoma de México)

E2 Atomic Layer Deposition Applications 8

Dielectric Science and Technology / Electronics and Photonics
304B, Level 3, Hawaii Convention Center

Energy – 08:20 – 10:00

08:20 **2467** Growth Characteristics and Properties of Yttrium Oxide Thin Films by Atomic Layer Deposition from Novel $Y(iPrCp)_3$ Precursor and O_3 – R. Xu, S. Selvaraj, N. Azimi, and C. G. Takoudis (University of Illinois at Chicago)

08:40 **2468** Electrocatalytic Activity of Platinum Grown by Atomic Layer Deposition on Carbon Nanotubes for Si-Based DMFC Applications – A. Johansson, R. Yang (Danish Technological Institute), B. Dalslet, J. V. Larsen, K. Haume (Technical University of Denmark), L. H. Christensen (Danish Technological Institute), and E. V. Thomsen (Technical University of Denmark)

09:00 **2469** Atomic Layer Deposition of Copper (I) Sulfide Using Commercially Produced Precursors – S. Christensen, A. Dameron, T. Gennett, and I. Repins (National Renewable Energy Laboratory)

09:20 **2470** High Performance Core-Shell Nanowire Array Devices Prepared by Atomic Layer Deposition – H. Kim (Yonsei University)

09:40 Intermission (20 Minutes)

Novel Applications – 10:00 – 12:00

10:00 **2471** Metal Oxide ALD Films for Low Power Sensor Applications – S. H. Brongersma (Holst Centre / imec)

10:40 **2472** Enabling High Performance Detectors and Optics for Astronomy and Planetary Exploration with ALD – F. Greer (Jet Propulsion Laboratory)

11:20 **2473** Nanomechanical Properties of Ultra Thin Films Synthesized by Atomic Layer Deposition – H. Baumgart (Old Dominion University)

Metals – 14:00 – 15:50

14:00 **2474** Study on Growth Characteristics of ALD RuO_2 Thin Films with Deposition Conditions – W. Kim (Samsung Electronics Co. Ltd.), B. Kim, J. Chang (Samsung Electronics Co., Ltd.), Y. Tak (Samsung Electronics Co. Ltd.), H. Yang, S. Moon, O. Kwon, K. Cho, C. Yoo, and H. Kang (Samsung Electronics Co., Ltd.)

14:20 **2475** Atomic Layer Deposition of TiN/Al_2O_3/TiN Nanolaminates for Capacitor Applications – L. Assaud, M. Hanbücken, and L. Santinacci (CNRS – Aix-Marseille University)

14:40 **2476** Impact of Direct Plasma Densification on Resistivity and Conformality of PEALD Tantalum Nitride – O. Van der Straten (IBM Research), X. Zhang (Global Foundries), C. Penny, J. Maniscalco (IBM Systems & Technology Group), S. Chiang, J. Ren, and P. Ma (Applied Materials, Inc.)

15:00 **2477** Atomic Layer Deposition of Ruthenium in Various Precursor and Oxygen Doses – J. Kim, K. Son, B. Kim, W. Kim, and J. Shim (Korea University)

15:20 Intermission (30 Minutes)

Reaction Mechanisms II – 15:50 – 17:40

15:50 **2478** *In Situ* FTIR Characterization of Growth Inhibition in Atomic Layer Deposition Using Reversible Surface Functionalization – A. Yanguas-Gil, J. A. Libera, and J. W. Elam (Argonne National Laboratory)

16:30 **2479** Substrate Reactivity effects in the ALD of Al_2O_3 Revealed by *In Situ* ALD – M. Tallarida, M. Michling, C. Das, and D. Schmeisser (Brandenburg University of Technology)

16:50 **2480** New Reaction Chemistries for Late Transition Metal Atomic Layer Deposition – B. Vidjayacoumar, V. Ramalingam, R. Kleinberger, D. J. Emslie (McMaster University), J. Blackwell, and S. Clendenning (Intel Corporation)

17:30 Concluding Remarks (10 Minutes)

E2 – Poster Session – 18:00 – 20:00

- **2481** Tungsten Nitride Films Prepared by Cyclic-Pulsed Chemical Vapor Deposition for IC Metallization – E. Kim, H. Woo, and D. Kim (Chonnam National University)
- **2482** Highly Uniform Self-Assembled Gold Nanoparticles over High Surface Area ZnO Nanorods as Novel Catalysts – T. M. Abdel-Fattah (Christopher Newport University), K. Zhang, W. Cao, and H. Baumgart (Old Dominion University)
- **2483** Characterization of Complex Magnetic Nanotubes – K. Pitzschel, J. Bachmann, S. Martens, J. Moreno Montero (University of Hamburg), J. Escrig (Universidad de Santiago de Chile), K. Nielsch, and D. Görlitz (University of Hamburg)
- **2484** Synthesis of VO_2 Thin Films by Atomic Layer Deposition with TEMAV as Precursor – K. Zhang, M. Tangirala, D. Nminibapiel (Old Dominion University), V. Pallem, C. Dussarrat (American Air Liquide), and H. Baumgart (Old Dominion University)

E4 Gallium Nitride and Silicon Carbide Power Technologies 2

Electronics and Photonics / Dielectric Science and Technology

316C, Level 3, Hawaii Convention Center

GaN Power Switching Transistors – 08:00 – 10:00
Co-Chairs: Mike Spencer and Joachim Wurfl

08:00 **2528** Physics of GaN-based Power Field Effect Transistors – M. Shur (RPI)

08:20 **2529** Recent Advances in III-N High-Power Electronics – R. Dupuis, Y. Lee, Z. Lochner, H. Kim, Y. Zhang, J. Ryou, and S. Shen (Georgia Institute of Technology)

08:40 **2530** Quasi-Vertical GaN-on-Silicon Transistors for Compact Enhancement-mode Power Switches – B. Brar, D. Kim, C. Neft, C. Nguyen, and V. Mehrotra (Teledyne Scientific)

09:00 **2531** Demonstration of Low ON-Resistance CAVETS with Ammonia MBE Grown Active p-GaN Layer as the Current Blocking Layer for High Power Applications – R. Yeluri, C. Hurni, S. Chowdhury, J. S. Speck, and U. Mishra (University of California Santa Barbara)

09:20 **2532** AlGaN/GaN Heterojunction FETs for High-Breakdown and Low-Leakage Operation – M. Kuzuhara and H. Tokuda (University of Fukui)

09:40 Intermission (20 Minutes)

GaN Crystal Growth and Characterization – 10:00 – 12:00
Co-Chairs: Mike Dudley and Ken Jones

10:00 **2533** III-Nitride High Voltage Power Electronics – M. Spencer and W. Schaff (Cornell University)

10:20 **2534** Hydrophobic Growth of GaN Material: Current Status and Future Potential – J. M. Mann (US Air Force Research Laboratory), B. Wang (Solid State Scientific Corporation), and D. Bliss (US Air Force Research Laboratory)

10:40 **2535** Electrochemical Solution Growth of Gallium Nitride – T. C. Monson, K. Waldrip (Sandia National Laboratories), V. Krishnamoorthy (Wish Consulting), A. Mollo, and L. E. Johnson (Sandia National Laboratories)

11:00 **2536** Comparison of Si, Sapphire, SiC, and GaN Substrates for HEMT Epitaxy – M. Leszczynski, P. Prystawko (Institute of High Pressure Physics), J. Plesiewicz (TopGaN Ltd.), L. Dmowski, E. Litwin-Staszewska, S. Grzanka, E. Grzanka (Institute of HIgh Pressure Physics), and F. Roccaforte (CNR-IMM)

11:20 **2537** GaN-on-Si for Power Technology – D. Visalli, J. Derluyn, S. Degroote, and M. Germain (EpiGaN)

11:40 **2538** Scalable GaN-On-Silicon Using Rare Earth Oxide Buffer Layers – M. Lebby (Translucent Inc.), F. Arkun (Translucent Inc), R. Dargis, R. Roucka, R. S. Smith, and A. Clark (Translucent Inc.)

GaN Power Transistor Reliability and Control – 14:00 – 16:00
Co-Chairs: Aivars Lelis and Durga Misra

14:00 **2539** Recent Advances in Wide Bandgap Power Devices – K. Sheng (Zhejiang University)

14:20 **2540** Advanced Driver and Control ICs for GaN and SiC Power Devices – S. P. Pendharkar and C. Chey (Texas Instruments Inc.)

14:40 **2541** GaN-Based Wide-Bandgap Power Switching Devices: From Atoms to the Grid – S. Atcitty, R. Kaplar, S. DasGupta, M. Marinella, A. Armstrong, L. Biedermann (Sandia National Labs), M. Sun, T. Palacios (Massachusetts Institute of Technology), and M. Smith (Sandia National Labs)

15:00 **2542** Device Breakdown and Dynamic effects in GaN Power Switching Devices: Dependencies on Material Properties and Device Design – J. Würfl, E. Bahat-Treidel, F. Brunner, M. Cho, O. Hilt, A. Knauer, P. Kotara, M. Weyers, and R. Zhytnytska (Ferdinand-Braun-Institut)

15:20 **2543** Degradation Study of Single and Double-Heterojunction InAlN/GaN HEMTs by Two-Dimensional Simulation – V. Palankovski and J. Kuzmik (TU Wien)

15:40 **2544** Temperature Dependence of Kink Effect for AlGaN/GaN/SiC High Electron Mobility Transistors – C. Cheng, T. Chang, S. Liao, H. Chang, W. Ho, Y. Shiau, and J. Sen (Chung-Shan Institute of Science & Technology)

Panel # 2: Safe Operating Area (SOA) – Silicon vs. SiC and GaN – 16:00 – 18:00
Co-Chairs: Reenu Garg and Mike Dudley

16:00 Introduction of Panelists (15 Minutes)

16:15 Mietek Bakowski (10 Minutes)

16:25 Joachim Wurfl (10 Minutes)

16:35 Krishna Shenai (10 Minutes)

16:45 Aivars Lelis (10 Minutes)

16:55 Robert Kaplar (10 Minutes)

17:05 Bobby Brar (10 Minutes)

17:15 Q&A (45 Minutes)

E5 Dielectric Materials and Metals for Nanoelectronics and Photonics 10

Dielectric Science and Technology / Electronics and Photonics
313A, Level 3, Hawaii Convention Center

Ge Channel – 09:00 – 09:40
Co-Chair: Koji Kita

09:00 **2584** Conduction Band-offset in GeO_2/Ge Stack Determined by Internal Photoemission Spectroscopy – W. Zhang, T. Nishimura, K. Nagashio, K. Kita, and A. Toriumi (The University of Tokyo)

09:20 **2585** Hydrogen Interaction with HfO_2 Films Deposited on Ge(100) and Si(100) – G. V. Soares (UFRGS), T. Feijó (IF-UFRGS), I. Baumvol (IF-UFRGS and UCS), C. Aguzzoli (UCS), C. Krug (IF-UFRGS and CEITEC S.A), and C. Radtke (IQ-UFRGS)

InGaAs and GaAs Passivation – 10:00 – 12:30
Co-Chairs: Susanne Stemmer and Heiji Watanabe

10:00 Award Ceremony (10 Minutes)

10:10 **2586** MOS Interface Control of High Mobility Channel Materials for Realizing Ultrathin EOT Gate Stacks – S. Takagi, R. Zhang, R. Suzuki, N. Taoka, M. Yokoyama, and M. Takenaka (The University of Tokyo)

10:40 **2587** III-V/Oxide Interfaces Investigated with Synchrotron Radiation Photoemission Spectroscopy – M. Tallarida (Brandenburg University of Technology)

11:10 **2588** Unit Cell by Unit Cell Cleaning and Nucleation for ALD Gate Oxide Deposition – W. Melitz, T. Kent, E. Chagarov (UCSD), M. Edmonds, T. Kaufman-Osborn (University of California, San Diego), J. Sung Lee (UCSD), K. Kiantaj, and A. Kummel (University of California, San Diego)

11:40 **2589** Scaling and Interface Control of High-k/III-V Interfaces – S. Stemmer, V. Chobpattana, Y. Hwang (University of California Santa Barbara), and R. Engel-Herbert (The Pennsylvania State University)

12:10 **2590** Effect of $In_{0.53}Ga_{0.47}As$ surface Nitridation on Electrical Characteristics of High-k/ Capacitors – Y. Suzuki, D. Zadeh, K. Kakushima, P. Ahmet, Y. Kataoka, A. Nishiyama, N. Sugii, K. Tsutsui, K. Natori, T. Hattori, and H. Iwai (Tokyo Institute of Technology)

Metal Work Function Tuning – 14:00 – 15:30
Co-Chairs: Akira Toriumi and Atif Noori

14:00 **2591** Interface Dipole Cancellation in SiO_2/High-k/SiO_2/Si Gate Stacks – S. Hibino, T. Nishimura, K. Nagashio, K. Kita, and A. Toriumi (The University of Tokyo)

14:20 **2592** Phenomena of Dielectric Capping Layer Insertion into High- κ Metal Gate Stacks in Gate-First/Gate-Last Integration – H. Jagannathan, P. Jamison, and V. Paruchuri (IBM Research)

14:40 **2593** Conformal Metal Gate Process Technology for 14nm Logic Node and Below – A. M. Noori, A. Brand, Y. Lei, M. Chen, W. Tang, X. Lu, X. Fu, S. Ganguli, J. Anthis, D. Thompson, N. Yoshida, M. Xu, M. Chang, and S. Gandikota (Applied Materials)

15:10 **2594** Investigation of Mg Diffusion in Ta(N) based Electrodes on HfO_2 for sub-32nm CMOS Gate-Last Transistors – R. Gassilloud, C. Maunoury, C. Leroux (CEA France), P. Chevalier (STMicroelectronics), C. Dressler, F. Aussenac, F. Martin (CEA France), D. Bensahel (STMicroelectronics), and S. Maitrejean (CEA France)

FinFET and 3-D Transistors – 15:40 – 17:40
Co-Chairs: Kaushik Roy and Durga Misra

15:40 **2595** Device-Circuit Co-design of FinFETs in Scaled Technologies – S. Gupta and K. Roy (Purdue University)

16:10 **2596** Independent-Double-Gate FinFET SRAM Technology – K. Endo, S. O'uchi, Y. Liu, T. Matsukawa, and M. Masahara (AIST)

16:40 **2597** Electrical Characterization and Reliability Assessment of Double-gate FinFETs – C. D. Young, K. Akarvardar, K. Matthews (SEMATECH), M. Baykan (U. of Florida – Gainesville), J. Pater, I. Ok, T. Ngai, K. Ang, M. Minakais, G. Bersuker, C. Hobbs, P. Kirsch, and R. Jammy (SEMATECH)

17:10 **2598** Current Status of High-k and Metal Gates in CMOS – G. Wilk, M. Verghese, P. Chen (ASM America), and J. Maes (ASM Belgium)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

E5 – Poster Session – 18:00 – 20:00
Co-Chairs: Durga Misra and Samares Kar

- **2599** Roles of Target Composition on the Dielectric Property of RF Sputtered Bi_2O_3-ZnO-Nb_2O_5 Pyrochlore Thin Film – K. Ko, M. Lim, B. Lee, H. Lee, and J. Choi (Ajou University)
- **2600** Effect of Erbium Silicide Crystallinity for Low Barrier Contact Between Erbium Silicide and n-type Silicon – H. Tanaka, A. Teramoto, S. Sugawa, and T. Ohmi (Tohoku University)
- **2601** Measurement and Identification of Three Contributing Charge Terms in Negative bias Temperature Instability – C. Mayberry (AFRL), D. Nguyen, C. Kouhestani (AFRL/RVSE), K. Kambour (SAIC), H. Hjalmarson (Sandia National Laboratories), and R. Devine (AFRL/RVSE)
- **2602** Process to Etch Ni and Pt Residues during Silicide Contact Electrode Processing using Low Temperature Aqueous Solutions – A. N. Duong (Intermolecular Inc), C. Fitz, S. Metzger (Globalfoundries), O. Karlsson, J. C. Foster, G. Nowling (Intermolecular Inc), V. Sih, and P. Besser (Globalfoundries)
- **2603** Correlation between Electrical and Optical Properties of Tantalum Anodic Oxide and Electron Cyclotron Resonance Etching Studies of E-beam Deposited Ta_2O_5 Films – A. Kulpa and N. Jaeger (The University of British Columbia)
- **2604** Area Dependence of Reliability characteristics for Atomic Layer Deposition HfO_2 Film under Static and Dynamic Stress – Y. Cheng, Y. Chang, C. Hsieh, and J. Lin (National Chi-Nan University)
- **2605** Characterization of Sol-Gel-Derived Crystalline HfO_2 -Y_2O_3 Thin Films on Si(001) Substrates – H. Shimizu and T. Nishide (Nihon University)
- **2606** Comparison on Physical and Electrical Properties of Sputtered Ru and RuO_2 Gate Electrodes Grown on HfO_2/Si for p-MOSFET – H. Kim, S. Lee, I. Yu, J. Lee (Seoul National University), T. Park (Hanyang University), and C. Hwang (Seoul National University)
- **2607** MOSFETs on InP Substrate with $LaAlO_3$/HfO_2 Bilayer of Different $LaAlO_3$ Thickness and Single $La_XAl_{1-X}O$ Layer with Different La Doping Level – Y. Wang, Y. Chen, F. Xue, F. Zhou, Y. Chang, and J. Lee (The University of Texas at Austin)
- **2608** Thiol-Ene Reaction Derived Sol-Gel Hybrid Dielectric Layer for Oragnic Thin Film Transistors – J. Kim, Y. Kim, J. Ko (Korea Advanced Institute of Science and Technology), and B. Bae (Korea Advanced Institute of Science ad Technology (KAIST))
- **2609** Comprehensive Study on Chemical Structures of Compositional Transition Layer at SiO_2/Si(100) Interface – T. Suwa, A. Teramoto (Tohoku University), T. Muro, T. Kinoshita (Japan Synchrotron Radiation Research Institute), S. Sugawa, T. Hattori, and T. Ohmi (Tohoku University)

E6 High Purity Silicon 12

Electronics and Photonics
320, Level 3, Hawaii Convention Center

Advanced Substrates and Characterization – 08:10 – 09:40
Co-Chair: J. A. Martino

08:10 **2634** Manufacturing of Ultra Thin SOI – O. Bonnin, W. Schwarzenbach, V. Barec, N. Daval, X. Cauchy, B. Nguyen, and C. Maleville (Soitec)

08:40 **2635** Hybrid-Formation of Ge-on-Insulator Structures on Si Platform by SiGe-Mixing-Triggered Rapid-Melting Growth --- A Road to Artificial Crystal --- – M. Miyao, M. Kurosawa, K. Toko, and T. Sadoh (Kyushu University)

09:10 **2636** The Pseudo-MOSFET: Principles and Recent Trends – S. Cristoloveanu, I. Ionica, A. Diab, and F. Liu (IMEP)

09:40 Intermission (20 Minutes)

Radiation Effects and Characterization – 10:00 – 12:00
Co-Chair: S. Cristoloveanu

10:00 **2637** Interface and Border Traps in Ge pMOSFETs – D. M. Fleetwood (Vanderbilt University), E. Simoen (imec), S. Francis (Air Force Institute of Technology), X. Zhang (Vanderbilt University), R. Arora (Georgia Tech), E. Zhang, R. Schrimpf, K. Galloway (Vanderbilt University), J. Mitard, and C. Claeys (imec)

10:30 **2638** Radiation Influence on Biaxial+uniaxial Strained Silicon MuGFETs – C. Bordallo (Centro Universitário da FEI), P. G. Agopian, J. A. Martino (University of Sao Paulo), E. Simoen, and C. Claeys (imec)

10:50 **2639** Wafer Level Statistical Evaluation of the Proton Radiation Hardness of a High-k Dielectric/Metal Gate 45 nm Bulk CMOS Technology – C. Claeys, S. Iacovo (imec), D. Kobayashi (ISAS/JAXA), A. Mercha, A. Griffoni, P. Roussel (imec), F. Crupi (DEIS, University of Calabria), and E. Simoen (imec)

11:10 **2640** Transistor-Based Extraction of Carrier Lifetime and Interface Traps in Silicon-on-Insulator Materials – J. A. Martino (University of Sao Paulo), V. Sonnenberg (FATEC/SP), M. Galeti (University of Sao Paulo), M. Aoulaiche, E. Simoen, and C. Claeys (imec)

11:40 **2641** Physical Mechanisms of Charge Pumping and DCIV Currents in Floating-Body SOI MOSFETs – E. Zhang, D. M. Fleetwood, R. Schrimpf (Vanderbilt University), E. Simoen, and D. Linten (imec)

12:00 Lunch Break (120 Minutes)

Oxygen-, Hydrogen-Related Defects and Their Characterization – 14:00 – 15:20
Co-Chairs: R. Job and J. Murphy

14:00 **2642** Lifetime-Degrading Boron-Oxygen Centres in p-types and n-type Silicon – V. V. Voronkov, R. J. Falster (MEMC Electronic Materials), B. Lim, and J. Schmidt (ISFH)

14:30 **2643** Impact of Oxide Precipitates on Minority Carrier Lifetime in Silicon – J. D. Murphy (University of Oxford), K. Bothe, R. Krain (Institut für Solarenergieforschung Hameln/Emmerthal), M. Olmo, V. V. Voronkov, and R. J. Falster (MEMC Electronic Materials)

15:00 **2644** Comparison of the Impact of Thermal Treatments on the Second and on the Millisecond Scales on the Precipitation of Interstitial Oxygen – G. Kissinger, D. Kot (IHP), and W. Von Ammon (Siltronic AG)

15:20 Intermission (20 Minutes)

Point Defects in Si and Ge – 15:40 – 17:30
Co-Chairs: R. Job and J. Murphy

15:40 **2645** Thermal Budget of Hydrogen-Related Donor Profiles – Diffusion Limited Activation and Thermal Dissociation – J. Laven (Infineon Technologies AG), R. Job (Muenster University of Applied Sciences), H. Schulze, F. Niedernostheide (Infineon Technologies AG), W. Schustereder (Infineon Technologies Austria AG), and L. Frey (University of Erlangen-Nuremberg)

16:10 **2646** Difficulties in Characterizing High-Resistivity Silicon – P. Nayak, R. Richert, and D. K. Schroder (Arizona State University)

16:30 **2647** Investigation of Doping Type Conversion of Hydrogen Implanted Cz-Silicon by EBIC – S. Kirnstoetter, M. Faccinelli, P. Hadley (Graz University of Technology), J. Laven, H. Schulze (Infineon Technologies AG), R. Job (Muenster University of Applied Sciences), and W. Schustereder (Infineon Technologies Austria AG)

16:50 **2648** Characterization of Deep Levels Introduced by RTA and by Subsequent Anneals in n-Type Silicon – D. Kot (IHP), T. Mchedlidze (TU Dresden), G. Kissinger (IHP), and W. Von Ammon (Siltronic AG)

17:10 **2649** Deep-Level Transient Spectroscopy of MOS Capacitors on GeSn Epitaxial Layers – E. Simoen, B. Vincent, C. Merckling, F. Gencarelli (Imec), L. Chu (National Tsing Hua University), and R. Loo (imec)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

E6 – Poster Session – 18:00 – 20:00

- **2650** Low Temperature Fluorinated Silicon Film Synthesis – D. E. Milovzorov (Fluens Technology Group Ltd)
- **2651** Chemical Vapor Deposition of Silicon by the Reaction of Bromosilanes and Hydrogen – K. Tomono, H. Furuya, S. Miyamoto, T. Ogawa, Y. Okamura, R. Komatsu, and M. Nakayama (Yamaguchi University)
- **2652** Diode Characteristics and Thermal Donor Formation in Germanium-Doped Silicon Substrates – J. Rafi (Institut de Microelectrònica de Barcelona (IMB-CNM-CSIC)), J. Vanhellemont (Ghent University), E. Simoen (imec), J. Chen (State Key Laboratory of Silicon Materials), M. Zabala (Institut de Microelectrònica de Barcelona (CNM-CSIC)), and D. Yang (State Key Laboratory of Silicon Materials)

E7 Low-Dimensional Nanoscale Electronic and Photonic Devices 5

Electronics and Photonics / Dielectric Science and Technology / Sensor
304A, Level 3, Hawaii Convention Center

Low-Dimensional Materials for Nanoelectronics/Optoelectronics I – 08:20 – 09:40
Co-Chairs: Jr-Hau He and Yu-Lun Chueh

08:20 **2669** GaN-based Nanorods: From High-Gain Photoconductor to Solar Hydrogen Generation – Y. Huang (National Taiwan University), Y. Huang (Academia Sinica), W. Tu (National Taiwan University), K. Chen (Academia Sinica), and L. Chen (National Taiwan University)

08:45 **2670** From Organic Powders to Geometrically Well Defined Low-Dimensional Structures: A way for Unprecedented Optical and Chemical Properties – J. Park, H. Moon, and H. Choi (Pohang University of Science and Technology)

09:10 **2671** Hybrid Silicon Solar Cells with Hierarchical Structure for Energy Harvesting – W. Wei, C. Ho, S. Tai (National Taipei University of Technology), H. Wang (Photonics and Optoelectronics), A. Li, R. Chung (National Taipei University of Technology), and J. He (National Taiwan University)

09:25 **2672** Three-dimensional Silicon Phononic Crystal – Y. Lin, H. Ting, L. Chou, and L. Chen (National Tsing Hua University)

Low-Dimensional Materials for Nanoelectronics/Optoelectronics II – 10:00 – 12:00
Co-Chairs: Li-Chyong Chen and Hee Cheul Choi

10:00 **2673** One-Dimensional Semiconductor Heterostructures: Challenges and Opportunities – S. Dayeh (Los Alamos National Laboratory)

10:25 **2674** Chemical Vapor Deposited MoS_2 Thin Layers and Their Applications – L. Li (Academia Sinica)

10:50 **2675** Epitaxial Growth of Iron-Silicide Nanodots on Si Substrates Using Ultrathin SiO_2 Film Technique and Their Physical Properties – Y. Nakamura (Osaka University) and M. Ichikawa (University of Tokyo)

11:15 **2676** Au@SnO_2 Core-Shell Nanowires: Novel Material for Gas Sensor – W. Liu, C. Hsu, and L. Chou (National Tsing Hua University)

11:30 **2677** DC and RF Characteristics of Ga_2O_3/GaN Single Nanowire MOSFET – J. Yu, C. Li, P. Yeh, Y. Wu, and L. Peng (National Taiwan University)

11:45 **2678** Controllable Surface Plasmon Resonance Properties of Hexagonal Close-packed Metal Nanosphere Arrays – H. Ting, Y. Lin, L. Chou, C. Tsai, and L. Chen (National Tsing Hua University)

Low-Dimensional Materials for Nanoelectronics/Optoelectronics III – 14:00 – 15:45
Co-Chairs: Lain-Jong Li and Shadi Dayeh

14:00 **2679** Surface Plasmon-Enhanced Optical Properties of Composite Materials Containing Metal Nanoparticles: Birefringence and Laser Oscillation – K. Tanaka, K. Fujita, S. Murai, X. Meng, Y. Moriguchi, and T. Komine (Kyoto University)

14:25 **2680** Nanoheterostructures of Semiconducting Nanowires for Electronic Sensors and Photodetectors – P. Lee (Nanyang Technological University)

14:50 **2681** Implantable and Bio-Integrated Flexible GaN LED – K. Lee (KAIST)

15:15 **2682** Photoacoustic Emission from Local Plasmon Resonators Nanostructured by Glancing Angle Deposition – K. Namura, M. Suzuki, K. Nakajima, and K. Kimura (Kyoto University)

15:30 **2683** Field Emission of Core-Shell Ga_2O_3 Nanowires – K. Cheng, C. Hsu, C. Hsieh, and L. Chou (National Tsing Hua University)

Low-Dimensional Materials: Functional Metal Oxide I – 16:00 – 17:35
Co-Chairs: Katsuhisa Tanaka and Pooi See LEE

16:00 **2684** 2D Oxide Nanosheets: Controlled Assembly and Applications – M. Osada and T. Sasaki (National Institute for Materials Science)

16:25 **2685** Optical Second Harmonic Generation of Pt Nanowires Created by Shadow Deposition on MgO(110) Facetted Templates – G. Mizutani and Y. Ogata (Japan Advanced Institute of Science and Technology)

16:50 **2686** SiO_2 nano- cylinder structure for low-k dielectric layer – R. Maeno, T. Fujii, and M. Omiya (Keio University)

17:05 **2687** Synthesis and Characterization of the Core-Shell Au/Ga_2O_3 Nanowires – B. Wu, C. Hsu, and L. Chou (National Tsing Hua University)

17:20 **2688** Horizontal-Slot Disk Resonators Incorporating Nanocrystals for Low-Cost, On-Chip Bio-Sensors – S. Lee, G. Kim, and J. H. Shin (KAIST)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

E7 – Poster Session – 18:00 – 20:00

- **2689** Study of the active volume for High Bright AlGaInP-based Light Emitting Diodes – H. Oh (Korea Photonics Technology Institute)
- **2690** Near-Infrared Light Detection of n-Type β-$FeSi_2$/i-Si/p- Type Si Heterojunction Photodiodes at Low Temperatures – R. Iwasaki, K. Yamashita, N. Promros, S. Izumi, and T. Yoshitake (Kyushu University)
- **2691** Single-Nanowire CMOS Inverter based on Ambipolar Si Nanowire FETs – H. Yuan, Q. Li, H. Zhu (George Mason University), H. Li (NIST & George Mason University), D. Ioannou (George Mason University), and C. A. Richter (NIST)
- **2692** Visible Light-Induced Immobilization of Gold Nanoparticles on Silicon Substrates – S. Mo, T. Ichii, K. Murase, and H. Sugimura (Kyoto University)
- **2693** Fabrication of Silicon Nanowire Arrays for Photovoltaic Applications – H. Li (National Chiao Tung University), J. Tseng (St. John's University), S. Chiou, H. Liu (National Chung Hsing University), and H. Cheng (National Chiao Tung University)
- **2694** Ultra-Compact Photonic Circuit Components based on Propagation of Exciton Polaritons in Organic Dye Nanofibers – K. Takazawa, J. Inoue, and K. Mitsuishi (National Institute for Materials Science)
- **2695** Extremely Low Electron Density in a Modulation-Doped Si/SiGe 2DEG by Effective Schottky Gating – J. Li, C. Huang, and J. Sturm (Princeton University)
- **2696** Influences of Hydrogen Passivation on Near-Infrared Light Detection of n-Type β-$FeSi_2$/p-Type Si Heterojunction Photodiodes – R. Iwasaki, K. Yamashita, N. Promros, S. Izumi, and T. Yoshitake (Kyushu University)

E8 Processing Materials of 3D Interconnects, Damascene and Electronics Packaging 4

Dielectric Science and Technology / Electrodeposition / Electronics and Photonics

310, Level 3, Hawaii Convention Center

Electrochemical Processing for TSVs – 08:00 – 09:40
Co-Chairs: R. Akolkar and P. Ramm

08:00 **2727** Bath Stability Monitoring for Electroless Cu Seed Formation in High Aspect Ratio TSV – F. Inoue (Kansai University), H. Philipsen, S. Armini, A. Radisic, Y. Civale, P. Leunissen (IMEC), and S. Shingubara (Kansai University)

08:20 **2728** Via Filling Electrodeposotion of 4µm Diameter via by Periodical Reverse Current – T. Hayashi, K. Kondo (Osaka Prefecture University), M. Takeuchi (Nittobo Medical Co., Ltd.), T. Saito, N. Okamoto (Osaka Prefecture University), M. Bunya (Nittobo Medical Co., Ltd.), and M. Yokoi (Osaka Prefecture University)

08:40 **2729** The Effect of Polymer Additives on TSV Filling by Copper Electroplating – C. Lin, W. Dow (National Chung Hsing University), J. Lin, W. Chang, and H. Lee (Industrial Technology Research Institute)

09:00 **2730** Periodic Pulse Reverse Cu Electroplating for Through Hole Filling – F. Shen, W. Dow (National Chung Hsing University), J. Lin, W. Chang, and H. Lee (Industrial Technology Research Institute)

09:20 **2731** Copper-free Through Silicon Via Filling by Ni-W Electrodeposition – H. Huang, W. Dow (National Chung Hsing University), J. Lin, W. Chang, and H. Lee (Industrial Technology Research Institute)

Electrochemical Processes for Damascene Interconnects – 10:00 – 12:00
Co-Chairs: S. Shingubara and M. Hayase

10:00 **2732** High Density Copper Nucleation on Ruthenium Using Commercial Plating Chemistry and Its Application to Metallization of High Aspect Ratio Through-Silicon Vias – P. Shi (Atotech USA Inc.)

10:20 **2733** Exploration of Process Window for Fill of Sub 30 nm Features by Direct Plating – M. Nagar, A. Radisic (imec), K. Stubbe (Ghent University), and P. Vereecken (imec)

10:40 **2734** The Impact of Electrolyte Acidity on Bottom-up Metallization of Copper Interconnects – L. Boehme (Case Western Reserve University), J. Wu, X. Kang, R. Preisser (Atotech USA Inc.), and U. Landau (Case Western Reserve University)

11:00 **2735** Temperature Effects on Additives Induced Polarization in Copper Electroplating of Interconnects – L. Boehme and U. Landau (Case Western Reserve University)

11:20 **2736** Effect of Additives on Direct Copper Electrodeposition on Transition Metal Diffusion Barriers for Silicon-based Integrated Devices – B. Im and S. Kim (University of Ulsan)

11:40 **2737** Superconformal Film Growth – T. Moffat and D. Josell (National Institute of Standards and Technology)

Modeling and Characterization of Novel Interconnect Processes – 14:00 – 18:00
Co-Chairs: K. Kondo and S. Shingubara

14:00 **2738** Multi-Scale Modeling of Direct Copper Plating on Resistive Non-Copper Substrates – L. Yang, A. Radisic, M. Nagar (imec), J. Deconinck (Vrije Universiteit Brussel), L. Leunissen, P. Vereecken (imec), and A. West (Columbia University)

14:20 **2739** Synergistic Effects of Additives on the Filling Process of High-Aspect-Ratio TSV – Kinetic Monte Carlo Simulation – - Y. Fukiage, Y. Kaneko (Kyoto University), K. Ohara, and F. Asa (C. Uyemura & Co., Ltd.)

14:40 **2740** Ultrathin Copper Layers Deposited by Galvanic Displacement: Characterization by Atom Probe Tomography – J. Ai, Y. Zhang, A. C. Hillier, and K. R. Hebert (Iowa State University)

15:00 **2741** Simulation of Shape Evolution in Through-Mask Electrochemical Deposition – G. J. Wilson, P. McHugh, S. Lee, and T. L. Ritzdorf (Applied Materials)

15:20 **2742** Inverse Analysis of Accelerator Distribution for Through Silicon Via Filling – M. Hayase, T. Matsuoka, K. Otsubo (Tokyo University of Science), Y. Onishi, and K. Amaya (Tokyo Institute of Technology)

15:40 **2743** Cu Electroplating for Through Silicon Vias (TSVs) Filling Using a Dimensionally Stable Anode (DSA) – W. Hsiung, W. Dow (National Chung Hsing University), J. Lin, W. Chang, H. Lee (Industrial Technology Research Institute), and S. Lin (Waste Recovery Technol)

16:00 **2744** Lead Free Solder Deposited by ECD – Material Analysis – T. L. Ritzdorf, S. Lee, and I. Drucker (Applied Materials)

16:20 **2745** Evaluation of Grain Size Distributions of 50nm Wide Cu Interconnects by X-ray Diffraction Method – T. Inami and J. Onuki (Ibaraki University)

16:40 **2746** A Novel Synthesis Method of Cu Nanoparticles with High Stability and Their Applications Acting as Seed Layer of TSV – C. Hsieh, W. Dow, and Y. Chang (National Chung Hsing University)

17:00 **2747** Halide-Free Flux Activity at Copper and Tin Surface – S. Vegunta, G. Qu, K. Mai, J. Nguyen, and J. Flake (Louisiana State University)

17:20 **2748** Investigation of the Mechanism of Cu Eruption-Induced Copper Void Defects in Memory Applications. – K. Chung, J. Park, T. Yoon, G. Oh, D. Park, S. Kim, D. Im, D. Lee, J. Kim, M. Park, D. Kim, Y. Chung, J. Baek, S. Kwon, H. Jeong, J. Kim, S. Nam (Samsung Electronics Co., LTD), H. Kang (Samsung Electronics Co., Ltd.), and C. Chung (Samsung Electronics Co., Ltd)

17:40 **2749** Failure Mechanism of Copper Through-Silicon Vias Under Biased Thermal Stress – S. Seo, J. Hwang (Sejong University), J. Yang (National NanoFab Center), and W. Lee (Sejong Univ.)

E10 More than Moore

Dielectric Science and Technology / Electronics and Photonics / Sensor / New Technology Subcommittee
319A, Level 3, Hawaii Convention Center

3D Systems Part 2 – 08:30 – 10:00

08:30 **2793** Multi-physics Equivalent Circuit Models for MEMS Sensors and Actuators – T. Konishi, K. Machida (NTT Advanced Technology Corp.), K. Masu (Tokyo Institute of Technology), and H. Toshiyoshi (The University of Tokyo)

09:05 **2794** ThruChip Interface for Heterogeneous Chip Stacking – T. Kuroda (Keio University)

09:40 Intermission (20 Minutes)

Novel Devices and Processing Part 1 – 10:00 – 11:45

10:00 **2795** Energy-efficient Novolatile Logic systems based on CMOS/spintronics Hybrid technology – S. Sugahara, Y. Shuto, and S. Yamamoto (Tokyo Institute of Technology)

10:35 **2796** Programmable Cell Array using Rewritable Atom Switch – M. Miyamura, T. Sakamoto (Low-power Electronics Association & Project), M. Tada (LEAP), N. Banno, K. Okamoto, N. Iguchi, and H. Hada (Low-power Electronics Association & Project)

11:10 **2797** Wafer Processing Photoresist Stripping Requirements – C. L. Arvin (IBM) and G. Banerjee (Air Products and Chemicals)

Novel Materials and Processing – Graphene – 14:00 – 15:30

14:00 **2798** Graphene for Nanoelectronic Device Applications – L. Colombo (Texas Instruments Incorporated)

14:35 **2799** Improving I_{on}/I_{off} in Bilayer Graphene Transistors by Molecular Functionalization – M. Cantoro, A. Nourbakhsh, A. Klekachev, I. Asselberghs, C. Huyghebaert, M. Heyns, and S. De Gendt (imec)

15:10 Intermission (20 Minutes)

Novel Materials and Processing Part 2 – 15:30 – 17:30

15:30 **2800** Integration with Diverse Functionalities on Standard CMOS – K. Masu (Tokyo Institute of Technology)

16:05 **2801** Heterogeneous Integration of Alternative Materials and Devices on Silicon CMOS Integrated Circuits – T. S. Mayer (The Pennsylvania State University)

16:40 **2802** New Technology Trends: Expand and Extend – R. Rhoades (Entrepix, Inc.)

17:15 Concluding Remarks (15 Minutes)

E12 Photovoltaics for the 21st Century 8

Dielectric Science and Technology / Electrodeposition / Electronics and Photonics / Energy Technology / Industrial Electrochemistry and Electrochemical Engineering
314, Level 3, Hawaii Convention Center

Dye Sensitized Solar Cells I – 08:00 – 12:00
Co-Chairs: Miyasaka, Druffel, and Rajeshwar

08:00 **2853** Microstructural Controls of a Titania Electrode for Dye-Sensitized Solar Cells – A. Nakamura, T. Hyodo, and Y. Shimizu (Nagasaki University)

08:20 **2854** Rapid Synthesis of High Performance TiO_2 Nanoparticles for Dye-Sensitized Solar Cells Employing Microwave and Supercritical Water – K. Manseki, Y. Kondo, D. Ishihama, T. Ban, T. Sugiura (Gifu University), and T. Yoshida (Yamagata University)

08:40 **2855** Protonated Carboxyl Anchor for Stable Adsorption of Ru N749 dye on TiO_2 Anatase (101) Surface – K. Sodeyama, M. Sumita, and Y. Tateyama (National Institute for Materials Science (NIMS))

09:00 **2856** High Efficiency Dye-sensitized Solar Cells Using Thin TiO_2 Films Co-sensitized by Indoline Dyes – S. MORITA, M. Ikegami, A. Ishii, and T. Miyasaka (Toin University of Yokohama)

09:20 **2857** Preparation of Non-annealed Anatase TiO_2 Films on ITO substrates by Anodizing in Hot Phosphate/glycerol – E. Tsuji, N. Hirata, and H. Habazaki (Hokkaido University)

09:40 Intermission (20 Minutes)

10:00 **2858** Enhanced Hole Transport in Nickel Oxide Electrodes for Photoelectrochemical Sensitized Cells – K. Zhu, S. Kang, N. Neale, and A. Frank (National Renewable Energy Laboratory)

10:20 **2859** Alkylation of Chlorin e6 for Higher Efficiency Dye-Sensitized Solar Cells – X. Wang (Yamagata University), H. Tamiaki (Ritsumeikan University), and S. Sasaki (Nagahama Institute of Bio-Science and Technology)

10:40 **2860** Tin Oxide Nanowires and Their Hybrid Architectures for Kinetically Fast Redox Couples in Dye-Sensitzed Solar Cells – V. Vendra (University of Louisville), T. Nguyen, D. Amos (Univeristy of Louisville), T. Druffel, and M. K. Sunkara (University of Louisville)

11:00 **2861** Nano-Clay Electrolyte for High Performance Dye-Sensitized Solar Cells – S. Uchida, T. Kubo (The University of Tokyo), and H. Segawa (Research Center for Advanced Science and Technology)

11:20 **2862** Integration of Polymer Electrolytes in Nanostructured Electrodes of Dye Sensitized Solar Cells – S. Nejati, D. Martin (Drexel University), C. Prejean (Drexel Univeristy), J. Deshmukh (Drexel University), and K. K. Lau (Drexel Unversity)

11:40 **2863** Conductivity Enhanced CuSCN for Improved Performance in Dye-Sensitized Solid-state Solar Cells – A. Konno, E. Premalal, and N. Dematage (Shizuoka University)

Dye Sensitized Solar Cells II – 14:00 – 16:00
Co-Chairs: Druffel and Miyasaka

14:00 **2864** Dye-sensitized photocapacitors fabricated with ionic liquid electrolytes for power generation and storage – T. Miyasaka, H. Ina, and M. Ikegami (Toin University of Yokohama)

14:20 **2865** Immobilization of Polymer-Protected Platinum Nanocluster on Plastic Substrate for Highly Efficient Dye-Sensitized Plastic Solar Cell – T. Wei, M. Ikegami, and T. Miyasaka (Toin University of Yokohama)

14:40 **2866** Atmospheric Processing of Dye Sensitized Solar Cell Photoanode – T. Druffel, V. Vendra, and R. Lupitskyy (University of Louisville)

15:00 **2867** Electrochemical Analysis for the Realization of Low Temperature Processed ZnO Dye-Sensitized Solar Cells – D. T. Bryant, M. Carnie, T. M. Watson, and D. A. Worsley (Swansea University)

15:20 **2868** Nanostructured Photoelectrodes for Dye Sensitized Solar Cells – I. Turkevych, K. Matsubara, and M. Kondo (National Institute of Advanced Industrial Science and Technology)

15:40 **2869** Study on Central Metal Ions and Electrolytes for Efficient Porphyrin-sensitized Solar Cells – F. AWAI (The University of Tokyo), Y. Arai (Research Center for Advanced Science and Technology (RCAST)), S. Uchida, T. Kubo (The University of Tokyo), and H. Segawa (Research Center for Advanced Science and Technology)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

E12 – Poster Session – 18:00 – 20:00

- **2870** *In Situ* Observation of Structural Change in N719 Dye Molecule in Dye Sensitized Solar Cells under a Visible Light Exposure – C. Yoshida, S. Nakajima (Sekisui Chemical Co.), Y. Syoji, and F. Hirose (Ymagata University)
- **2871** Gold Nanoparticles Embedded Single Crystalline ZnO (Au NPs@ZnO) Nanowire Arrays for Plasmonic Enhanced Dye-sensitized Solar Cells (DSSCs) – M. Lu, H. Chen, H. Chen, C. Peng, Y. Chueh, S. Gwo, and H. Chen (National Tsing Hua University)
- **2872** Zinc Oxide Nano-pillar Array prepared by a Microwave-assisted Process for an Organic Photovoltaic Cell – N. Murakami, Y. Imoto, and T. Ohno (Kyushu Institute of Technology)
- **2873** Development of Inverted Organic Photovoltaic Cells Using Amorphous Niobium Oxide as Electron Collection Layer – K. Hamada, N. Murakami, and T. Ohno (Kyushu Institute of Technology)
- **2874** Dye-Sensitized Solar Cell Prepared with TNO Transparent Conductive Film – S. Takemura (Shizuoka University), R. Muramoto, Y. Sekine (Shizuoka Univercity), M. Okuya (Shizuoka University), S. Okazaki, E. Sakai, N. Yamada (KAST), T. Hitosugi (Tohoku University), and T. Hasegawa (University of Tokyo)
- **2875** Reliable and Secure DSSC Sub-Module Assembled by One Drop Filling Method – C. Nishiyama, S. Uchida, T. Kubo (The University of Tokyo), and H. Segawa (Research Center for Advanced Science and Technology)
- **2876** Cu_2S Counter Photocathodes for Quantum-Dot Sensitized Solar Cells – S. Lee and K. Ahn (Yeungnam University)
- **2877** CdS Quantum Dots Deposited by Chemical Bath Deposition for the Application to Quantum Dot-Sensitized Solar Cells – D. Lee and K. Ahn (Yeungnam University)
- **2878** Effects of High Pressure Annealed for Electrodeposited $CuInSe_2$ Solar Cell – T. Chang, W. Lee, and Y. Su (National Cheng Kung University)
- **2879** Organic Photovoltaics by Using a Nanoscale Thin Film of Solution-based Titanium Sub-Oxide (Solution based Titanium sub-oxide Nanoscaled Thin Films for Passivation (or Sealant) of Organic Photovoltaic Cells) – K. Foe, V. Potturi, M. Samson, H. Baumgart, and G. Namkoong (Old Dominion University)
- **2880** The Effect of TiO_2 Microstructure and Introduction of Silver Nanoparticles on Conversion Efficiency of Sb_2S_3 Sensitized Semiconductor Solar Cells – S. Yoshioka, T. Mishima, and M. Ihara (Tokyo Institute of Technology)
- **2881** ZnS Films Deposited by ALD for Solar Cell Applications – Y. Erkaya, D. Nminibapiel, N. Hegde, K. Aryal, G. Rajan, P. Boland, K. Zhang, H. Baumgart, and S. Marsillac (Old Dominion University)
- **2882** Molecular Precursors and Their Application to Chalcogenide Solar Cell – C. Kim, J. Park, H. Choi, B. Park, J. Song, T. Chung, and D. Jeon (Korea Research Institute of Chemical Technology)
- **2883** Effect of Post-Treatment for Colloidal PbS Quantum dots on Performance of Schottky Solar Cell – J. Kim, J. Song, H. An (Korea Institute of Machinery & Materials), K. Kim, and S. Jeong (Korea Institute of Machinery and Materials)
- **2884** Analysis of Degradation Products in Electrolyte of Dye Sensitized Solar Cell by High Mass Accuracy MS^n and Multivariate Statistical Technique – T. Goda, D. Nakayama, T. Nishine, S. Satoshi (SHIMADZU CORPORATION), C. Nishiyama, S. Uchida (The University of Tokyo), and H. Segawa (Research Center for Advanced Science and Technology)
- **2885** Application of Electrochemical Impedance Spectroscopy in Characterization of Mass- and Charge Transfer Processes in Dye-Sensitized Solar Cell – N. T. Hoang, H. Tran, and T. Nguyen (Vietnam National University)
- **2886** Photovoltaic Properties in Al-doped ZnO/non-doped Zn1-XMgXO/Cu_2O Heterojunction Solar Cells – T. Minami, Y. Nishi, T. Miyata, and S. Abe (Kanazawa Institute of Technology)
- **2887** Two-Step Anodization for TiO_2 Nanotube Arrays – Y. Lee, J. Kim (Gangneung-Wonju National University), J. Lee (Konkuk University), and W. Choi (Gangneung-Wonju National University)

- **2888** Development of a Cu_2OZnO Nanorod Heterojunction Solar Cell – D. Marui, N. Murakami, and T. Ohno (Kyushu Institute of Technology)
- **2889** Fabrication of CZTS based Solar Cells Using Nanocrystals – S. Suehiro, M. Yuasa (Kyushu University), T. Tanaka (Saga University), K. Fujita, S. Hata, T. Kida, and K. Shimanoe (Kyushu University)
- **2890** Electrochemically Self-Assembled ZnO/Rhodamine dye Hybrid 2D-Nanostructure towards One-Pot Synthesis of Solar Cells – S. Lina (Yamagata University), T. Sekiya, Y. Kimikado (Gifu University), and T. Yoshida (Yamagata University)
- **2891** Improved Conversion Efficiency of CdS Quantum Dot-Sensitized Solar Cells based on Nanoporous-Layer-Covered TiO_2 Nanotube Arrays – S. Jung and K. Ahn (Yeungnam University)
- **2892** Photovoltaic Performances of p-type Nickel Oxide as Photocathode in Photoelectrochemicalsolar Cells – M. Park and K. Ahn (Yeungnam University)
- **2893** The Effect of CuI Layer Deposited from Various Solutions on the Performance of Dye-Sensitized Solid-State Solar Cells – S. Endo, T. Yamamoto, and A. Konno (Shizuoka University)
- **2894** Fabrication of Silicon and Carbon based Wide-Gap Semiconductor Thin Films for High Conversion Efficiency – K. Yoshinaga, H. Naragino, A. Nakahara, S. Tanaka, and K. Honda (Yamaguchi University)
- **2895** Improving the Efficiency of Polymer:Fullerene Bulk Heterojunction Solar Cells by Varying the Material Concentration in the Photoactive Layer – M. Samson, K. Latimer, P. Boland, K. Foe, G. Namkoong, H. Baumgart (Old Dominion University), and T. M. Abdel-Fattah (Christopher Newport University)
- **2896** Optical Management by Localized Surface Plasmon of Metal Nanoparticles and Application to a Solar Cell – K. NAM, H. Hachimura, K. Hirano, M. Ihara, P. Sichanugrist, and M. Konagai (Tokyo Institute of Technology)
- **2897** Novel Method of Synthesis of Zinc Oxide Doped with Nitrogen for photocatalytic Applications – J. Flores, J. Valladares, and P. Nandakumar (Midland College)
- **2898** FTO Film with High Haze and Transmittance Prepared for Dye-Sensitized Solar Cell – R. Murakami (Shizuoka University), R. Muramoto (Shizuoka Univercity), and M. Okuya (Shizuoka University)
- **2899** Dye-Sensitized Solar Cells Based on Polyaniline – Single Waller Carbon Nanotubes Composite – T. M. Abdel-Fattah (Christopher Newport University), S. Ebrahim, and M. Soliman (Alexandria University)
- **2900** Electrodeposited ZnO Morphological, Structural and Optical Properties Control by Potential Sweep Rate – E. Matei, M. Enculescu, C. Florica, and I. Enculescu (National Institute of Materials Physics)
- **2901** Photovoltaic R&D Status and Strategy of Korea – C. Park (Yeungnam University)

E14 Semiconductor Wafer Bonding 12: Science, Technology, and Applications

Electronics and Photonics

312, Level 3, Hawaii Convention Center

Metal and 3D Integration – 08:00 – 09:40

08:00 **2964** Cu Surface Passivation with Self-Assembled Monolayer (SAM) and Its Application for Wafer Bonding at Moderately Low Temperature – C. Tan (Nanyang Technological University) and D. Lim (NTU)

08:40 **2965** Evaluation of Titanium Direct Bonding Mechanisms – F. Baudin, L. Di Cioccio, P. Gergaud, N. Chevalier, V. Delaye, D. Mariolle, J. Fabbri, B. Imbert (CEA, LETI, Minatec Campus), and Y. Bréchet (SIMaP)

09:00 **2966** A New Combined Process of Formic Acid Pretreatment for Low-temperature Bonding of Copper Electrodes – W. Yang, M. Akaike, M. Fujino (The University of Tokyo), and T. Suga (University of Tokyo)

09:20 **2967** Low-Temperature Cu-Cu Wafer Bonding – B. Rebhan (EV Group), G. Hesser (Center of Surface- and Nanoanalytics, Johannes Kepler University), J. Duchoslav (Center of Surface- and Nanoanalytics, Johannes Kepler University; and Christian Doppler Laboratory for Microscopic and Spectroscopic Material Characterization), V. Dragoi (EV Group E. Thallner GmbH), M. Wimplinger (EV Group), and K. Hingerl (Center of Surface- and Nanoanalytics, Johannes Kepler University)

Materials and Device Integration – 10:20 – 12:00

10:20 **2968** Advanced Heterogeneous Integration of InP HBT and CMOS/SiGeBiCMOS Technologies – A. Gutierrez-Aitken, P. Chang-Chien, B. Oyama, D. Scott, K. Hennig, E. Kaneshiro, P. Nam, K. Thai, B. Poust, A. K. Oki, and R. Kagiwada (Northrop Grumman Aerospace Systems)

11:00 **2969** Wafer Level 3D Stacking using Smart CutTM and Metal-Metal Direct Bonding Technology – L. Di Cioccio, F. Mazen (CEA,LETI,Minatec), F. Baudin (CEA, LETI, Minatec Campus), A. Mounier, T. Lacave (CEA,LETI,Minatec), V. Delaye (CEA, LETI, Minatec Campus), B. Imbert (Cea.leti.Minatec), N. Chevalier (CEA, LETI, Minatec Campus), M. Denis (CEA,LETI,Minatec), G. Gaudin, I. Radu, S. Thieffry, and T. Signamarcheix (Soitec)

11:20 **2970** Cu-Sn Transient Liquid Phase Wafer Bonding: Process Parameters Influence on Bonded Interface Quality – C. Floetgen, K. Corn, M. Pawlak, and V. Dragoi (EV Group E. Thallner GmbH)

11:40 **2971** Laser Transmission Bonding of Silicon with Titanium and Copper Layer for Wafer-Level Packaging – A. Wissinger (RWTH Aachen University), M. Schmitz, A. Olowinsky, A. Gillner (Fraunhofer Institute for Laser Technology ILT), and R. Poprawe (Aachen University)

Mechanics of Wafer Bonding – 14:00 – 16:00

14:00 **2972** Mechanics of Wafer Bonding and Layer Transfer Processes – K. T. Turner (University of Pennsylvania)

14:40 **2973** A Study of Factors Influencing Micro-Chevron-Testing of Glass Frit Bonded Interfaces – F. Naumann (Fraunhofer Institute for Mechanics of Materials), S. Brand (Fraunhofer Institute for Mechanics of Materials IWM), D. Wünsch (Fraunhofer Institute for Electronic Nano Systems), P. Czurratis (PVA Tepla Analytical Systems GmbH), and M. Petzold (Fraunhofer Institute for Mechanics of Materials IWM)

15:00 **2974** Failure Mechanisms and Mechanical Characterization of Reactive Bonded Interfaces – B. Boettge (Fraunhofer Institute for Mechanics of Materials IWM), F. Naumann (Fraunhofer Institute for Mechanics of Materials), F. Schippel, and M. Petzold (Fraunhofer Institute for Mechanics of Materials IWM)

15:20 **2975** Low Temperature Fusion Wafer Bonding Quality Investigation for Failure Mode Analysis – V. Dragoi (EV Group E. Thallner GmbH), P. Czurratis (PVA Tepla Analytical Systems GmbH), S. Brand, A. Graff, C. Patzig, and M. Petzold (Fraunhofer Institute for Mechanics of Materials IWM)

15:40 **2976** Using of Different Nano Scale Energetic Material Systems for Reactive Bonding – J. Braeuer, J. Besser, M. Wiemer, and T. Gessner (Fraunhofer ENAS)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

E14 – Poster Session – 18:00 – 20:00

- **2977** Integrating Laser Diode and Optical Isolator by Photosensitive Adhesive Bonding – H. Yokoi, N. Ichishima, and I. Myouenzono (Shibaura Institute of Technology)
- **2978** Room Temperature Wafer Bonding by Surface Activated ALD- Al_2O_3 – Y. Li (InterUniversity Microelectronics Centre of china), S. Wang (Institute of Microelectronics, Chinese Academy of Sciences), B. Sun, H. Chang, W. Zhao (Chinese Academy of Sciences), X. Zhang (Southeast University), and H. Liu (Chinese Academy of Sciences)
- **2979** Interface Morphology and Electrical Properties of Bonded GaAs/GaAs Wafers at Different Temperatures – S. Chang and Y. Wu (National Chiao Tung University)
- **2980** Multi-Wavelength High Resolution Micro-Raman and Optical Reflectance Characterization of Nano-Scale Strained Silicon-on-Insulator Substrates – T. Kim, T. Shim (Hanyang University), W. Yoo (WaferMasters, Inc.), and J. Park (Hanyang University)
- **2981** Advanced Process Control in Megasonic-Enhanced Pre-Bonding Cleaning – D. Dussault (ProSys Inc.), F. Fournel (CEA, LETI), and V. Dragoi (EV Group E. Thallner GmbH)
- **2982** Glass Direct Bonding – G. Kalkowski, C. Rothhardt, R. Eberhardt, P. Jobst, and M. Schürmann (Fraunhofer IOF)
- **2983** Quality Control of Bond Strength in Low-Temperature Bonded Wafers – J. Siegert (ams AG), C. Cassidy, F. Schrank (austriamicrosystems AG), R. Gerbach (Fraunhofer Institute for Mechanics of Materials IWM), F. Naumann (Fraunhofer Institute for Mechanics of Materials), and M. Petzold (Fraunhofer Institute for Mechanics of Materials IWM)
- **2984** Micro-Structural Analysis of AlN Wafer Bonding and Hydrogen Ion-Induced Splitting for Film Exfoliation – M. Mamun, K. Tapliy (Old Dominion University), O. Moutanabbir (Universite de Montreal, Canada), D. Gu, H. Baumgart, and A. Elmustafa (Old Dominion University)
- **2985** The Effects of Composition and Design of Experiment on the Quality of Al-Ge Eutectic Bonding for Wafer Level Packaging – X. Huang, C. Cheng, P. Liu, Y. Hsieh, L. Chao, C. Tsai, D. Huang (Taiwan Semiconductor Manufacturing Company, Ltd.), and C. Colinge (Waferbond)
- **2986** High Resolution Double-Crystal X-ray Diffraction Imaging for Interfacial Defect Detection in Bonded Wafers. – S. Sharma (UCLA) and M. Goorsky (University of California, Los Angeles)
- **2987** Optimization of H+ Implantation Parameters for Exfoliation of 4H-SiC Films – V. P. Amarasinghe, L. Wielunski (Rutgers University), A. Barcz (Institute of Electron Technology), L. C. Feldman, and G. K. Celler (Rutgers University)

E15 State-of-the-Art Program on Compound Semiconductors 54 (SOTAPOCS 54)

Electronics and Photonics / Luminescence and Display Materials

328, Level 3, Hawaii Convention Center

Advances in Compound Semiconductor – 08:45 – 12:00

08:45 **3014** Revisiting Impurity Doping of III-Nitride Materials for Optical and Magnetic Device Applications – J. M. Zavada (National Science Foundation)

09:15 **3015** Effects of Proton Irradiation on the Reliability of InAlN/GaN High Electron Mobility Transistors – L. Liu, C. Lo, Y. Xi, Y. Wang (University of Florida), H. Kim, H. Kim (Korea University), S. Pearton (University of Florida), O. Laboutin, Y. Cao, J. Johnson (Kopin Corporation), I. Kravchenko (Oak Ridge National Laboratory), and F. Ren (University of Florida)

09:45 **3016** Efficiency Droop in GaN-based Light-Emitting Diodes: Mechanisms and Solutions – J. Kim (Pohang University of Science and Technology (POSTECH)), S. Hwang, J. Park, D. Kim (POSTECH), J. Cho, and E. Schubert (Rensselaer Polytechnic Institute)

10:15 **3017** GaN HEMT Degradation: Effect of RF Stress – E. Douglas (Sandia National Laboratories), B. Gila, F. Ren, C. Abernathy, and S. Pearton (University of Florida)

10:45 **3018** A Survey of Electrical Signatures Characteristic of Step-Stressed InGaP/GaAs HBTs – A. G. Baca, A. Scruggs, A. Gorenz, T. Fortune, J. Klem, R. Briggs, J. Clevenger, G. Patrizi, and C. Sullivan (Sandia National Laboratories)

11:15 **3019** Direct Die Solder of GaAs Power Amplifier Dies and Application of Electrolessly Plated Nickel Barrier – H. Shen and S. Maganti (Skyworks Solutions, Inc.)

11:30 **3020** Resistive Switching Characteristics of N-doped ZnO Films Using Atomic Layer Depsition – T. Huang (Photonics and Optoelectronics), W. Chang (National Taiwan University), J. Chien (Materials Science and Engineering), C. Kang, P. Yang (National Taiwan University), M. Chen (Materials Science and Engineering), and J. He (National Taiwan University)

11:45 **3021** Influence of Catalystic Effect on Transport Behaviors of InAs NWs For High Performance Nanoscale Transistors – Y. Chueh (National Tsing Hua University)

Compound Semiconductor Process – 13:30 – 17:15

13:30 **3022** Semiconductor Nanostructure Direct-Write Using Scanning Probes and Conducting Stamps – M. Rolandi (University of Washington)

14:00 **3023** CMOS-Compatible Precise Placement of Ge Quantum Dots for Nanoelectronic, Nanophotonic, and Energy Conversion Devices – K. Chen, I. Chen, C. Wang, and P. Li (National Central University)

14:30 **3024** Why <111>A Pore Propagation Occurs in InP and the Mechanism that Dictates Pore Width – R. Lynch (University of Limerick), N. Quill, C. O'Dwyer, S. Nakahara (Materials and Surface Science Institute, University of Limerick), and D. Buckley (Materials & Surface Science Institute, University of Limerick)

14:45 **3025** TiC Electrode Formed by Multi-Stacking Process for Diamond Contact Metal – Y. Tanaka, K. Kakushima, P. Ahmet, Y. Kataoka, A. Nishiyama, N. Sugii, K. Tsutsui, K. Natori, T. Hattori (Tokyo Institute of Technology), S. Yamasaki (Advanced Industrial Science and Technology), and H. Iwai (Tokyo Institute of Technology)

15:00 **3026** Application of Inline X-ray Metrology for Defect Characterization of III-V/Si Heterostructures – P. Hung (Sematech), M. Wormington, K. Matney, P. Ryan (Jordan Valley Semiconductors Ltd), K. Dunn (CNSE), A. Wang, R. Hill, M. Wong, J. Price, W. Wang, and G. Bersuker (SEMATECH)

15:15 Intermission (15 Minutes)

15:30 **3027** Advanced Compound Semiconductor and Silicon Fabrication Techniques for Next-Generation Solar Power Systems – G. N. Nielson (Sandia National Laboratories)

16:00 **3028** Improvement in Etching Rate of Epilayer Lift-Off for High Concentrated Solar Cell Applications with Low Surface Tension Fluid – R. Horng, F. Wu, and M. Tseng (National Chung Hsing University)

16:30 **3029** Band Offsets in Dielectric/InGaZnO4 Heterojunctions – H. Cho (Pusan National University), K. Kim, E. Douglas, B. Gila, V. Craciun, E. Lambers, F. Ren, and S. Pearton (University of Florida)

17:00 **3030** Anodic Formation of Porous InP in KCl Solutions – N. Quill, R. Lynch, C. O'Dwyer (University of Limerick), and D. Buckley (Materials & Surface Science Institute, University of Limerick)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

E15 – SOTAPOCS 54 Poster Session – 18:00 – 20:00
Co-Chair: Pablo Chang

- **3031** Cytotoxicity Study of Zinc Oxide Nanoparticles Modified with Biological Coatings – R. Chung, W. Wei, R. Lin (National Taipei University of Technology), W. Shih (Metal Industries Research and Development Centre), and H. Wang (Mackay Memorial Hospital)
- **3032** 4H-SiC Lateral JFET for Low Power Operational Amplifier Applications – W. Lien (University of California, Berkeley), D. G. Senesky (Stanford University), and A. Pisano (University of California, Berkeley)
- **3033** Visible-Blind Ultraviolet Photodetector Fabricated on n-ZnO/$LaAlO_3$/p-Si Heterojunction – D. Tsai, C. Kang, H. Wang (National Taiwan University), Y. Chu (National Chiao Tung University), and J. He (National Taiwan University)

E16 Thin Film Transistors 11 (TFT 11)

Electronics and Photonics
327, Level 3, Hawaii Convention Center

Si-Based TFTs I – 08:00 – 10:20
Co-Chairs: R. Ishihara and O. Bonnaud

08:00 **3056** Twenty five Years of Improvement of the Silicon Based TFT: From As-Deposited Polycrystalline Silicon to Nanostructured Silicon Deposited at Very Low Temperature – T. Mohammed-Brahim and O. Bonnaud (University Rennes 1)

08:40 **3057** Beyond the Current Horizontal of Silicon Thin Film Technology: Light-Soaking Free Nano-Crystal Embedded Polymorphous Silicon Thin Film and TFT by Neutral Beam Assisted CVD at Room Temperature – M. Hong and J. Jang (Korea University)

09:20 **3058** Impacts of Channel Thickness on the Characteristics of N-Type Planar Junctionless Poly-Si Thin-Film Transistors – C. Lin, H. Lin, and T. Huang (National Chiao Tung University, Hsinchu, Taiwan, R.O.C.)

09:40 Intermission (40 Minutes)

Si-Based TFTs II – 10:20 – 11:40
Co-Chairs: O. Bonnaud and R. Ishihara

10:20 **3059** Grain Growth Control during Micro-Thermal-Plasma-Jet Irradiation Using Amorphous Si Strips and Slit Masks – Y. Fujita, S. Hayashi, K. Sakaike, and S. Higashi (Hiroshima University)

10:40 **3060** Decreasing the Off-Current for Vertical TFT by Using an Insulating Layer between Source and Drain – P. Zhang, E. Jacques, R. Rogel, and O. Bonnaud (University Rennes 1)

11:00 **3061** Thick Single Grain Silicon Formation with Microsecond Green Laser Crystallization – A. Arslan (Delft University of Technology), H. Kahlert, P. Oesterlin (Innovavent GmbH), D. Mofrad, R. Ishihara, and C. Beenakker (Delft University of Technology)

11:20 **3062** Single-Grain Si TFTs Fabricated by Liquid-Si and Long-Pulse Excimer-Laser – R. Ishihara, J. Zhang, M. Trifunovic, M. Van der Zwan (Delft University of Technology), H. Takagishi, R. Kawajiri (Japan Science and Technology Agency), T. Shimoda (Japan Advanced Institute of Science and Technology), and C. Beenakker (Delft University of Technology)

Si-based TFTs II Continued – 14:00 – 15:50
Co-Chairs: K. Takechi and M. P. Hong

14:00 **3063** Materials, Processing, and Characterization for Printed Flexible Electronics – W. S. Wong (University of Waterloo)

14:40 **3064** Investigation of Transfer Mechanism of Si Film with Mid-Air Structure Induced by Near-Infrared Semiconductor Diode Laser Irradiation – K. Sakaike, Y. Kobayashi, S. Nakamura, M. Akazawa, and S. Higashi (Hiroshima University)

15:00 **3065** Modes of Operation and Optimum Design for Application of Source-Gated Transistors – R. A. Sporea, J. M. Shannon, and S. Silva (University of Surrey)

15:20 Intermission (30 Minutes)

Graphene and Organic TFTs – 15:50 – 17:30
Co-Chairs: M. P. Hong and K. Takechi

15:50 **3066** CVD Produced Graphene/Silicon Nitride TFTs – W. Milne, M. T. Cole, P. Kidambi (Cambridge University), K. Ying, M. Drapeko, S. Hofmann, and A. Nathan (University of Cambridge)

16:30 **3067** Characterization and Modeling of Organic Field-Effect Transistors – G. Horowitz (CNRS)

17:10 **3068** Carrier Behavior in a Highly-Doped P3HT Layer and Its Application to Organic Thin Film Transistors – D. Tadaki, T. Ma, J. Zhang, S. Iino, Y. Kimura, and M. Niwano (Tohoku University)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

E16 – Poster Session – 18:00 – 20:00
Co-Chair: H. H. Lee

- **3069** High Performance Low-Voltage Organic Phototransistors: Interface Modification and the Tuning of Electrical, Photosensitive and Memory Properties – X. Liu, G. Dong, L. Duan, L. Wang, and Y. Qiu (Tsinghua University)
- **3070** Influence of Annealing Conditions on the Bias Temperature Stability of MgZnO TFTs – Y. Tsai, J. Chen, and I. Cheng (National Taiwan University)
- **3071** Comparative Study of In_2O_3, ZnO and In-Zn-O Source Solutions for Oxide Channel Thin Film Transistors – E. Tokumitsu (Japan Advanced Institute of Science and Technology), T. Shimizu, K. Haga (Tokyo Institute of Technology), and T. Shimoda (Japan Advanced Institute of Science and Technology)
- **3072** Thin-Film Transistor Using Dielectrophoretic Assembly of Single-walled Carbon Nanotubes – T. Toda (School of Environmental Science and Engineering, Institute for Nanotechnology, Kochi University of Technology), T. Kawaharamura (Institute for Nanotechnology, Kochi University of Technology), H. Furusawa (School of Environmental Science and Engineering, Institute for Nanotechnology, Kochi University of Technology), and M. Furuta (Kochi University of Technology)
- **3073** Degradation of p-Channel Low Temperature Poly-Si TFTs with Positive Source Pulse Stress – H. Liu, S. Chiou, P. Chan, C. Kung, F. Wang (National Chung Hsing University), and T. Kang (Feng-Chia University)
- **3074** Simple Patterning Process of the Polymer Source/Drain electrodes for Organic Thin-Film Transistors – Y. Jang (Korea Institute of Machinery & Materials)
- **3075** Influence of Polymer Dielectric Surface Energy on Thin-Film Transistor Performance of Solution-Processed Triethylsilylethynyl Anthradithiophene (TES-ADT) – L. Chen, P. Lin (Department of Materials Science and Engineering, National Chiao-Tung University, Hsinchu, Taiwan, ROC), C. KIM (Sogang University), M. Chen, P. Huang (Department of Chemistry, National Central University, Chung-Li, Taiwan, ROC.), J. Ho, and C. Lee (Process Technology Division, Display Technology Center, Industrial Technology Research Institute, Hsinchu, Taiwan, ROC.)
- **3076** Study of Electronic Structure and Film Composition at Back Channel Surface of Amorphous In-Ga-Zn-O Thin Films – A. Hino, T. Kishi, S. Morita, K. Hayashi, and T. Kugimiya (Kobe Steel, Ltd.)
- **3077** Performance Variations of Amorphous-$In_2Ga_2ZnO_7$ Thin-Film Transistors According to Thin Al_2O_3 Passivation Layer Deposited by Atomic Layer Deposition – S. Rha, U. Kim, J. Jung, W. Jeon, Y. Yoo, E. Hwang, B. Park, and C. Hwang (Seoul National University)
- **3078** Chemical-Structure Tailored, High Performance Indium Gallium Zinc Oxide Thin-Film Transistors – S. Jeong, J. Lee, Y. Seo, S. Choi, Y. Choi, and B. Ryu (Korea Research Institute of Chemical Technology)
- **3079** Electrospray Deposited Semiconducting Oxide Thin Films For Display Backplane TFT Application – S. LEE (Electronics and Telecommunications Research Insitute(ETRI)) and C. Hwang (ETRI)
- **3080** Low-Temperature, Aqueous Solution Processed Amorphous Indium Oxide Thin Film Transistors – K. Choi, S. Chang, T. Oh, S. Jeong, K. Lee, Y. Kim, H. Ha, and B. Ju (Korea University)
- **3081** Characteristiscs of Nanocrystalline Silicon Films Deposited by Cat-CVD Below 100°C – T. Song, K. Keum, S. Kang, J. Park, J. Kim, and W. Hong (University of Seoul)
- **3082** Influence of Thermal Stress and Kinetic Bias Stress on The Electrical Performance of Mixed Oxide Thin Film Transistors – T. L. Alford, S. Husein, and R. Vemuri (Arizona State University)

- **3083** Composition Dependence of the Negative Bias Light Illumination Instability of Indium Zinc Oxide Transistors – S. Oh, B. Yang, Y. Kim, and H. Kim (Seoul National University)
- **3084** SKPM Study on Oxide TFT – J. Park and H. Cha (ETRI)
- **3085** The Change of Electrical Performance and Stability of Ti, B-doped In-Zn Oxide Thin Film Transistors Depending on Gate Insulators – B. Kim, J. Shin, C. Hong, K. Kim, N. Park, and W. Cheong (Electronics and Telecommunications Research Institute)
- **3086** Aqueous Inorganic Inks for Low Temperature Fabrication of Metal Oxide-Based High-Mobility Transparent Thin-Film Transistors – C. Liu, W. Lee, and T. Shih (National Cheng Kung University)

E17 SiGe, Ge, and Related Compounds: Materials, Processing, and Devices 5

Electronics and Photonics

316A, Level 3, Hawaii Convention Center

FET/Processing/Strain Session 1: SiGe and Ge Channel FET – 08:00 – 10:40
Co-Chairs: Yee-Chia Yeo and Bernd Tillack

08:00 **3113** Implant Free SiGe-Quantum Well: From Device Concept To High-Performing pFETs – J. Mitard, G. Hellings, L. Witters, G. Eneman, A. Hikavyy, B. Vincent, R. Loo, N. Collaert, N. Horiguchi, and A. Thean (imec)

08:30 **3114** Effective Condensation Process for Higher Ge Concentration and Thin SiGe layer-on-insulator Substrates in Advanced High Mobility MOSFETs – D. LEE, T. Shim, T. Kim, S. Song, S. Lee (Hanyang University), R. Okuyama (Sumco Corporation), and J. Park (Hanyang University)

08:50 **3115** SiGe Doped-Channel FET Formed by Sputter Epitaxy Method – M. Yoshikawa, H. Otsuka (Tokyo University of Agriculture & Technology), A. Kasamatsu, N. Hirose, T. Mimura, T. Matsui (National Institute of Information and Communications Technology), and Y. Suda (Tokyo University of Agriculture & Technology)

09:10 **3116** Hole Mobility Boost of Ge p-MOSFETs by Composite Uniaxial Stress and Biaxial Strain – H. Lan, Y. Chen, J. Lin, and C. Liu (National Taiwan University)

09:30 Intermission (20 Minutes)

09:50 **3117** Modeling of Field-Effect-Transistors with Strained and Alternative Channel Materials – F. Conzatti, D. Esseni, P. Palestri, and L. Selmi (University of Udine)

10:20 **3118** Physical Mechanism of Enhanced Uniaxial Stress Effect on Carrier Mobility in ETSOI MOSFETs – T. Ohashi, O. Shunri, and U. Ken (Tokyo Institute of Technology)

Surfaces and Interfaces Session I – 10:40 – 12:40
Co-Chairs: Seiichi Miyazaki and Shigeaki Zaima

10:40 **3119** Reliability of SiGe channel MOS – J. Franco, B. Kaczer, J. Mitard, M. Toledano-Luque, G. Eneman, P. Roussel, M. Cho, T. Kauerauf (imec), T. Grasser (T.U. Wien), L. Witters, G. Hellings, L. Ragnarsson, N. Horiguchi, M. Heyns, and G. Groeseneken (imec)

11:10 **3120** Evaluation of Two contact Resistivity References on $Si_{1-x}Ge_x$ for FDSOI 20nm pMOS – E. Bourjot (STMicroelectronics), F. Nemouchi, V. Carron (CEA-LETI), Y. Morand (STMicroelectronics), S. Bernasconi, M. Vinet, J. Damlencourt, F. Allain, O. Cueto, D. Lafond (CEA-LETI), and D. Mangelinck (IM2NP,UMR CNRS)

11:30 **3121** Gate Stack and Source/Drain Junction Formations for High-Mobility Ge MOSFETs – H. Nakashima, K. Yamamoto (Kyushu University), H. Yang (Kyushu Univerisy), and D. Wang (Kyushu University)

12:00 **3122** Thermally Stable $NiSi_2$ for Ge Contact with Schottky Barrier Height Modulation Capability – R. Yoshihara, Y. Tamura, K. Kakushima, P. Ahmet, Y. Kataoka, A. Nishiyama, N. Sugii, K. Tsutsui, K. Natori, T. Hattori, and H. Iwai (Tokyo Institute of Technology)

12:20 **3123** Effect of an Atomically Matched Structure on Fermi-level Pinning at Metal/p-Ge Interfaces – K. Kasahara, H. Yoshioka, S. Yamada, T. Nishimura, M. Miyao, and K. Hamaya (Kyushu University)

Processing Session 1: Strain, Defects, and Diffusion – 13:50 – 16:05
Co-Chairs: D. Gruetzmacher and A. Sakai

13:50 **3124** Understanding Diffusion, Activation, and Related Phenomena in SiGe Alloys: Models and Challenges – H. W. Kennel (Intel Corporation)

14:20 **3125** Strain Control of Si and $Si_{1-x-y}Ge_xC_y$ Layers in $Si/Si_{1-x-y}Ge_xC_y/Si$ Heterostructures – J. Murota (Tohoku University), T. Kikuchi, and M. Sakuraba (Tohoku Univ.)

14:50 **3126** Phosphorus Profile Control in Ge by Si Delta Layers – Y. Yamamoto, P. Zaumseil, R. Kurps (IHP), J. Murota (Tohoku University), and B. Tillack (IHP)

15:10 **3127** Dopant Enhanced Diffusion for High n-typed Doped Ge – Y. Cai, R. E. Camacho-Aguilera, J. Bessette, L. Kimerling, and J. Michel (Massachusetts Institute of Technology)

15:30 **3128** A Threading Dislocation Density Study of Ge Epitaxial Layer on Si and The Dependency on Various Post Growth Treatments – A. Silber and E. Ginsburg (Micron Semiconductors Israel Ltd.)

15:50 Intermission (15 Minutes)

316B, Level 3, Hawaii Convention Center

Optoelectronics Session 1: Solar Cells, Emission, and Photonics – 13:50 – 16:05
Co-Chair: Gianlorenzo Masini

13:50 **3129** Ge Optical Emitters Fabricated by Ge Condensation and Epitaxial Growth – K. Oda, K. Tani, S. Saito, and T. Ido (PETRA)

14:20 **3130** Group-IV Subcells in Multijunction Concentrator Solar Cells – R. R. King, C. Fetzer, P. Chiu, E. Rehder, K. Edmondson, and N. Karam (Spectrolab, Inc.)

14:50 **3131** Substrate Design and Thermal Budget Tuning for Integration of Photonic Components in a High-Performance SiGe:C BiCMOS Process – D. Knoll, H. Richter, B. Heinemann, S. Lischke, Y. Yamamoto, L. Zimmermann, and B. Tillack (IHP)

15:10 **3132** Direct Band-gap Electroluminescence from Strained n-Ge Light Emitting Diodes – P. Velha, K. F. Gallacher, D. C. Dumas, D. J. Paul (University of Glasgow), M. Myronov, and D. R. Leadley (University of Warwick)

15:30 **3133** Parameters Controlling Emission of Terahertz Frequency Electromagnetic Radiation from InAs and GaAs: An Ensemble Monte Carlo Simulation Study – D. Cortie and R. Lewis (University of Wollongong)

15:50 Intermission (15 Minutes)

316A, Level 3, Hawaii Convention Center

Epitaxy Session 1: Pre-epi Si Surface Cleaning and III-V Compound Semiconductor Hetero-Epitaxy – 16:05 – 18:05
Co-Chairs: Yee-Chia Yeo and Alexander Reznicek

16:05 **3134** Selective-Area Epitaxial Lateral Overgrowth of InGaAs Microdiscs on Si – M. Sugiyama (University of Tokyo)

16:35 **3135** III-V/GaP Epitaxy on Si for Advanced Photovoltaics and Green Light Emitters – S. A. Ringel, T. Grassman, C. Ratcliff, A. Carlin, J. Carlin, L. Yang, and M. Mills (The Ohio State University)

17:05 **3136** Controlling Epitaxial GaAsP/SiGe Heterovalent Interfaces – P. Sharma, T. Milakovich, M. Bulsara, and E. A. Fitzgerald (Massachusetts Institute of Technology)

17:25 **3137** High Efficiency Low Temperature Pre-epi Clean Method for Advanced Group IV epi Processing – V. Machkaoutsan (ASM Belgium), D. Weeks, M. Bauer (ASM America), J. Maes (ASM Belgium), J. Tolle (ASM America), S. Thomas (ASM), A. Alian, A. Hikavyy, and R. Loo (imec)

17:45 **3138** Heteroepitaxy of III-V Compound Semiconductors on Si for Logic Applications: Selective Area Epitaxy in Shallow Trench Isolation Structures vs. Direct Epitaxy mediated by Strain Relaxed Buffers – M. Cantoro, C. Merckling, S. Jiang, W. Guo, N. Waldron, H. Bender, J. Dekoster, R. Loo, W. Vandervorst, M. Caymax, and M. Heyns (imec)

316B, Level 3, Hawaii Convention Center

Optoelectronics Session 2: Lasing, Strain and Interconnects – 16:05 – 18:05
Co-Chair: Gianlorenso Masini

16:05 **3139** Electrically Pumped Lasing from Ge-on-Si – J. Michel (Massachusetts Institute of Technology)

16:35 **3140** Strain Engineering for Optical Gain in Germanium – P. Boucaud (CNRS), M. El Kurdi, M. De Kersauson, A. Ghrib (Univ Paris-Sud), S. Sauvage, R. Jakomin, G. Beaudoin, O. Mauguin, L. Largeau, I. Sagnes (CNRS), G. Ndong, M. Chaigneau, and R. Ossikovski (Ecole Polytechnique)

17:05 **3141** Silicon Compatible High Performance Optical Interconnect Technology – B. Dutt (APIC Corporation)

17:25 **3142** Optical Characterization of Ge-on-Si Grown by using RTCVD – T. Kim, Y. Kil, W. Hong, H. Yang, S. Kang, T. Jeong, and K. Shim (Chonbuk National University)

17:45 **3143** High Extinction Ratio, Low Energy Consumption Ge Quantum Well Electro-Absorption Modulator with 23 GHz Bandwidth – G. Isella (Politecnico di Milano), P. Chaisakul, D. Marris-Morini, M. Saïd Rouifed (Univ. Paris-Sud), D. Chrastina, J. Frigerio (L-NESS Dip. di Fisica – Politecnico di Milano), X. Le Roux, S. Edmond, J. Coudevylle, and L. Vivien (Univ. Paris-Sud)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

E17 – Poster Session – 18:00 – 20:00

- **3144** Effects of HCl on the Growth of Epitaxial Ge – D. Franca (Research Foundation of SUNY)
- **3145** Analysis of Local Electric Conductive Property for Si Nanowire Models – Y. Ikeda, M. Senami, and A. Tachibana (Kyoto University)
- **3146** $Ge_{1-x}Sn_x$ Alloys Pseudomorphically Grown by R. F. Magnetron Sputtering – H. Pérez Ladrón de Guevara (Universidad de Guadalajara), Á. Rodríguez Vázquez, H. Navarro Contreras, and M. Vidal Borbolla (Universidad Autónoma de San Luís Potosí)
- **3147** High Quality Silicon Cap Layer for 28nm and Beyond PMOS Processes – C. Liao, T. Hsuan, C. Chien, M. Chan (United Microelectronics corp), C. Yang (United Microelectronics Corp.), J. Wu (United Microelectronics Corp), and B. Ramachandran (Applied Materials Inc.)
- **3148** Accurate Reactive Ion Etching of Si, Ge and P Doped Ge in an SF_6-O_2 Radio-Frequency Plasma – C. Wongwanitwattana, V. A. Shah, M. Myronov, E. H. Parker, T. E. Whall, and D. R. Leadley (University of Warwick)
- **3149** Formation of Large Grain SiGe on Insulator by Si Segregation in Seedless-Rapid-Melting Process – R. Kato, M. Kurosawa (Kyushu Univ.), R. Matsumura, T. Sadoh (Kyushu University), and M. Miyao (Kyushu Univ.)

- **3150** Direct Measurement of Silicon Strain Induced by Stressed TiNx Stripes Through Raman – Z. Fu, X. Ma, H. Yin, J. Niu, J. Yan (Institute of Microelectronics of Chinese Academy of Sciences), and C. Zhao (Chinese Academy of Sciences)
- **3151** Nano-Engineered Ge_xSi_{1-x} -on Insulator for Heteroepitaxy – K. Hossain, O. Holland (Amethyst Research Inc), M. Debnath, T. Mishima, and M. Santos (University of Oklahoma)
- **3152** NMOS SiP Epitaxy Process – Optimizing Facet Growth – C. Liao, C. Chien, M. Chan (United Microelectronics corp), C. Yang (United Microelectronics Corp.), J. Wu (United Microelectronics Corp), C. Chung (Applied Materials Inc), and B. Ramachandran (Applied Materials Inc.)
- **3153** Control of Schottky Barrier Height at Al/p-Ge Junctions by Ultrathin Layer Insertion – A. Ohta, M. Matsui, H. Murakami, S. Higashi (Hiroshima University), and S. Miyazaki (Nagoya Univ.)
- **3154** Characterization of Resistance-Switching Properties of SiOx Films Using Pt Nanodots Electrodes – K. Makihara, M. Fukushima (Nagoya University), A. Ohta, M. Ikeda (Hiroshima University), and S. Miyazaki (Nagoya Univ.)
- **3155** X-ray and Raman Characterization of strained SiGe Layers Treated by Stain Etching – W. Zhou, R. Liang, and L. Yan (Tsinghua National Laboratory for information, Institute of Microelectronics, Tsinghua University)
- **3156** Ge-on-Si Bufferless Epitaxial Growth for Photonic Devices – R. E. Camacho-Aguilera, Y. Cai, J. Bessette, X. Duan, L. Kimerling, and J. Michel (Massachusetts Institute of Technology)
- **3157** Formation of Large-Grain Ge(111) Films on Insulator by Gold-Induced Layer-Exchange Crystallization at Low Temperature – J. Park, T. Suzuki, M. Kurosawa, M. Miyao, and T. Sadoh (Kyushu University)
- **3158** Impedance Spectroscopy of GeSn/Ge Heterostructures by a Numerical Method – B. Baert (University of Liege), O. Nakatsuka, S. Zaima (Nagoya University), and N. Nguyen (University of Liege)
- **3159** Improvements in Atomic Layer Deposition Nucleation on Ge(100) and SiGe(100) via HOOH dosing – T. Kaufman-Osborn, J. Lee, K. Kiantaj, and A. Kummel (University of California, San Diego)
- **3160** Orientation Dependence of $Si_{1-x}C_x$:P Growth and the Impact on FinFET Structures – J. Tolle, D. Weeks, M. Bauer (ASM America), V. Machkaoutsan, J. Maes (ASM Belgium), M. Togo, A. Hikavyy, S. Brus, and R. Loo (imec)
- **3161** High Throughput SEG of Highly *In Situ* Doped SiCP/SiP Layers for NMOS Devices Using a $Si_3H_8SiH_3CH_3/PH_3/Cl_2$ based CDE Process – M. Bauer (ASM America)
- **3162** Ge-on-Si: Single-Crystal Selective Epitaxial Growth in a CVD reactor – A. Sammak, W. De Boer, and L. K. Nanver (TUDelft)
- **3163** The Structural and Electrical Properties in CeO_2 Dielectric on Ge Substrate for MOS Capacitors by Atomic Layer Deposition with $Ce(iprCp)_3$ – I. Oh, M. Kim, J. Park (Yonsei University), J. Gatineaub, K. Changhee (K.K. Air Liquide Laboratories), and H. Kim (Yonsei University)
- **3164** Point-of-Use Sampling and Organic Impurity Analysis for Bulk Gases in Semiconductor Processing – J. PARK, S. Shin*, Y. Lee*, P. Jun*, and J. Kim* (Samsung Electronics Co.,Ltd)
- **3165** Electronic Band Structure and Effective Masses of $Ge_{1-x}Sn_x$ Alloys – K. Low, Y. Yang, G. Han (National University of Singapore), W. Fan (Nanyang Technological University), and Y. Yeo (National University of Singapore)
- **3166** Multi-Wavelength High Resolution Micro-Raman and Optical Reflectance Characterization of Nano-Scale Strained Silicon-on-Insulator Substrates – T. Kim, T. Shim (Hanyang University), W. Yoo (WaferMasters, Inc.), and J. Park (Hanyang University)
- **3167** Theoretical Calculation of Defects Formation Under Thermal Equilibrium in Heavily n-type Doped Germanium – K. Takinai, Y. Ishikawa, and K. Wada (The University of Tokyo)
- **3168** Strain Engineering in GeSnSi Materials – H. Radamson, M. Noroozi, A. Jamshidi, and M. Ostling (Royal Institute of Technology (KTH))
- **3169** Optimization of SiC:P Raised Source Drain Epitaxy for Planar 20nm Fully Depleted SOI MOSFET Structures – N. Loubet (STMicroelectronics), T. Nagumo (Renesas), T. Adam (IBM), Q. Liu (STMicroelectronics), M. Raymond (Globalfoundries), K. Cheng, A. Khakifirooz, Z. Zhu (IBM), P. Khare (STMicroelectronics), V. Paruchuri (IBM Research), B. Doris (IBM), and R. Sampson (STMicroelectronics)
- **3170** Evidence of Boron Cluster Formation in Ultra-Shallow Ion Implanted Ge – B. R. Yates, B. L. Darby, N. Rudawski (University of Florida), D. H. Petersen, O. Hansen (Technical University of Denmark), R. Lin, P. F. Nielsen (CAPRES A/S), A. Kontos (Applied Materials), and K. S. Jones (University of Florida)
- **3171** Strain Evolution of $Si_{1-x}Ge_x$ Selective Epitaxial Growth in Steps – S. Koo, S. Kim, and D. Ko (Yonsei University)
- **3172** Formation of Silicene and 2D Si Sheets on Ag(111): Growth Mode, Structural and Electronic Properties – P. Vogt, T. Bruhn (TU-Berlin), A. Resta (CNRS-CINaM), B. Ealet (Aix-Marseille University), P. De Padova (CNR-ISM), and G. Le Lay (Aix-Marseille University)
- **3173** Investigations on GeO Disproportionation Using X-ray Photoelectron Spectroscopy – S. Wang (Institute of Microelectronics, Chinese Academy of Sciences), H. Liu (Chinese Academy of Sciences), T. Nishimura, K. Nagashio, K. Kita, and A. Toriumi (The University of Tokyo)
- **3174** The Oxidation of Germanium Surfaces Investigated at the Atomic Scale: Site-specific Atomic and Electronic Structure – C. Fleischmann, K. Schouteden (KU Leuven), C. Merckling, S. Sioncke, M. Meuris (imec), C. Van Haesendonck, K. Temst, and A. Vantomme (KU Leuven)

F1 Bio-Enabled Materials, Processes, and Devices

Electrodeposition / Physical and Analytical Electrochemistry / Sensor

311, Level 3, Hawaii Convention Center

Biological Templates for Device Fabrication – 10:00 – 12:00
Co-Chair: Nosang Myung

10:00 **3250** (Invited) Rational Design of Proteins for Modulation of Materials Growth Processes – D. T. Schwartz (University of Washington)

10:40 **3251** (Invited) Selective Metallization of Scaffolded DNA Origami to Form Self-Assembled Nanoelectronic Systems – A. T. Woolley, Y. Geng, E. Pound, M. Lydiksen, A. Pearson, J. Liu, B. Uprety, R. Davis, and J. N. Harb (Brigham Young University)

11:20 **3252** DNA/Metal Nanoparticles Functionalized Single-Walled Carbon Nanotubes Based Gas Sensor Arrays – H. C. Su, M. Zhang (University OF CALIFORNIA, RIVERSIDE), J. Lim (Korea Institutte of Materials Science), and N. Myung (University of California – Riverside)

11:40 **3253** Use of Galvanic Displacement to Fabricate DNA-Templated Tellurium and Bismuth Telluride Nanowires – J. Liu, B. Uprety (Brigham Young University), N. Myung (University of California – Riverside), and J. N. Harb (Brigham Young University)

Bio-enabled Materials – 14:00 – 16:40
Co-Chairs: John Harb and Sachio Yoshihara

14:00 **3254** (Invited) Modification of Solid Surface with Self-Assembled Monolayer for Chiral Sensing – T. Nakanishi and T. Osaka (Waseda University)

14:40 **3255** Design of Molecular Recognition Interface for Detecting Carbohydrate and Lectin Weak Interactions – Y. SATO (National Institute of Advanced Industrial Science and Technology (AIST)), K. Yoshioka (National Institute of Advanced Industrial Science and Technology), T. Murakami (National Institute of Advanced Industrial Science and Technology (AIST)), and O. Niwa (National Institute of Advanced Industrial Science and Technology)

15:00 **3256** Interfacial Structure and Function of Nano-Structured Membranes of Newly Synthesized Phosporylcholine Derivatives – T. Sawaguchi and M. Tanaka (National Institute of Advanced Industrial Science and Technology)

15:20 **3257** A Study on the Effect of Novel Surface Treatments and Biodegradable Polymer Coatings on Corrosion and Surface Properties of Ternary Nitinol Alloys – C. Pulletikurthi and N. Munroe (Florida International University)

15:40 **3258** Using Biocompatible Ionic liquid to Control the Corrosion of Mg Alloys in Simulated Body Fluid – Y. Zhang (ACES/ IFM), B. Hinton (IFM/ Deakin University), G. Wallace, X. Liu (IPRI/ University of Wollongong), and M. Forsyth (Deakin University)

16:00 **3259** Development of Novel Guided Tissue Regeneration Membranes for Biomedical Applications – Y. C. Chen and K. Ou (Taipei Medical University)

16:20 **3260** Multifunctional Biodegradable Cross-Linked Polymer Research and Development and Clinical Application of Animal Experiments – W. Su and K. K. Ou (Taipei Medical University)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

F1 – Poster Session – 18:00 – 20:00

• **3261** Investigating Phosphonate Monolayer Stability as Protective Coatings for Retinal-Neural Sensors – B. A. Branch (The University of New Mexico/ Los Alamos National Laboratory), M. Dubey, A. Aaron, K. Baldwin, A. M. Dattelbaum (Los Alamos National Laboratory), and D. Petsev (The University of New Mexico)

F2 Electrodeposition General Session: Fundamentals and New Materials – Dieter M. Kolb Memorial Symposium

Electrodeposition

313B, Level 3, Hawaii Convention Center

Session III Cont'd: Thin Film Electrodeposition – 08:00 – 11:00
Co-Chairs: G. Zangari and R. Sawaguchi

08:00 **3276** Electroforming of Thick Film Bi_2Te_3-based Thermoelectrics – C. L. Arrington, P. Sharma, J. Coleman, E. Baca, A. Rowen, D. Banga, D. B. Robinson, and V. Stavila (Sandia National Laboratories)

08:20 **3277** Electrodeposition of Sb_xTe_y and Bi_xTe_y Thin Films for Thermoelectric application – J. Lim (Korea Institutte of Materials Science), I. Yoo (KIMS), N. Myung (University of California – Riverside), Y. Song, D. Chang, D. Lim (Korea Institute of Materials Science), Y. Kim (Pusan National University), and K. Lee (Korea Institute of Materials Science)

08:40 **3278** Wear and Corrosion Resistance of Cr-C Deposits Obtained from a Trivalent Chromium Electroplating Bath with the Addition of Nanosized Al_2O_3 Powder – C. Huang, C. Chuang, and C. Lin (Chang Gung University)

09:00 **3279** Effects of Sonication on Electrodeposited Nickel-based Carbon Nanotube Composites Coatings – T. Suzuki and M. Kato (Yamagata Research Institute of Technology)

09:20 **3280** Application of Artificial Neural Networks to Predict Chemical Composition of Electrodeposited Nanocrystalline Ni-Mo Thin Films – M. Allahyarzadeh (Abadan faculty of Petroleum Engineering), A. Ashrafi (Shahid Chamran University of Ahvaz), B. Roozbehani (Abadan faculty of Petroleum Engineering), and A. Seddighian (Sharif University of Technology)

09:40 Intermission (20 Minutes)

10:00 **3281** Stepwise Anodizing Processes for Hierarchical Nanoporous Structures – C. Jeong and C. Choi (Stevens Institute of Technology)

10:20 **3282** Dependence of Fermi Level in Conducting Polymers Joined with Oxide Semiconductor on Its Crystal Plane – Y. Fujikawa (Chiba Institute of Technology), J. Kawakita, T. Chikyow (National Institute for Materials Science), and Y. Sakamoto (Chiba Institute of Technology)

10:40 **3283** Photoluminescence Properties of Electrodeposited Porous Silicon/ Cerium oxide Composite – M. Mizuhata and Y. Kubo (Kobe University)

Session IV: Deposition – 11:00 – 12:00
Co-Chairs: S. Yoshimoto and S. Brankovic

11:00 **3284** Superconformal Film Growth: Challenges and Opportunities – T. Moffat, G. Liu (National Institute of Standards and Technology), S. Zou (Miami University), L. Richter (National Institute of Standards and Technology), L. Ou Yang (TSMC), C. Lee (KAERI), and D. Josell (National Institute of Standards and Technology)

11:20 **3285** Beyond Interfacial Anion/Cation Pairing: The Role of Cu(I) Coordination Chemistry for the Action of Leveler Additives in Copper Electroplating – M. Hai, F. Janser, T. Brunner (University of Bern), A. Fluegel (BASF SE), F. Simona, M. Cascella, K. Kraemer (University of Bern), D. Mayer, M. Arnold (BASF SE), and P. Broekmann (University of Bern)

11:40 **3286** Influence of Glycine as Additive on Cobalt Electrodeposition – R. A. Critelli and P. Sumodjo (Universidade de São Paulo)

Session IV Cont'd: Deposition – 14:00 – 16:00
Co-Chairs: U. Stimming and T. Kondo

14:00 **3287** Mechanistic Studies of Zinc Electrodeposition from Deep Eutectic Electrolytes – L. Vieira (CEST Competence Centre for Electrochemical Surface Technology), B. Gollas (Graz University of Technology), and R. Schennach (Institute of Solid State Physics, Graz University of Technology)

14:20 **3288** Theoretical Analysis of the Solvent Effect on Hypophosphite Ion Adsorption on Pd and Cu Surfaces – M. Kunimoto, K. Seki, H. Nakai, and T. Homma (Waseda University)

14:40 **3289** Electrodeposition of FeRh Alloys: Influence of Ag Underlayer – R. Della Noce (Unesp), D. Cornejo, H. Kumar (USP), and A. Benedetti (Unesp)

15:00 **3290** Surface Alloy Formation During Pb UPD on Cu(100) and Its Role in Cu-Pb Alloy Deposition – D. Gokcen, C. Hangarter, and T. Moffat (National Institute of Standards and Technology)

15:20 **3291** An Environmentally Friendly Process for Electroplating Copper on Zinc – C. Liao, F. Ernst, and U. Landau (Case Western Reserve University)

15:40 **3292** Study of the Copper Electrodeposition Mechanism on Molybdenum Substrate – E. Delbos, H. El Belghiti (OMG Ultra Pure Chemicals), D. Mercier, J. Vigneron, M. Bouttemy, and A. Etcheberry (Institut Lavoisier de Versailles)

Session IV Cont'd: Deposition – 16:00 – 18:00
Co-Chairs: L. Kibler and M. Mizuhata

16:00 **3293** Deposition of Metallic Nanoparticles; Variations of Particle Size – T. Brülle, O. Schneider (Technische Universität München), and U. Stimming (TUM CREATE Centre for Electromobility)

16:20 **3294** Electrodeposition of Arrays of Au/NiO/ Au Nanowire Heterostructures for ReRAM Applications – D. Perego, S. Franz, M. Bestetti (Politecnico di Milano), S. Brivio, G. Tallarida (Laboratorio MDM, IMM-CNR), and S. Spiga (CNR-IMM)

16:40 **3295** Crystal Orientation of Iron Produced by Electrodeoxidation of Hematite Particles – M. Tokushige (Norwegian University Science Technology), O. Kongstein (SINTEF), and G. Haarberg (Norwegian University of Science and Technology)

17:00 **3296** Study of the Electrodeposition of Zn-TiO_2 Dispersion Coatings – M. K. Camargo (Ilmenau University of Technology), U. Schmidt (Technische Universitaet Ilmenau), and A. Bund (Technische Universität Ilmenau)

17:20 **3297** Epitaxial Growth of Au on Pt (111) and Pt (poly) by Surface Limited Redox Replacement of Pb UPD Layer – N. Dimitrov, C. Mitchell, and M. Fayette (SUNY at Binghamton)

17:40 **3298** Implications on the Use of 1-D and 2-D Models for Metal Electrodeposition: Voltammetry and Impedance Analysis – J. G. Vazquez and M. Pritzker (University of Waterloo)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

F2 – Poster Session – 18:00 – 20:00

- **3299** Understanding the Mechanism of Functional Molecules in Shape-Controlled Synthesis of Nanomaterials -- *In Situ* FTIR Spectroscopic Study of Citrate Adsorption on Pt Polycrystalline and Single Crystal Electrodes – D. Chen, J. Ye, C. Xu, X. Li, J. Li, C. Zhen, and S. Sun (Xiamen University)
- **3300** Fabrication of Low CTE Metal Masks by the Invar Fe-Ni Alloy Electroforming Process for Large and Fine Pitch OLED Displays – T. Nagayama, T. Yamamoto, T. Nakamura, and Y. Mizutani (Kyoto municipal institute of industrial technology and culture)
- **3301** Synthesis and Characterization of Electrodeposited Cu_2O Thin Film for Photo-Electrochemical Cells – M. Kim (Korea Institute of Materials Science), S. Yoon (Hanyang University), D. Chang (Korea Institute of Materials Science), N. Myung (University of California – Riverside), D. Lim (Korea Institute of Materials Science), I. Kim (Dong-A University), B. Yoo (Hanyang University), K. Lee (Korea Institute of Materials Science), and J. Lim (Korea Institutte of Materials Science)
- **3302** Characterization of Zn-Ni-P alloys Electrodeposited in Alkaline Solutions – Y. Kamimoto, K. Yamamoto, S. Yamashita, and R. Ichino (Nagoya University)
- **3303** The Electrodeposition of Zinc-Bismuth Alloys – A. Luegger (CEST Competence Centre for Electrochemical Surface Technology), B. Gollas (Graz University of Technology), and J. Zidar (Miba Gleitlager GmbH)

- **3304** Influence of Adatom Supersaturation on Real Activation Energy of Charge Transfer Stage during Metal Electrocrystallization – I. Kryshtop, N. Yurchenko, and V. Trofimenko (Dnipropetrovsk National University)
- **3305** Electrochemical Assembly of Ruthenium Complexes during the Multilayering Process of MnO_2 – K. Tomono, R. Yamaguchi, and M. Nakayama (Yamaguchi University)
- **3306** AFM Analysis for Initial Stage of Electroless Displacement Deposition of Silver on Silicon Surface – T. Ego (Graduate school of Engineering, University of Hyogo), S. Yae (University of Hyogo), T. Hagihara (Shinko seiki Co., Ltd.), N. Fukumuro, and H. Matsuda (University of Hyogo)
- **3307** Fabrication of Cu-Ag Film Using Electrodeposition and Characterization of Its Properties – H. Ko (University of Incheon), M. Kim, J. Kim (Seoul National University), and O. Kwon (University of Incheon)
- **3308** Degradation of Additives and Its Influences on Copper Electrodeposition – S. Choe, M. Kim, H. Kim, T. Lim (Seoul National University), A. Lee, S. Jun, K. Woo (LS Mtron Ltd.), and J. Kim (Seoul National University)
- **3309** Electrodeposition of CoNiW Alloys: HCP-FCC Structural Transition – A. M. Sakita (Instituto de Química – Unesp), R. Della Noce, C. Sadao Fugivara, and A. Vicente Benedetti (Unesp)
- **3310** Electrochemical Formation of Functional Silver Coatings: Nanostructural Peculiarities – O. Bersirova and V. Kublanovsky (V.I.Vernadskii Institute of General and Inorganic Chemistry NAS of Ukraine)
- **3311** High Temperature Hardness of Electrodeposited Nickel-based Carbon Nanotube Composite Coatings – T. Suzuki, M. Kato, T. Matsuda, and S. Kobayashi (Yamagata Research Institute of Technology)

F3 Electroless Deposition: Principles, Activation, and Applications 2

Electrodeposition

306A, Level 3, Hawaii Convention Center

Co-Chairs: Stojan Djokic, T. Homma, L. Magagnin, and J. Stickney

10:00 **3328** Electroless Atomic Layer Deposition: a Scalable Approach to Tailored Surface Structures – D. B. Robinson, P. Cappillino (Sandia National Laboratories), L. Sheridan, and J. Stickney (The University of Georgia)

10:20 **3329** Electroless Deposition of Cu and Ag on Valve Metal Substrates – L. Nolan (University of Alberta), S. Djokic (Elchem Consulting Ltd.), K. Cadien, and T. Thundat (University of Alberta)

10:40 **3330** Chemical Modification of Nano-Nonwoven Fabrics Using Electrochemical and Electroless Deposition – S. Ndzesse and C. Shannon (Auburn University)

11:00 **3331** Miniature Fuel Cell with Monolithically FabricatedSi Electrodes -Reduction of Pt by UPD-SLRR- – D. Ogura, T. Honjo, and M. Hayase (Tokyo University of Science)

11:20 **3332** Large Scale, Electroless Synthesis of Highly Stable Flower-like Silver Nanostructures by a Templateless Method for SERS Application – C. Desmonda and Y. Tai (National Taiwan University of Science and Technology)

11:40 **3333** SERS-Active Substrates Fabricated by Displacement Deposition of Metals on Porous Silicon – K. Artsemyeva (BSUIR), H. Bandarenka (Belarussian State University of Informatics and Radioelectronics), A. Panarin, I. Khodasevich, S. Terekhov (NASB), M. Balucani (University Sapienza), and V. Bondarenko (Belarussian State University of Informatics and Radioelectronics)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

F3 – Poster Session – 18:00 – 20:00
Co-Chair: Stojan Djokic

- **3334** The Kinetic Parameter of the Ni-W Alloy Electrodeposition – H. Xiao, N. Yu, Y. Feng, and Z. Liu (Yunnan University)
- **3335** Cohesion Property of Electroless Plated Ni-P Coating on Fiber Bragg Grating – L. Fang, P. Zhang, A. Tang, and S. Xue (ChongQing University)
- **3336** Oxygen-Assisted Vacuum Ultra-Violet Surface Modification of Polymers as a Pretreatment for Electroless Nickel Platimg – A. Nakamura, N. Mukado, T. Ichii, and H. Sugimura (Kyoto University)
- **3337** Enhanced Pd Distribution by Three-Step Activation Process for Electroless Cu Plating – C. Lee, H. Lee, M. Lee, J. Hur, and H. Lee (Korea Institute of Industrial Technology)
- **3338** Preparation and properties of Ni-Co-P/nano-sized SiC electroless composite coatings – J. Hu, L. Fang, P. Zhong, and Y. Yang (ChongQing University)
- **3339** Raman and DFT study of Reductant Adsorption on Metal Surfaces in Electroless Deposition Process – B. Jiang (WASEDE University), M. Kunimoto, M. Yanagisawa, and T. Homma (Waseda University)

F5 Magnetic Materials and Devices 12

Electrodeposition

323C, Level 3, Hawaii Convention Center

Magnetic Recording and Materials 2 – 08:00 – 12:00
Co-Chairs: E. Podlaha, W. Schwarzacher, and T. Osaka

08:00 **3399** Development of Thin Film Technology for High-Density Magnetic Recording Media – M. Futamoto (Chuo University)

08:40 **3400** Electroplated Hardmask for Bit Patterned Media Nanoimprinting Template Fabrication using Block Copolymer Lithography – C. Bonhote (HGST , a WD company), G. Siddiqi, J. Lille, and R. Ruiz (HGST)

09:00 **3401** Microstructural and Magnetic Studies of Electrodeposited, Equiatomic Fe-Pt Films – D. Liang and G. Zangari (University of Virginia)

09:20 **3402** Metastable $L1_1$ and B_h Ordered Phase Formation in CoPt Alloy Thin Films Epitaxially Grown on Metal Underlayers – M. Ohtake, D. Suzuki (Chuo University), F. Kirino (Tokyo National University of Fine Arts and Music), and M. Futamoto (Chuo University)

09:40 Intermission (20 Minutes)

10:00 **3403** Superconformal Electrodeposition of Ni, Co and Fe-Group Alloys – T. Moffat (National Institute of Standards and Technology), C. Lee (KAERI), S. Kim (Chung-Ang University), Y. Liu, and D. Josell (National Institute of Standards and Technology)

10:40 **3404** Induced Codeposition of NiMo, NiW and CoW Alloys with a Competing Side Reaction – S. Sun, T. Bairachna (Northeastern University), T. Maliar, H. Cesiulis (Vilnius University), and E. Podlaha (Northeastern University)

11:20 **3405** Electrodeposition of Super Invar into Micro- and Nano- Recesses – H. Kim (Northeastern University), M. Murphy (Louisiana State University), S. Soper (University of North Carolina), and E. Podlaha (Northeastern University)

11:40 **3406** Aqueous DC Electrodeposition and Mechanism of Magnetic SmCo Alloys – J. Wei, M. Schwartz, and K. Nobe (UCLA)

Magnetic MEMS and Devices – 14:00 – 18:00
Co-Chairs: H. Gatzen and P. Hesketh

14:00 **3407** Developments in Integrated On-Chip Inductors with Magnetic Yokes – E. J. O'Sullivan, N. Wang, P. Herget (IBM Research Division), L. Romankiw (IBM, Thomas J. Watson Research Center), B. Webb, R. Fontana (IBM Research Division), N. Sturcken, K. Shepard (Columbia University), and W. Gallagher (IBM Research Division)

14:40 **3408** A Unique Magnetic Alloy for Integrated Power Systems on a Chip – A. Panda (Enpirion Inc), T. Liakopoulos (Enpirion Inc.), M. Wilkowski, and A. Lotfi (Enpirion Inc)

15:00 **3409** Magnetic Micro and Nano Actuator Systems – H. H. Gatzen (Leibniz Universitaet Hannover)

15:40 **3410** Evaluation of the Effects of Electroplating Conditions on the Material Properties of Iron Cobalt Thick Films using Design of Experiments – W. C. Patterson and D. P. Arnold (University of Florida)

16:00 **3411** Nanoporous Alumina Growth in a Magnetic Field – A. Ispas (Technische Universität Ilmenau), I. Vrublevsky (Belarusian State University of Informatics and Radioelectronics Minsk), U. Schmidt (Technische Universitaet Ilmenau), and A. Bund (Technische Universität Ilmenau)

16:20 **3412** Investigation of the Crystallization of NiFe81/19 Depending on the Annealing Temperature – M. Wurz (Leibniz University of Hanover), A. Shaganov, A. Filimonov (Physics of Nanocomposite Materials), and L. Rissing (Leibniz Universitaet Hannover)

16:40 **3413** Integration of Electroplated CoFe in Trench Type Flux Guides for Magnetic MEMS Applications – J. Chen, S. Cvetkovic, and L. Rissing (Leibniz Universitaet Hannover)

17:00 **3414** Microfabrication of High-Performance Thick $Co_{80}Pt_{20}$ Permanent Magnets for Microsystems Applications – O. D. Oniku and D. P. Arnold (University of Florida)

17:20 **3415** Fabrication and Characterization of an Improved Micro Inductosyn® Sensor – D. Miletic (Leibniz Universitaet Hannover), J. Flügge (Physikalisch-Technische Bundesanstalt (PTB)), and H. H. Gatzen (Leibniz Universitaet Hannover)

17:40 **3416** Embossing of Soft-magnetic Structures and Influence on Magnetic Properties – M. Kaiser (Leibniz Universitaet Hannover), M. Wurz (Leibniz University of Hanover), S. Cvetkovic (Leibniz Universitaet Hannover), R. Schwaiger (Karlsruhe Institute for Technology), and L. Rissing (Leibniz Universitaet Hannover)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

F5 – Poster Session – 18:00 – 20:00
Co-Chairs: C. Bonhote and G. Zangari

- **3417** Magnetic Properties of Ni-Cu Alloy Nanowires Obtained by the Template Method – I. Enculescu, E. Matei (National Institute of Materials Physics), M. Toimil Molares (GSI Darmstadt), A. Leca, and V. Kuncser (National Institute of Materials Physics)
- **3418** CPP-GMR of Co/Cu Multilayered Nanowires Electrodeposited into Anodized Aluminum Oxide Nanochannels with Large Aspect Ratio – N. Goya, Y. Zenimoto, K. Takao, T. Ohgai (Nagasaki University), M. Nakai, and S. Hasuo (Kyushu Mitsui Aluminium Co. Ltd.)
- **3419** Electroplating of Cu/Sn Layers for Hermetic Encapsulation for Vacuum Applications – M. Wurz (Leibniz University of Hanover), S. Cvetkovic, L. Rissing (Leibniz Universitaet Hannover), and F. Bach (Leibniz University of Hanover)
- **3420** Anisotropic Magnetoresistance of Ni-Co-Fe Alloy Nanowires Electrodeposited into Anodized Aluminium Oxide Membrane Thin Films – Y. Ikeda, T. Egawa, K. Takao, T. Ohgai (Nagasaki University), M. Nakai, and S. Hasuo (Kyushu Mitsui Aluminium Co. Ltd.)
- **3421** Current-Induced Magnetization Switching in CPP Junctions based on $Fe_3Si/FeSi_2$ Multilayered Films – Y. Noda (Kyushu University), K. Sakai (Kurume National College of Technology), T. Sonoda (Kyushu University), K. Takeda (Fukuoka Institute of Technology), and T. Yoshitake (Kyushu University)

H1 Carbon Nanotubes and Graphene: From Fundamental Properties and Processes to Applications and Devices

Fullerenes, Nanotubes, and Carbon Nanostructures / Dielectric Science and Technology / Energy Technology / Sensor

317A, Level 3, Hawaii Convention Center

Session I – 08:00 – 12:20
Co-Chairs: T. Akasaka, D. Guldi, and F. D'Souza

08:00 **3471** N-type Graphene Induced by Molecular Hydrogen Exposure at Room Temperature – B. Kim (Ulsan National Institute of Science and Technology), S. Hong, S. Baek (Seoul National University), H. Jeong, N. Park, M. Lee (Ulsan National Institute of Science and Technology), S. Lee (Konkuk University), J. Lim, Y. Jun (Ulsan National Institute of Science and Technology), and Y. Park (Seoul National University)

08:20 **3472** DFT Calculation for Various Adatom Adsorptions on Graphene for Using Graphene as Substrate – A. Ishii, K. Nakada, and T. Torobu (Tottori University)

08:40 **3473** Theoretical Study of a Zigzag Graphene Nanoribbon Field Effect Transistor – H. Karamitaheri, M. Pourfath, N. Neophytou, and H. Kosina (IUE/TU Wien)

09:00 **3474** Hierarchical Graphene Macroassemblies – M. A. Worsley, M. Merrill, M. Suss, J. Lee, S. Kucheyev, C. Valdez, H. Mason, B. Mayer, J. Lewicki, A. Wittstock, M. Stadermann, J. Satcher, J. Biener, and T. Baumann (Lawrence Livermore National Laboratory)

09:20 **3475** Nitrogen-Containing Graphene for Electrochemical Oxygen Reduction – S. M. Lyth, J. Liu, and K. Sasaki (Kyushu University)

09:40 Intermission (20 Minutes)

10:00 **3476** Graphene Thermal Interface Materials – A. A. Balandin (University of California)

10:20 **3477** Towards Novel Pillared Nanostructures based on Graphene – K. Spyrou (RUG University), P. Rudolf (RUG University The Netherlands), D. Gournis (University of Ioannina Greece), P. Maurizio, L. Kang (Università degli Studi di Trieste), and E. Diamanti (University of Ioannina Greece)

10:40 **3478** Chemically Prepared Reduced Graphene Oxide as Ultra Fast Temperature Sensor – S. Sahoo, S. Barik, G. Sharma, G. Khurana, and J. Scott (University of Puerto Rico)

11:00 **3479** Comparison of Epitaxial Graphene growth on non-Polar and Polar 6H-SiC – L. O. Nyakiti (U.S. Naval Research Laboratory), V. Wheeler, R. Myers-Ward, N. Garces, F. Bezares, J. Caldwell, C. Eddy Jr., and D. Gaskill (U.S Naval Research Laboratory)

11:20 **3480** Non-Monotonic Size Dependence of Thermal Conductivity of Graphene Ribbons – D. Nika, A. Askerov (Moldova State University), and A. A. Balandin (University of California)

11:40 **3481** Layer by Layer Etching of CVD Graphene for Full Graphene Device Fabrication – J. OH, J. Lim, J. Park, and G. Yeom (SungKyunKwan University)

12:00 **3482** Wafer-Scale Graphene Synthesis and Tailoring via Segregation Methods Extended to Metals with Low Carbon Solubility – A. Zenasni (CEA), A. Delamoreanu (CNRS/LTM), and C. Rabot (CEA)

Session II – 14:00 – 18:20
Co-Chairs: S. De Gendt, M. T. Carter, and S. Fukuzumi

14:00 **3483** Study of the Point Defects Induced by Electrochemical Potential in Graphene Monolayers – J. J. Velasco-Velez, Y. Zhang, I. Martin-Fernandez, C. Martinez, and M. Salmeron (Lawrence Berkeley National Laboratory)

14:20 **3484** Interfacing Nanocarbons with Organic and Inorganic Semiconductors – From Extended Tetrathiafulvalenes to Nanocrystals / Quantum Dots – D. M. Guldi (Universität Erlangen-Nürnberg)

14:40 **3485** Mechanochemical Synthesis of Carbon Nanomaterials by a High-Speed Ball-Milling Process – S. Ohara, Z. Tan, K. Yamamoto (Osaka University), and T. Hashishin (Joining and Welding Research Institute, Osaka University)

15:00 **3486** Far-Infrared Absorption of Single-Walled Carbon Nanotube Films – T. Morimoto, S. Joung (TASC/AIST), and T. Okazaki (AIST)

15:20 Intermission (20 Minutes)

15:40 **3487** Photosensitized Hydrogen Evolution from Water Using Single-Walled Carbon Nanotube/Fullerodendron/SiO_2 Coaxial Nanohybrid – Y. Takaguchi, T. Wada, W. Sakata, and T. Tajima (Okayama University)

16:00 **3488** Electrochemical Property of Well-Coated Multi-Walled Carbon Nanotube with Polyaniline-Cyclodextrin Polymer Composites – W. Zhang, M. Chen, X. Gong, and G. Diao (Yangzhou University)

16:20 **3489** Advantage of Carbon Nanotubes as Catalyst Support in Polymer Electrolyte Membrane Fuel Cells – M. Berber, T. Fujigaya, and N. Nakashima (Kyushu University)

16:40 **3490** Effect of Charge of Solubilizers on the Electronic States of Single-Walled Carbon Nanotubes – Y. Hirana, Y. Niidome, and N. Nakashima (Kyushu University)

17:00 **3491** Enlargement of Space Charge Layer by P-N Junction of Multi-walled Carbon Nanotubes Modified with Tin Oxide Nanoparticles – T. Hashishin (Joining and Welding Research Institute, Osaka University), H. Ikenoko, K. Kojima, and J. Tamaki (Ritsumeikan University)

17:20 **3492** Single Molecule Lysozyme Monitoring by a Carbon Nanotube Circuit – Y. Choi, P. Sims, I. Moody, T. Olsen, G. Weiss, and P. G. Collins (Univ. of California, Irvine)

17:40 **3493** Application of Carbonaceous Nanomaterials in Biomedicine – J. Zhen, Q. Liu, D. Chen, C. Wang, and C. SHU (Institute of Chemistry, Chinese Academy of Sciences)

18:00 **3494** One-Step Liquid-Phase Synthesis of Carbon Nanomaterials with Carbon Paper – K. Yamagiwa, Y. Ayato (Tokyo University of Science), H. Shiroishi (Tokyo National College of Technology), and J. Kuwano (Tokyo University of Science)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

H1 – Poster Session – 18:00 – 20:00
Co-Chairs: F. D'Souza and D. Guldi

- **3495** PVDF/MWCNT Composite Films for Infrared Sensing and Energy Harvesting Applications – A. K. Batra, A. Chilvery, and M. Thomas (Alabama A&M University)
- **3496** The Investigation of Partial Reduced Graphene Oxide (GO)/PEDOT:PSS Nanocomposite – J. Seo, H. Yun, W. Hong (Korea Basic Science Institute), J. Jung (Chonbuk National University), B. Sohn, J. Lee (Korea Basic Science Institute), and C. Choi (Chonbuk National University)
- **3497** Evaluations of Nonbonding Interactions in Endohedrally and Exohedrally Functionalized Fullerenes – N. Mizorogi, T. Akasaka (University of Tsukuba), and S. Nagase (Kyoto University)
- **3498** Synthesis and Structural Characterization of Fullerene derivatives Encapsulating Trimetallic Nitride Cluster – T. ABE (University of Tsukuba), S. Sato (National Institute for Materials Science), C. Saito, Z. Slanina, T. Tsuchiya, T. Akasaka (University of Tsukuba), and S. Nagase (Kyoto University)
- **3499** Catalytic Synthesis of Carbon Nanotube and Nanofilament Over Oxidized Diamond-Supported Catalysts – K. Nakagawa, T. Toriyama, G. Tsujino (Kansai University), T. Ando (National Institute for Materials Science), and H. Oda (Kansai University)
- **3500** Large-Area Graphene Grown with a Novel rapid Cooling Method – M. C. Chen (National Taitung University), Y. Huang, C. Chen, S. Hung (Department of Physics, National Central University), C. Cheng, C. Li, H. Hsieh, H. Wu (Department of Applied Science,National Taitung University), and G. Chi (Department of Photonics, National Chiao Tung University)
- **3501** Synthesis and Properties of Paramagnetic Metallofullerene/Electron Donor Dyad – Y. Kawana, T. Tanaka, T. Tsuchiya, T. Akasaka, N. Mizorogi (University of Tsukuba), and S. Nagase (Kyoto University)
- **3502** Complexation Studies of Endohedral Metallofullerene with Concave π-System – N. Umekita, T. Tsuchiya, N. Mizorogi (University of Tsukuba), H. Sakurai (Institute for Molecular Science), N. Martín (Universidad Complutense de Madrid), D. M. Guldi (Universität Erlangen-Nürnberg), S. Nagase (Kyoto University), and T. Akasaka (University of Tsukuba)
- **3503** Framework Transformation of Non-IPR Structured Metallofullerene – Y. Muto, H. Kurihara, Z. Slanina, T. Tsuchiya (University of Tsukuba), S. Nagase (Kyoto University), and T. Akasaka (University of Tsukuba)
- **3504** Thermally Reduced Graphene Oxide as Energy Storage Materials – W. Hong (Korea Basic Science Institute), B. Kim (Ulsan National Institute of Science and Technology), J. Kim, S. Lee, and H. Kim (Korea Basic Science Institute)
- **3505** Soft Lithographic Patterning and Transfer Process of Graphene Sheets – H. Kim, M. Jung (Korea Research Institute of Chemical Technology), D. Jung (Sung Kyun Kwan University), S. Lee, J. Lim, J. Lee, and K. An (Korea Research Institute of Chemical Technology)
- **3506** Novel Growth Process of Carbon Nanotubes in Atmosphere – S. Lu and W. Hsu (National Tsing Hua University)
- **3507** The Organic Additives Effects during Electroless Nickel and Silver Deposition on Carbon Nanotube – T. Saito, Y. Takagi, N. Okamoto, K. Kondo (Osaka Prefecture University), Y. Kobayashi, and Y. Fujiwara (Osaka Municipal Technical Research Institute)
- **3508** Integrated Field Emission Diode with a Nano-graphite-diamond-like Emitters Process Development and Its Electrical Characteristics Study – N. Zaytsev, S. N. Orlov, S. Yanovich, A. Krasnikov, I. Matyushkin, I. Khomyakov, K. Svechkarev (Molecular Electronics Research Institute JSC), and R. Yafarov (RAS, Kotel'nikov Institute of Radio Engineering and Electronics)
- **3509** Multiple Auger Decay at Resonant Photo-Excitation in Carbon Thin Films – M. Richter, D. Friedrich, and D. Schmeißer (Brandenburg University of Technology)
- **3510** Photo-Thermo-Voltaic Effects in Carbon Nanotube Films – M. Omari, T. Hosseini, and N. Kouklin (University of Wisconsin-Milwaukee)
- **3511** Enhancement of Diamond Crystallite Size of Ultrananocrystalline Diamond/Amorphous Carbon Composite Films by Controlling Arc Discharge Energy of Coaxial Arc Plasma Gun – K. Hanada, A. Tominaga, T. Sugiyama (Kyushu University), K. Sumitani, H. Setoyama (Kyushu Synchrotron Light Research Center), and T. Yoshitake (Kyushu University)
- **3512** p-Type Semiconducting Properties of Boron Doped Ultrananocrystalline Diamond/Amorphous Carbon Composite Films Prepared by Coaxial Arc Plasma Deposition – Y. Katamune, S. Ohmagari (Kyushu University), H. Setoyama, K. Sumitani, Y. Hirai (Kyushu Synchrotron Light Research Center), and T. Yoshitake (Kyushu University)
- **3513** Controllable Synthesis of High-Quality Graphene Using Inductively-Coupled Plasma Chemical Vapor Deposition – L. Nang, N. Park (Chungnam National University), Z. Lee (UNIST), and E. Kim (Chungnam National University)
- **3514** High Reactive Catalysts Based on Gold Nanoparticles Supported Over Carbon Nanotubes – T. M. Abdel-Fattah (Christopher Newport University)

I1 Physical and Analytical Electrochemistry General Session

Physical and Analytical Electrochemistry
318B, Level 3, Hawaii Convention Center

PAED General Session 3 – 09:00 – 12:00
Co-Chairs: C. Hussey and T. Chung

09:00 **3541** Preparation and Electrochemical Behavior of Water-Soluble Inclusion Complex of Imidacloprid with β-cyclodextrin Polymer – M. Chen, J. Wang, W. Zhang, and G. Diao (Yangzhou University)

09:20 **3542** Fabrication of Porous Conductive Diamond Hollow Fibers – T. Kondo, Y. Kodama, and M. Yuasa (Tokyo University of Science)

09:40 Intermission (20 Minutes)

10:00 **3543** Electroanalytical Performance of Nitrogen-Containing Tetrahedral Amorphous Carbon Thin-Film Electrodes – X. Yang, G. DeVivo (Michigan State University), L. Haubold (The Fraunhofer Center for Coatings and Laser Applications), and G. Swain (Michigan State University)

10:20 **3544** Synthesis of Pt-Ir Catalysts by Coelectrodeposition: Application to Ammonia Electrooxidation in Alkaline Media – S. Le Vot (Université du Québec à Montréal), L. Roué (INRS- Énergie Matériaux et Télécommunications), and D. Bélanger (Université du Québec à Montréal)

10:40 **3545** Electrochemical Study of Ilmenite using Carbon Paste Electrode Under Reducing Condition – N. Jabit, G. Senanayake, and M. Nicol (Murdoch University)

11:00 **3546** Experiments and Modeling of Electrochemical Impedance Spectroscopy on Pressurized SOFC – C. Willich, M. Henke, C. Westner, L. Florian, W. Bessler, J. Kallo, and K. Friedrich (German Aerospace Center (DLR))

11:20 **3547** Diffusion Impedance Analyzed by Equivalent Circuit Involving CPE using Microelectrode – Y. Hoshi, S. Kawakita, I. Shitanda, and M. Itagaki (Tokyo University of Science)

11:40 **3548** Electrochemical Behavior of Samarium and Ytterbium in the 1-(1-Butyl)trimethylammonium Bis(trifluoromethylsulfonyl)imide Ionic Liquid Containing TODGA – Y. Pan and C. Hussey (The University of Mississippi)

PAED General Session 4 – 14:00 – 15:00
Co-Chairs: P. Atanassov and P. Kulesza

14:00 **3549** Electrochemical Behavior of Praseodymium and Neo-Dymium in the 1-butyl-3-methylpyrrolidinium bis(trifluoromethylsulfonyl)imide Ionic Liquid Containing Chloride – L. Chou and C. Hussey (The University of Mississippi)

14:20 **3550** In-depth Study on Nano-structured Electrode Reaction Mechanism in Lithium-Ion Batteries – H. Cho (University of California, San Diego) and Y. Meng (University of California San Diego)

14:40 **3551** Investigation on Polyoxometalates for the Application in Redox Flow Batteries – J. Friedl (TUM-CREATE), C. Bauer (TUM CREATE Centre for Electromobility), R. Al-Oweini (Jacobs University), D. Yu (Energy Research Insitute @ NTU), U. Kortz (Jacobs University), H. Hoster, and U. Stimming (TUM CREATE Centre for Electromobility)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

I1 – Poster Session – 18:00 – 20:00
Co-Chairs: S. Minteer and A. Hillier

- **3552** Electrode Reactions of Dissolved p-Dimethoxybenzene on a Polyaniline-Modified Electrode – J. Yano (Niihama National College of Technology)
- **3553** Equivalent Circuits of Zinc-Air Battery and Analysis of Zinc-Air Battery Oxygen Sensor using the Equivalent Circuits – M. Takahashi and M. Yamauchi (Tokyo National College of Technology)
- **3554** The Electrocatalytic Activity of Ligand-Protected Gold Particles: Formaldehyde Oxidation – K. Luo (Guilin University of Technology), X. Li, and Y. Gong (College of Materials Science and Technology, Guilin University of Technology)
- **3555** Nanocomposite Coatings based on the Conductive Polymers and Functionalized Carbon Nanotubes for Obtained of Modified Electrodes – V. Branzoi (University of Politehnica Bucharest), F. Branzoi (Institute of Physical Chemistry), and A. Musina (University Politehnica of Bucharest)
- **3556** Solar Driven Hydrogen Production with co-doped Gallium and Nitrogen in Zinc Oxide films prepared by Reactive RF Magnetron Sputtering – S. Shet (National Renewable Energy Laboratory)
- **3557** Comparison between Palladium Electrode and Nanoparticles in the Ethanol Detection to Biosensor and Sensor Applications – I. Feliciano, D. Diaz, Y. De la Torre, and C. Cabrera (UPR Rio Piedras)
- **3558** Preparation of Bismuth Tungstate Nanocrystallites by Ball Milling of Flake-ball Particles and Their Photocatalytic Activity – H. Hori (Hokkaido University Catalysis Research Center) and B. Ohtani (Hokkaido University)
- **3559** Electrochemical Properties of Free-Standing Boron-Doped Heteroepitaxial Diamond Electrode – H. Kodama (Aoyama Gakuin University), K. Suzuki (Toplas Engineering Co., Ltd), S. Kono, and A. Sawabe (Aoyama Gakuin University)
- **3560** Study on the Effects of Electrochemical Realkalization Method with Alcamines Inhibitors as Electrolyte – J. Lu, Y. Zhang (Shanghai Harbor Engineering Design & Research Institute Co., Ltd.), J. Zhang, and J. Jiang (Shanghai University of Electric Power)
- **3561** Transcutaneous Vein Imaging and Venepuncture System for Blood Test – H. Saito, S. Yamamoto, and H. Takagi (Tokyo National College of Technology)

- **3562** Reduction of Perchlorate by Electrochemically Generated Zero-Valent Iron on Conducting Polymer Electrode – E. Kim, S. Choi (Yonsei University), S. Kim (Hannam University), and K. Paeng (Yonsei University)
- **3563** Anomalous Codeposition of Ni-Zn in Acid Solutions – Y. ADDI (ENPEI-USTHB) and A. Khouider (USTHB)
- **3564** Irregular-Stairs Method: A More Precise Method of Measuring the Performance of Dye-Sensitized Solar Cells – J. Shimura and K. Noda (Sony Corporation)
- **3565** Cyclic Voltmogram for HUPD on Pt(111) Calculated from Total Gibbs Energies – H. A. Asiri (CWRU) and A. Anderson (Case Western Reserve University)
- **3566** Long Term Evaluation of Potentiometric Oxygen Sensors in Molten Lead – A. Verdaguer, S. Colominas, and J. Abella (Universitat Ramon Llull)
- **3567** Electrochemical Reduction of Selenite and Selenate Accelerated by Methyl Viologen – F. Koshikumo, W. Murata, A. Ooya, and S. Imabayashi (Shibaura Institute of Technology)
- **3568** Effect of pH on Absorption and Reductive Desorption Processes for Self-assembled Monolayer of Aromaticthiol Studied by Surface Enhanced IR Spectroscopy – K. Nishiyama, A. Kumatabara (Kumamoto Univ.), H. Ueda (Graduate School of Science and Technology, Kumamoto University), and S. Yoshimoto (Kumamoto University)
- **3569** Crystalline Composition Analysis of Titanium(IV) Oxide Photocatalyst Particles by X-ray Diffraction Analysis – M. SANO and B. Ohtani (Hokkaido University)
- **3570** Photoelectrochemical Water Splitting with Aluminum and Nitrogen co-doped Zinc Oxide prepared by Sputtering Technique – S. Shet (National Renewable Energy Laboratory)
- **3571** Potentiometric Determination of Potassium Ions in Biodiesel at a Nickel(II) Hexacyanoferrate Modified Electrode Using Microemulsions – G. Sedenho, L. Paim, and N. R. Stradiotto (Institute of Chemistry)

I2 Bioelectroanalysis and Bioelectrocatalysis

Physical and Analytical Electrochemistry

317B, Level 3, Hawaii Convention Center

Biofuel Cells – 08:00 – 12:00
Co-Chairs: S. Minteer and S. Higgins

08:00 **3588** Characterization of Microbial Fuel Cell Anodic Biofilms Grown on Pure and Mixed Cultures – S. R. Higgins, R. Lopez, D. Foerster, M. Cooney (Hawaii Natural Energy Institute), P. Atanassov, C. Lau (The University of New Mexico), S. Minteer (University of Utah), K. Nealson, A. Cheung (University of Southern California), O. Bretschger (J. Craig Venter Institute), T. Yan, and E. Pagaling (University of Hawaii)

08:20 **3589** In Vivo Operating Miniature, Direct Electron Transfer based, Membrane-less Glucose/Oxygen Biofuel Cell – M. Falk, V. Andoralov (Biomedical Sciences), M. Granmo (Neuronano Research Center), D. Suyatin (Division of Solid State Physics), J. Schouenborg (Neuronano Research Center), J. Sotres (Biomedical Sciences), R. Ludwig (Food Biotechnology Laboratory), O. Morozova (Kurchatov NBIC Centre), Z. Blum, and S. Shleev (Biomedical Sciences)

08:40 **3590** Enhanced Electrical Contact of Microbes using Magnetite Particle Coated with Polyelectrolyte onto Multi-Walled Carbon Nanotube Nanohybrid (MaPoNT) in Microbial Fuel Cell – I. Park, Y. Heo, P. Kim, and K. Nahm (Chonbuk National University)

09:00 **3591** Ammonia Production at Anabaena variabilis Modified Electrodes – T. Paschkewitz and J. Leddy (University of Iowa)

09:20 **3592** Solar Bioelectrocatalysis Utilizing Thylakoids – S. Minteer (University of Utah)

09:40 Intermission (20 Minutes)

10:00 **3593** Investigating Separators to Improve Performance of Flat-Plate Microbial Fuel Cells – S. Kazemi (University of British Columbia), K. Fatih (National Research Council Canada (NRC)-University of British Columbia (UBC)), M. Mohseni (University of British Columbia (UBC)), and H. Wang (National Research Council Canada (NRC)- University of British Columbia (UBC))

10:20 **3594** Direct Electron-Transfer Reactions from Solid Electrodes to Chemoautotrophic CO_2 Fixation Microbes – T. ISHII (University of tokyo), K. Hashimoto, and R. Nakamura (The University of Tokyo)

10:40 **3595** A Novel Recombinant PQQ Alcohol Dehydrogenase as Catalyst for Bioanode: Two-Step Electrochemical Oxidation of Alcohols – K. Takeda (Tokyo University of Agriculture and Technology), H. Matsumura (Oregon Health and Science University), K. Igarashi, M. Samejima (The University of Tokyo), N. Nakamura, and H. Ohno (Tokyo University of Agriculture and Technology)

11:00 **3596** Surface Modification of Carbon Black toward Retention of Enzyme Activity in High-Surface-Area Enzymatic Biofuel Cell Electrodes – T. Tamaki, H. Fujimoto, H. Ohashi, and T. Yamaguchi (Tokyo Institute of Technology)

11:20 **3597** Simultaneous 3-D Impedance Measurement of Whole Biofuel Cell, Anode and Cathode using Porous Carbon Electrode – I. Shitanda, H. Yanai, Y. Yoshihata, Y. Hoshi, M. Itagaki (Tokyo University of Science), and S. Tsujimura (University of Tsukuba)

11:40 **3598** Polyaniline Nanofiber/Carbon Black Composite as an Air Cathode Material for Microbial Fuel Cells – J. Ahmed and S. Kim (Konkuk University)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

I2 – Poster Session – Bioelectroanalysis and Bioelectrocatalysis – 18:00 – 20:00
Co-Chair: S. Minteer

- **3599** Catechol Biosensor based on Polyphenol Oxidase Immobilized by Combining Electropolymerization and Cross-Linking Process – S. Wang and J. Kan (Yangzhou University)
- **3600** A Bioanode for an Ethanol Biofuel Cell Operating at High Temperature – A. Kontani, M. Masuda, N. Nakamura, M. Yohda, and H. Ohno (Tokyo University of Agriculture and Technology)
- **3601** Immobilization of NAD^+ on an Electrode Using Hydrophobic Ionic Liquids – M. Masuda, N. Nakamura, and H. Ohno (Tokyo University of Agriculture and Technology)
- **3602** Investigation of Impedance Spectra of Mediator-type Amperometric Biosensor by Faradaic Impedance Analysis – I. Shitanda, Y. Hoshi, and M. Itagaki (Tokyo University of Science)
- **3603** The Direct Electron Transfer Reaction of Bilirubin Oxidase in Protic Ionic Liquids – R. Ikari, J. Kuwahara, N. Nakamura, and H. Ohno (Tokyo University of Agriculture and Technology)

I3 Molten Salts and Ionic Liquids 18

Physical and Analytical Electrochemistry / Electrodeposition / Energy Technology
301A, Level 3, Hawaii Convention Center

Electrodeposition – 08:00 – 12:00
Co-Chairs: M. Ueda and H. De Long

08:00 **3628** Recent Developments in Low-Temperature Electrolysis of Aluminum – A. Redkin, A. Apisarov, A. Dedyukhin, V. Kovrov, Y. Zaikov (Institute of High Temperature Electrochemistry), O. Tkacheva, and J. Hryn (Argonne National Laboratory)

08:20 **3629** $AlCl_3$/Trimethanyl Hydrochloride Ionic Liquid as an Electrolyte for Electrodepoisiton of Aluminium Wires – C. Su (National Cheng Kung University), T. Wu (National Yunlin University of Science and Technology), Y. Sun, and I. Sun (National Cheng Kung University)

08:40 **3630** Electrodeposition of Lead from Chloride Melts – G. Haarberg, L. Owe, B. Qin, J. Wang, and R. Tunold (Norwegian University of Science and Technology)

09:00 **3631** The Interface Ionic Liquids / Au(111) and nano-structured materials made from ionic liquids – F. Endres (Clausthal University of Technology)

09:40 Intermission (20 Minutes)

10:00 **3632** Electrodeposition on Tantalum in Alkali Halide Melts – J. H. Von Barner, A. H. Jensen, and E. Christensen (Technical University of Denmark)

10:20 **3633** Electrochemical Deposition of Niobium onto the Surface of Copper Using a Novel Choline Chloride-Based Ionic Liquid – A. I. Wixtrom, J. Buhler (Christopher Newport University), C. E. Reece (Thomas Jefferson National Accelerator Facility), and T. M. Abdel-Fattah (Christopher Newport University)

10:40 **3634** Ta and Nb Electrodeposition from Ionic Liquids – S. Krischok, A. Ispas, A. Zühlsdorff, A. Bund (Technische Universität Ilmenau), and F. Endres (Clausthal University of Technology)

11:00 **3635** Al-W Alloy Deposition from Lewis Acidic Room-Temperature Chloroaluminate Ionic Liquid – T. Tsuda, Y. Ikeda, T. Arimura, A. Imanishi, S. Kuwabata (Osaka University), C. Hussey (The University of Mississippi), and G. Stafford (NIST)

11:20 **3636** An Inverted Aluminium Electrolysis Cell Using a High Density Electrolyte and an Inert Anode – S. Rolseth (SINTEF Materials and Chemistry), H. Gudbrandsen (SINTEF), and J. Thonstad (Norwegian University of Science and Technology)

11:40 **3637** Al-Pt Alloy Deposition in $AlCl_3$-NaCl-KCl Molten Salt – M. Ueda, H. Hayashi, and T. Ohtsuka (Hokkaido University)

Biomass – 14:00 – 16:40
Co-Chairs: K. Brown and L. Haverhals

14:00 **3638** Polysaccharide Ecocomposite Materials: Synthesis, Characterization and Application in Removal of Pollutants and Bacteria – C. D. Tran and S. Duri (Marquette University)

14:20 **3639** Impact of Anti-Solvents on the Structural Features and Enzyme Digestibility of Regenerated Cellulose from Ionic Liquid Dissolution – X. Geng and W. A. Henderson (North Carolina State University)

14:40 **3640** Electrospinning of Biopolymers from Ionic Liquid – Co-Solvent Systems – E. K. Brown (United States Naval Academy), L. Haverhals (U. S. Naval Academy), M. P. Foley (U.S. Naval Academy), H. De Long (AFRL/AFOSR), and P. Trulove (US Naval Academy)

15:00 **3641** Ionic Liquid-based Solvents for Natural Fiber Welding – L. M. Haverhals (United States Naval Academy), M. P. Foley (U.S. Naval Academy), L. Nevin, E. K. Brown (United States Naval Academy), D. Fox (American University), H. De Long (AFRL/AFOSR), and P. Trulove (US Naval Academy)

15:20 Intermission (20 Minutes)

15:40 **3642** Formation of Surface Structures on Biopolymer Substrates Through the Inkjet Printing of Ionic Liquids – E. K. Brown (United States Naval Academy), L. Haverhals (U. S. Naval Academy), M. P. Foley (U.S. Naval Academy), K. Sweely (United States Naval Academy), H. De Long (AFRL/AFOSR), and P. Trulove (US Naval Academy)

16:00 **3643** Chitin to Plastic: Utilization of Ionic Liquids for the Depolymerization of Chitin – W. M. Reichert, A. Mirjafari, T. Goode, N. Williams, and M. La (University of South Alabama)

16:20 **3644** Selective Removal and Recovery of Lignin Using Protic Ionic Liquids (PILs) for a Cost–Effective Biomass Pretreatment Method – E. C. Achinivu, G. Li, and W. A. Henderson (North Carolina State University)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

I3 – Poster Session 1 – 18:00 – 20:00
Co-Chairs: D. Fox and M. Foley

- **3645** Electrochemical Behavior of Vanadium Oxides in $(NH_2)_2CO$ – KCl Melt – A. Savchuk and S. V. Devyatkin (Institute of General and Inorganic Chemistry)
- **3646** Effect of the Second Coordination Sphere on the Standard Rate Constants of Charge Transfer for the Cr(III)/Cr(II) Redox Couple in Chloride Melts – Y. Stulov, V. Kremenetsky (Institute of Chemistry, Kola Science Centre RAS), and S. Kuznetsov (KSC RAS)
- **3647** Characteristic of Steam-Activated Boron-Doped Diamond Electrode in a Molten $NH_4F·2HF$ – A. Oishi (Doshisha University), H. Kazuhiro, M. Uno, T. Nakai (Permelec Electrode LTD.), W. Sugimoto (Shinshu University), M. Saito, M. Inaba, and A. Tasaka (Doshisha University)
- **3648** Corrosion of Nickel-Chromium-Molybdenum Based Alloy in Chloride Melts Containing Transition Metal Ions – A. Abramov, V. Karpov, I. B. Polovov, D. Vinogradov, V. A. Volkovich, and O. Rebrin (Ural Federal University)
- **3649** Electronic Absorption Spectra of Niobium Species in Halide Melts – N. Brevnova, I. B. Polovov, M. Chernyshov, V. A. Volkovich, B. Vasin (Ural Federal University), and T. Griffiths (Redston Trevor Consulting, Ltd.)
- **3650** Corrosion of Ferritic and Ferritic-Martensitic Steels in NaCl-KCl-VCl_2 Melts – I. B. Polovov, D. Vinogradov, A. Abramov, A. Shak, V. A. Volkovich, O. Rebrin (Ural Federal University), and T. Griffiths (Redston Trevor Consulting, Ltd.)
- **3651** Corrosion of Austenitic Steels and Their Components in Vanadium-Containing Chloride Melts – A. Abramov, I. B. Polovov, V. A. Volkovich, O. Rebrin, E. Denisov (Ural Federal University), and T. Griffiths (Redston Trevor Consulting, Ltd.)
- **3652** Evaluation of NaTFSI-TBATFSI Ionic Liquid as an Electrolytic Melt for Na Electrorefining – R. Inaba, M. Ueda, and T. Ohtsuka (Hokkaido University)
- **3653** Induction of Liquid-Crystalline Bicontinuous Cubic Phases into Zwitterions by Addition of Lithium Salts – T. Matsumoto (Tokyo University of Agricuture and Technology), T. Ichikawa (Tokyo University of Agriculture and Technology), T. Kato (The University of Tokyo), and H. Ohno (Tokyo University of Agriculture and Technology)
- **3654** Influence of Nonflammable Diluents on Properties of Phosphonium Ionic Liquids as Lithium Battery Electrolytes – K. Tsunashima, H. Taguchi (Wakayama National College of Technology), and F. Yonekawa (Nippon Chemical Industrial Co., Ltd.)
- **3655** Absorption and Desorption of Water by 1-Alkyl-3-Methylimidazolium+ Ionic Liquids, and Studies of Their Electrochemical and Physical Properties – J. DeCerbo and V. Katovic (Wright State University)
- **3656** Electrochemical Behavior of Bis(trifluoromethylsulfonyl)imide-based ILs at Gold Single Crystal Electrodes – H. Ueda (Graduate School of Science and Technology, Kumamoto University), K. Nishiyama (Kumamoto Univ.), and S. Yoshimoto (Kumamoto University)
- **3657** Hysteresis Effects in the *In Situ* SFG and Differential Capacitance measurements on Metal electrode/Ionic Liquids Interface – W. Zhou, Y. Wang, R. Yin (Shanghai University), and Y. Ouchi (Nagoya University)
- **3658** Spatial Distribution of Chemical Species at Ionic Liquid / Electrode Interface Studied by *In Situ* X-ray Photoelectron Spectroscopy – M. Hirogaki, T. Tsuda, S. Kuwabata, K. Fukui, and A. Imanishi (Osaka University)
- **3659** Visualization of Ionic-Liquid/Solid Interfaces by Frequency Modulation Atomic Force Microscopy – M. Negami, T. Ichii, K. Murase, and H. Sugimura (Kyoto University)
- **3660** Electrochemical Studies of Cyclic Ammonium Based Ionic Liquids with Allyl Substituents – T. Wu (National Yunlin University of Science and Technology), C. Su, C. Chen (National Cheng Kung University), C. Kuo (National Kaohsiung University of Applied Sciences), and I. Sun (National Cheng Kung University)
- **3661** Electrochemical Oxidation of Glucose by Nitroxide Radicals or Gold Nanoparticles in Ionic Liquids – A. Konno, M. Abe, and H. Ohno (Tokyo University of Agriculture and Technology)
- **3662** Characterization of Au Nanoparticles Prepared by X-ray-Induced Reduction in Ionic Liquid at Nanopore – T. Arimura, T. Sakamoto, T. Tsuda, S. Kuwabata, K. Fukui, and A. Imanishi (Osaka University)
- **3663** Electrode Kinetics of Oxygen/Superoxide Ion Redox Couple in Some Amide-Type Ionic Liquids – T. Nakagawa, Y. Katayama, and T. Miura (Keio University)
- **3664** Molten Salts as a Promising Medium for the Synthesis of High Active Catalytic Coatings – A. Dubrovskiy (Institute of Chemistry, Kola Science Centre RAS) and S. Kuznetsov (KSC RAS)
- **3665** Synthesis of Carbides Refractory Metal Nanocoatings on Carbon Fibers and Nanoneedles of Silicon in Molten Salts – V. Dolmatov (Tananaev Institute of Chemistry and Technology of Rare Elements and Mineral Raw Materials) and S. Kuznetsov (KSC RAS)
- **3666** Facile Synthesis of Cu-based Semiconductor Nanoparticles by the Oxidation of Cu Metal Sputter-deposited in an Ionic Liquid – A. Morimoto, K. Okazaki (Nagoya University), S. Kuwabata (Osaka University), and T. Torimoto (Nagoya University)
- **3667** Reaction Entropies of some Redox Couples in Ionic Liquids – Y. Yamato, Y. Katayama, and T. Miura (Keio University)
- **3668** Effect of Ion Structures on Phase Behaviors of Hydrophobic and Polar Ionic Liquids after Mixing with Water – Y. Fukaya, T. Nakano, N. Nakamura, and H. Ohno (Tokyo University of Agriculture and Technology)

- **3669** Synthesis of Ionic Liquids as Solvents for Poly(3-Hydroxybutyrate) under Mild Condition – H. Mokudai, Y. Fukaya, N. Nakamura (Tokyo University of Agriculture and Technology), and H. Ohno (Tokyo University of Agriculture and Technology, JST CREST)
- **3670** Design of Ionic Liquid-Based Polyelectrolytes Showing Dynamic Phase Transition with Water – Y. Kohno and H. Ohno (Tokyo University of Agriculture and Technology)

I4 Electrocatalysis 6

Physical and Analytical Electrochemistry / Energy Technology / Industrial Electrochemistry and Electrochemical Engineering

315, Level 3, Hawaii Convention Center

Electrocatalysts Structural Effects II – 08:20 – 12:00
Co-Chairs: G. Brisard and D. Guay

08:20 **3752** (Invited) Application of Ordered Intermetallic Phases to Electrocatalysis – F. Matsumoto (Kanagawa University) and H. Abe (National Institute for Materials Science (NIMS))

09:00 **3753** Activation of Noble Metal Centers through Modification with Metal Oxo Species towards Electrocatalytic Oxidation of Alcohols and Formic Acid – P. J. Kulesza, I. Rukowska (University of Warsaw), A. Wadas, D. Marks, K. Klak (Department of Chemistry, University of Warsaw), and S. Zoladek (University of Warsaw)

09:20 **3754** Synthesis, Characterization and Electrocatalytic Properties of Electrodeposited Pt Thin Films with Preferential {100} Orientation – E. Bertin, S. Garbarino (INRS-EMT), J. Solla-Gullón, F. Vidal-Iglesia, J. Feliu (University of Alicante), A. Ponrouch, M. H. Martin, and D. Guay (INRS-EMT)

09:40 **3755** Electrode Surface Control by Platinum Nanoparticles Protected by Polyacrylic Acid for Electrocatalytic Hydrogen Generation – M. Kajita and M. Yagi (Niigata University)

10:00 Intermission (20 Minutes)

10:20 **3756** (Invited) Electrochemical Behavior of Pt-Skin Layers on Pt-Co Alloy Single-Crystal Electrodes in Acid Media – M. Wakisaka, S. Morishima, Y. Hyuga, H. Uchida, and M. Watanabe (University of Yamanashi)

11:00 **3757** Unique Properties of Reduced SnO_x: CO Oxidation on Nanostructured SnO_x/Pt(111) – S. Axnanda, W. Zhou, M. G. White (Brookhaven National Laboratory), Z. Zhu (University of California, Berkeley), and Z. Liu (Lawrence Berkeley National Laboratory)

11:20 **3758** Clarification of Two-Consecutive Potential Driven Phase Transition Processes of Diphenyl Viologen at a Au (111) Electrode Surface – T. Higashi and T. Sagara (Nagasaki University)

11:40 **3759** Electrooxidation of CO on Epitaxial Bilayer Oxide Formed on Platinum Nanofacets – V. Komanicky (Safarik University), D. Hennessy, and H. You (Argonne National Laboratory)

Theoritical Aspects in Electrocatalysis – 14:00 – 17:20
Co-Chairs: N. Hoshi and T. Ohsaka

14:00 **3760** Multiscale Modeling of the H_2 Oxidation Reaction at the Ni/YSZ Interface in the Presence and Absence of Sulfur – A. Heyden and S. C. Ammal (University of South Carolina)

14:20 **3761** Theoretical Investigation of the H_2 Oxidation on the $Sr_2Fe_{1.5}Mo_{0.5}O_{6-\delta}$ (001) Perovskite Surface under Anodic Solid Oxide Fuel Cell Conditions – S. Suthirakun, S. C. Ammal, and A. Heyden (University of South Carolina)

14:40 **3762** Electrochemistry by First-Principles Calculations: Electrochemical Oxidation of Ammonia at Pt(hkl)/Alkaline Solution Interfaces – D. Skachkov, C. Venkateswara Rao, and Y. Ishikawa (University of Puerto Rico)

15:00 **3763** Density Functional Theory Computation of Electrolyte Competitive Adsorption and Electrochemical Activation Barriers – M. J. Janik, K. Yeh, and G. Rostamikia (The Pennsylvania State University)

15:20 Intermission (20 Minutes)

15:40 **3764** A DFT Calculation Study of the Hydrogen Electrode Processes on Pt (111) and Pt (100) Surfaces – Q. Zhang, J. Chen, and S. Chen (Wuhan University)

16:00 **3765** DFT Study of Water Dissociation and Diffusion on Metal Surfaces, Kinks and Step – L. Arnadottur (Oregon State University)

16:20 **3766** Cost Effective Computational Method for Performing First-Principles Molecular-Dynamics Simulations under Constant Potential Bias – N. Bonnet, T. Morishita (AIST), O. Sugino (University of Tokyo), and M. Otani (National Institute of Advanced Industrial Science and Technology)

16:40 **3767** Vibration Analysis of (Bi)Sulfate Adsorption on Pt (111) Surface in Aqueous Solution from the First Principles Simulation – Y. Qian (FC-Cubic Cutting-Edge Center Technology Research Association), M. Otani, and T. Ikeshoji (National Institute of Advanced Industrial Science and Technology)

17:00 **3768** Fundamental Insights on the Electrochemical Water Splitting using Solid Oxide Electrolyzers – E. Nikolla (Wayne State University)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

I4 – Poster Session – Electrocatalysis VI – Poster – 18:00 – 20:00
Co-Chairs: G. Brisard and A. Wieckowski

- **3769** Electrochemically Fabricated Metal Catalysts for Glucose Oxidation in Bio Fuel Cell Application – J. Lim, S. Pyo, D. Lee, H. Park, and S. Kim (Chung-Ang University)
- **3770** Redox Catalysis for Dehydrogenation of Liquid Hydrogen Carrier for Fuel Cell Applications – E. Deunf (Lawrence Berkeley National Laboratory / University California Berkeley), L. Rubin (University of California Berkeley), D. Pete (Lawrence Berekeley National Laboratory), J. Arnold (Universoty of California Berkeley), and J. Kerr (Lawrence Berekeley National Laboratory)

- **3771** The Graphene-supported PdSn Nanoparticles as Efficient Catalysts for Ethanol Electrooxidation – Y. Kim, S. Choi, E. Lim, S. Lee (Gwangju Institute of Science and Technology (GIST)), and W. Kim (Gwagnju Institute of Science and Technology)
- **3772** Structural Effects on the Oxygen Reduction Reaction on the High Index Planes of Pt3Co – Y. Takesue, T. Rurigaki (Chiba University), A. Hototsuyanagi, M. Nakamura (Chiba Univeristy), and N. Hoshi (Chiba University)
- **3773** Controlling Diffusion Profile of Electroactive Species for Selective Anodic Stripping Voltammetry of Cd[sup]2+[/sup] – A. Sugitani, T. Watanabe, and Y. Einaga (Keio University)
- **3774** Molecuar Self-Assembling Control Over the Surface States and Field Effects at N-Gaas (100) Electrodes – V. Lazarescu, M. Enache, G. Dobrescu, M. Gartner (Institute of Physical Chemistry "Ilie Murgulescu"), C. Negrila, and M. Lazarescu (National Institute of Material Physics)
- **3775** One-Step Electrodeposition of Multilayered Surfactant/MnO_2 Composite and Its Electrochemistry – M. Shamoto, S. Mito, K. Tomono, and M. Nakayama (Yamaguchi University)
- **3776** Tungsten Carbide Promoted Co@Pd Core-Shell Nanoparticles as Highly Active ORR Electrocatalyst – Z. Li and P. Shen (Sun Yat-Sen University)
- **3777** Hydrazine Oxidation at {100} Preferentially Oriented Pt Black Surfaces – C. Roy, E. Bertin, M. H. Martin, S. Garbarino, and D. Guay (INRS-EMT)
- **3778** Surface Modification of Diamond Nanoparticle and Its Electrochemical Properties – J. Urai, T. Kondo, and M. Yuasa (Tokyo University of Science)
- **3779** Electrocatalytic Water Oxidation on a Mesoporous IrO_2 Film Fabricated Using a Triblock Copolymer Template – D. Chandra, N. Abe, and M. Yagi (Niigata University)
- **3780** *In Situ* Observation of Adsorption Behaviors of Nafion Side-Chain Model Compounds on Electrodes by ATR-SEIRAS – K. Nomura, N. Ohta, H. Notsu (FC-Cubic TRA), T. Kondo (Ochanomizu University), and I. Yagi (FC-Cubic TRA)
- **3781** Electrochemical Activity and Stability of Pt Catalysts Supported on Silica-CNF Hybrid Materials – A. Kim, S. Lim, D. Peck, S. Kim, B. Lee, and D. Jung (Korea Institute of Energy Research)
- **3782** Intermediates of Ethanol Electro-oxidation on SnOx/Pt Catalysts Studied by *In Situ* FTIR Spectroscopy – J. Magee, W. Zhou, and M. G. White (Brookhaven National Laboratory)
- **3783** Synthesis and Electrocatalytic Activity of Shape Controllable Gold Nanoparticles Enclosed by High-index Facets – B. C. Solomon, F. Ke, and X. Zhou (University of South Carolina)

J1 Chemical Sensors 10 – Chemical and Biological Sensors and Analytical Systems

Sensor

319B, Level 3, Hawaii Convention Center

J1-3 – Gas and Liquid Phase Chemical Sensors – 08:00 – 12:20
Co-Chairs: J. Li and L. Nagahara

08:00 **3845** (Sensor Division Outstanding Achievement Award Presentation) Ceramic Gas Sensors to Oxide Nanostructures: Opportunities and Challenges – S. Akbar (Ohio State University)

08:40 **3846** The Characteristics of Nanocomposite Chemical Sensors – A. K. Batra, J. Stephens (Alabama A&M University), and J. Currie (NASA-MSFC)

09:00 **3847** Diminishing Ethanol Cross-sensitivity via Lamination of Selective Oxidation Catalyst layer on Zirconia-based VOC Sensor – T. Sato (Kyushu University), M. Breedon (Japan Society for the Promotion of Science), Y. Kugimiya (Sasebo Heavy Industries), and N. Miura (Kyushu University)

09:20 **3848** Rapid and Simple Immunoassay Based on Negative Dielectrophoresis with Three-Dimensional Interdigitated Array Electrodes – T. Yasukawa (University of Hyogo), H. Shiku, T. Matsue (Tohoku University), and F. Mizutani (University of Hyogo)

09:40 **3849** Bismuth-film electrodes for Sn^{2+} Sensing: The Roles of Grain Size, Preferred Orientation Ratio, and Surface Roughness – C. H. Lien, K. Chang, C. Hu, Y. Tsai, and D. Wang (National Tsing Hua University)

10:00 Intermission (20 Minutes)

10:20 **3850** High-Throughput Separation Assay for NO Metabolites in Blood using Microfluidic Electrophoresis – S. Wakida (National Institute of Advanced Industrial Science and Technology (AIST)), T. Miyado (Kinki Polytechnic College), K. Shimazu, Y. Shibutani (Osaka Institute of Technology), T. Mizukami, K. Nose, and A. Shimouchi (National Cerebral and Cardiovascular Center)

10:40 **3851** Effects of Surface Modification of Noble-Metal Electrodes with Au on the H_2 Sensing Properties of Diode-type Gas Sensors – T. Hyodo, T. Yamashita, and Y. Shimizu (Nagasaki University)

11:00 **3852** Application of Electrospun Carbon Nanofiber and Its Composites in Electroanalytical Chemistry – J. Huang, Y. Liu, and T. You (Changchun Institute of Applied Chemistry)

11:20 **3853** Soluble Polyaniline for a State of Health Sensor – M. Kane (Sandia National Laboratories)

11:40 **3854** Potentiometric YSZ-based Sensors Using Zn-Ta-O-based Sensing Electrode for Selective H_2 Detection – S. A. Anggraini (Kyushu University), M. Breedon (Japan Society for the Promotion of Science), and N. Miura (Kyushu University)

12:00 **3855** Solid Electrolyte Type Ammonia Gas Sensor with High Water Durability – S. Tamura, T. Nagai, and N. Imanaka (Osaka University)

J1-4 – Gas and Liquid Phase Chemical Sensors – 14:00 – 18:00
Co-Chairs: M. Carter and Z. M. Sailor

14:00 **3856** Low Cost 8 nm Radius Nanoelectrodes Arrays by Sol-Gel Chemistry: To Fundamental Understanding of Mass Transport Toward Direct DNA Hybridization Detection Electrochemical Sensor – O. Fontaine (University of St. Andrews), C. Laberty, H. Perrot, and C. Sanchez (University of Pierre et Marie Currie)

14:20 **3857** Direct Comparison of Anti-Interference Property for Bimetallic PtAu, PtIr, and PtRu Nanoparticle catalysts in Amperometric Detection for H_2O_2 Based Biosensors – M. Janyasupab (Case Western Reserve University), Y. Zhang (Shanghai University), C. Liu (National Central University), and C. Liu (Case Western Reserve University)

14:40 **3858** A High-Throughput Assay for Evaluation of Embryoid Bodies using Local Redox Cycling-Based Electrochemical Chip Device – K. Ino, T. Nishijo, Y. Kanno, H. Shiku, and T. Matsue (Tohoku University)

15:00 **3859** Printed Amperometric Gas Sensors – M. T. Carter, J. Stetter, M. Findlay, and V. Patel (KWJ Engineering, Inc.)

15:20 **3860** Interaction of Water Vapor with SnO_2 Sensor Materials: A Comparison of DRIFTS and Resistance Measurements – R. G. Pavelko (Kyushu University), K. Grossmann, N. Barsan (University of Tuebingen), and K. Shimanoe (Kyushu University)

15:40 **3861** pH Sensing Characteristics and Biosensing Application of Solution-Gated Reduced Graphene Oxide Field-Effect Transistors – I. Sohn, D. Kim, J. Jung, O. Yoon, and N. Lee (Sungkyunkwan University)

16:00 **3862** Development of Micro Hydrogen Gas Sensor Utilizing Polymerized Gel with Ionic Liquid as a Solvent – T. Yamauchi (Niigata University)

16:20 **3863** Iridium Oxide pH Sensor Development and Its Application in Corrosion Study – F. Huang, Y. Jin, and L. Wen (University of Science and Technology Beijing)

16:40 **3864** Surface-enhanced Raman Scattering on Ordered Metal Nanodot Array Obtained Using Anodic Porous Alumina – T. Kondo (KAST), K. Nishio, and H. Masuda (Tokyo Metropolitan University)

17:00 **3865** Enzyme-Encapsulated Quantum Dot Hydrogels in the Development of Biosensors: A Multifunctional Platform for Both Bio-Catalysis and Fluorescent Probing – J. Yuan, N. Gaponik, and A. Eychmüller (TU Dresden)

17:20 **3866** Adaptive Chemical Sampling Device Inspired by Crayfish – R. Takemura, K. Takahashi, T. Makishita, and H. Ishida (Tokyo University of Agriculture and Technology)

17:40 **3867** Carbohydrate Immobilization on the Surface of Field Effect Transistor Biosensor for Detection of Virus-related Protein – S. Hideshima (Research Institute for Science and Engineering, Waseda University), H. Hinou (Graduate School of Life Science, Hokkaido University), D. Ebihara, R. Sato, S. Kuroiwa (Department of Applied Chemistry, Graduate School of Advanced Science and Engineering, Waseda University), S. Nishimura (Graduate School of Life Science, Hokkaido University), and T. Osaka (Waseda University)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

J1 – Poster Session – 18:00 – 20:00
Co-Chairs: J. Li and L. Nagahara

- **3868** Block Co-polymer Enhanced 3D Carbon Nanostructure Electronics – S. Guo, A. George, M. Penchev, C. Ozkan, and M. Ozkan (University of California, Riverside)
- **3869** Self-Assembled Monolayers of Oligonucleotides as Receptor Layers for Metal Ions Sensors – L. Gorski, R. Ziolkowski, and E. Malinowska (Warsaw University of Technology)
- **3870** Development of Highly-Sensitive Electrochemical Measurement System on Dry Chemistry using Ionic Liquid – S. Arimoto, M. Takahashi, A. Kamei, and T. Yoshioka (Panasonic Corporation)
- **3871** Chalcogenide Glass Chemical Sensor for Cadmium Detection in Industrial Environment – M. Milochova, M. Kassem, and E. Bychkov (University of Littoral)
- **3872** Electrochemical Pump Consisting of Cu^{2+}-Poly(acrylic acid) Gel – K. Takada, N. Yamamura, A. Hayashi, T. Yasui, and A. Yuchi (Nagoya Institute of Technology)
- **3873** The pH Sensing Characteristics of Extended-Gate Field-Effect Transistor Base on The Electrode with Copper Oxide Nanowires – Y. Huang, H. Lin, H. Li, W. Dai, C. Chou, and H. Cheng (National Chiao Tung University)
- **3874** Multiplexed Cantilever Sensors with a Peptide Receptor and Humidity Effects on Binding Kinetics – Y. Yoo, M. Chae, J. Kang, K. Hwang, T. Kim (Korea Institute of Science and Technology), and J. Lee (Kwangwoon University)
- **3875** High Sensitive Amperometric Detection of Glucose using Conductive DLC Electrode in Higher Potential Region – K. Honda, H. Naragino, K. Yoshinaga, A. Nakahara, and S. Tanaka (Yamaguchi University)
- **3876** Electrochemical Immunosensor for Diagnostic of Parasitical Human Diseases – C. A. Erdmann, J. Inaba, A. G. Viana, C. A. Pessoa, K. Wohnrath, and J. R. Garcia (State University of Ponta Grossa)
- **3877** Characterization and Electrochemical Response of Sonogel Carbon Electrode Modified with Nanostructured TiO_2 and ZrO_2 Film to Detect Common Neurotransmitters – M. Hughes, N. Vincent, and S. K. Lunsford (Wright State University)

- **3878** A Novel Approach of Pb(II) Determination in Environmental Samples by Lead Selective Electrodes – G. Lisak and J. Bobacka (Åbo Akademi University)
- **3879** Functionalization of Pyrolyzed Carbon Structures for Bio-nano-electronics Platforms – M. Hirabayashi, B. Mehta (San Diego State University), S. Kassegne (MEMS Lab, San Diego State University), and A. Khosla (Simon Fraser University)
- **3880** Micromechanical Detection of 2,4-Dinitrotoluene by a Cantilever-based Artificial Olfactory System with Micro-Preconcentrator – M. Chae, Y. Yoo (Korea Institute of Science and Technology), J. Lee (Kwangwoon University), S. Lee, J. Kang, T. Kim, and K. Hwang (Korea Institute of Science and Technology)
- **3881** Layer-by-Layer Catalytic Interface for Electrochemical Detection of Multiple Substrates Featuring Bio-Functionalized Carbon Nanotubes – J. Kirsch and A. Simonian (Auburn University)
- **3882** Improved Electrocatalytic Performance for H_2O_2 Detection Based on Bimetallic PtM (M = Pd, Au or Ir) Nanoparticles – Y. Zhang (Shanghai University), M. Janyasupab (Case Western Reserve University), C. Liu (National Central University), J. Xu (Shanghai University), and C. Liu (Case Western Reserve University)
- **3883** Superoxide Anion Radical Sensor using GC Electrode Modified with Heparin/PEDOT and Polymerized Iron Porphyrin – R. Matsuoka, T. Kondo, and M. Yuasa (Tokyo University of Science)
- **3884** Ultra-Sensitive Label-Free Detection of Proteins by Chemically Derived Graphene Based Field-Effect Transistor – D. Kim, I. Sohn, J. Jung, O. Yoon (Sungkyunkwan University), J. Park (Korea Electronics Technology Institute), and N. Lee (Sungkyunkwan University)
- **3885** New Application of Produced Pigment from Bacteria to Detect of Ammonia in Combination with Flow Injection for Ammonia Analysis – Y. Iida and I. Satoh (Kanagawa Institute of Technology)
- **3886** Preparation of Fine Implantable Needle Type Biosensors for Blood Vessel Glucose Monitoring – K. Edagawa and M. Yasuzawa (University of Tokushima)

J2 Luminescence and Display Materials: Fundamentals and Applications

Luminescence and Display Materials

323A, Level 3, Hawaii Convention Center

Phosphors for Lighting – 10:40 – 15:40
Co-Chairs: John Collins and Baldassare DiBartolo

10:40 Intermission (20 Minutes)

11:00 **3897** Novel Synthesis Methods of Silicate and Silicon Oxynitride Phosphors Using Silicon Monoxide (SiO) as a Raw Material – T. Ishigaki, T. Sakamoto, S. Kamei, K. Uematsu, K. Toda, and M. Sato (Niigata University)

11:40 **3898** Synthesis of Nitride and Oxynitride Phosphors Using Fluidized Bed Furnace – K. Toda, S. Kamei, K. Uematsu, T. Ishigaki, and M. Sato (Niigata University)

12:00 Lunch Break (120 Minutes)

14:00 **3899** Synthesis of Highly Efficient Red Phosphor $SrCaSiO_4:Eu^{2+}$ by Aqueous Solution Method – S. Tezuka, K. Hideki, Y. Takatuka, and M. Kakihana (Tohoku University)

14:20 **3900** Effects of Preparation Condition for Photoluminescent Properties of White Light Emitting Mesoporous Carbon¬-Silica Nanocomposites – Y. Ishii (Nagoya Institute of Technology), K. Sato, Y. Ishikawa (Japan Fine Ceramics Center, Mutsuno), and S. Kawasaki (Nagoya Institute of Technology)

14:40 **3901** Luminescence Properties of New Thioaluminate Phosphors $(Ba_{1-X}Sr_X)_4Al_2S_7:Eu$ – T. Hasegawa, H. Kato, M. Kobayashi, H. Yamane, and M. Kakihana (Tohoku University)

15:00 **3902** Anomalous Rare Earth Doping in Nitride and Oxynitride Phosphors – T. Takeda, R. Xie, N. Hirosaki, K. Kimoto (National Institute for Materials Science), and M. Saito (Tohoku University)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

J2 – Poster Session – 18:00 – 20:00

- **3903** Investigation of Ion Dependence of Electronic Structure for $3d^3$ Ions in Mg_2TiO_4 based on First-principles Calculations – M. Novita (Kwansei Gakuin University), H. Yoshida (Mitsubishi Chemical Group), and K. Ogasawara (Kwansei Gakuin University)
- **3904** Comparison of Simulation and Experimental Results of Crystalline Si Solar Module with $YVO_4:Bi^{3+},Eu^{3+}$ Nanophosphor Spectral Shifter – Y. Iso, S. Takeshita, and T. Isobe (Keio University)
- **3905** Simple-Structure Light-Emitting Diodes Based on a Blend of Nanocrystal Quantum Dots and ZnO – J. Kwak (Dong-A University), W. Bae (Los Alamos National Laboratory), and C. Lee (Seoul National University)
- **3906** Optimizing the Synthesis of Europium Dibenzoylmethide Triethylammonium – K. Bhat, R. Fontenot (Alabama A&M University), W. A. Hollerman (University of Louisiana at Lafayette), and M. Aggarwal (Alabama A&M University)
- **3907** Comparison of Hydrothermal and Glycothermal Syntheses of $YBO_3:Ce^{3+},Tb^{3+}$ with Green Fluorescence under Near UV Excitation – H. Hara, S. Takeshita, T. Isobe (Keio University), T. Sawayama, and S. Niikura (SINLOIHI Co., Ltd.)
- **3908** Practical Multiplet Energy Level Diagrams for V^{2+}, Cr^{3+}, Mn^{4+} in Oxides and in Fluorides – H. Nagoshi (Kwansei Gakuin University), H. Yoshida (Mitsubishi Chemical Group), and K. Ogasawara (Kwansei Gakuin University)
- **3909** The Influence of Phosphor Decay Time on the Cross-Talk in 3D-PDP – J. Yoo (Chung-Ang University), C. Ji (LG Electronics), G. Anoop, I. Cho, S. Lee (Chung-Ang University), Y. Cho, W. Kim, and E. Park (LG Electronics)

- **3910** Synthesis of InP Multi-Shell Structured Quantum Dot and Their Application for White LEDs – K. Kim and S. Jeong (Korea Institute of Machinery and Materials)
- **3911** Improved Optical Properties of InP Quantum Dot Through Transition Metal Doping – J. No, K. Kim, and S. Jeong (Korea Institute of Machinery and Materials)
- **3912** Synthesis and Spectroscopy of Nanoscale Y_2O_3:Nd^{3+} Phosphors – G. Bilir (Istanbul Technical University), G. Ozen (Instanbul Technical University), J. Collins (Wheaton College), and B. Di Bartolo (Boston College)
- **3913** Preparation and Photoluminescence Property of Praseodymium doped Calcium Titanate Nanocrystals – Y. Hakuta (National Institute of Advanced Industrial Science and Technology (AIST)), M. Ohara, M. Aoki, K. MInami, K. Sue, and H. Takashima (AIST)
- **3914** Effects of Preparing Conditions on the Luminescent Properties of Mn^{4+} Ion Doped $CaAl_4O_7$ Phosphors – J. Park, G. Kim, and Y. Kim (Kyonggi University)
- **3915** The Luminescent Properties of Eu^{2+} Doped Ca_2SiO_4 Nanopowders Synthesized by a Sol-Gel Method – J. Park, J. Lee, and Y. Kim (Kyonggi University)
- **3916** 3D Visualization of 4-Component Relativistic Wave Functions of the Free Ce^{3+} Ion and the Ce^{3+} Ion in YAG – T. Katakami, K. Higashiura, and K. Ogasawara (Kwansei Gakuin University)
- **3917** Low Electric Field Driving Transparent Thin Films Electroluminescence Devices with Perovskite Oxides – H. Takashima (National Institute of Advanced Industrial Science and Technology) and I. Mitsuru (Tokyo Institute Technology)
- **3918** Luminescence study of $Ca_{3-3x/2}(VO4)_2$:xEu ($0.01 \leq x \leq 0.09$) Red-Phosphors Prepared by Solution Combustion Method – K. Kim, S. Yoon (Sejong University), Y. Shin (Ceronics), and K. Park (Sejong University)
- **3919** Microstructure and Photoluminescence Properties of $Sr_{2.91}V_2O_8$:$Eu_{0.06}$ Phosphors Prepared by the Solution Combustion Method – K. Park, S. Yoon, K. Kim (Sejong University), and Y. Shin (Ceronics)
- **3920** Electroluminescence from Cr^{3+} in New Perovskite Thin-Film Phosphors using $LaAlO_3$ and $LaGaO_3$ as the Host – T. Miyata, Y. Nishi, T. Mori, and T. Minami (Kanazawa Institute of Technology)
- **3921** Development of Novel Electrochromic Hyperbranched Polymer for Displays – S. Kim (Kumamoto University), A. Tanaka (Nissan Chemical Industries, Ltd.,), and T. Nagamura (Kitakyushu National College of Technology (KCT))
- **3922** Electric and Electroluminescence Properties of $Ca_{0.6}Sr_{0.4}TiO_3$:Pr Thin Films Prepared by Sol-Gel Method – T. Kyomen, M. Hanaya (Gunma University), and H. Takashima (National Institute of Advanced Industrial Science and Technology)
- **3923** Optical Phonon Emission of ZnO Thin Films – S. Munisamy, S. Kasilingam (Nagoya Institute of Technology), T. Rajalingam (National Chaio Tung University), and T. Masaki (Nagoya Institute of Technology)
- **3924** Synthesis of $Sr_2Si_5N_8$:Eu^{2+} Red-Emitting Phosphor by Induction Heating – J. Choi (University of California, San Diego), A. Piquette, M. Hannah, K. C. Mishra (Osram Sylvania), J. B. Talbot, and J. McKittrick (University of California, San Diego)
- **3925** Morphology and Particle Size Dependent Luminescence Properties of Y_2O_3:Eu Phosphors Prepared by Various Synthetic Methods – Y. Kim, J. Han, J. Talbot, and J. Mckittrick (University of California, San Diego)

J3 Materials for Solid State Lighting

Luminescence and Display Materials / New Technology Subcommittee

316B, Level 3, Hawaii Convention Center

Oxide and Oxynitrides – 08:00 – 09:40
Co-Chairs: Kyota Ueda and John Collins

08:00 **3969** Synthesis, Luminescence Mechanism and Application of β-sialon Green Phosphor with Sharp Line-Width – K. Takahashi, K. Yoshimura, M. Harada, Y. Tomomura (Sharp), T. Takeda, R. Xie, and N. Hirosaki (National Institute for Materials Science)

08:40 **3970** Synthesis and Luminescence of Eu^{2+} Activated Yellow Oxynitride Phosphor – P. Nammalwar, S. Manepalli, D. Porob (GE ITC Pvt Ltd), Y. Gao, and A. Setlur (GE Global Research Niskayuna)

09:00 **3971** Sr-Containing Sialon Phosphors with High Quantum Efficiencies for White LEDs – Y. Fukuda, K. Albessard, A. Okada, T. Sato, R. Hiramatsu, and N. Matsuda (Toshiba Corporation)

Oxide Materials – 09:40 – 10:40
Co-Chairs: Naotoshi Matsuda and Kailash Mishra

09:40 **3972** Bandgap Estimates and Ce^{3+} Quenching in Cs_3CoCl_5-based Phosphors – U. Happek (University of Georgia) and A. Setlur (GE Global Research Niskayuna)

10:00 **3973** Single Phase, Highly Efficient $Li(Ca_{0.99-x}Sr_xEu_{0.01})PO_4$ Blue Emitting Phosphors for Near UV-Emitting LEDs – J. Han (University of California, San Diego), M. Hannah, A. Piquette (Osram Sylvania), J. Talbot (University of California, San Diego), K. C. Mishra (Osram Sylvania), and J. Mckittrick (University of California, San Diego)

10:20 **3974** Luminescence Quenching in Highly Doped YAG:Ce – A. Setlur (GE Global Research), M. Pasricha, M. Perera, G. Levitt, and U. O. Happek (The University of Georgia)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

J3 – Poster Session – 18:00 – 20:00

- **3975** Enhancement of Photoluminescence Properties of Green-Emitting Oxynitride Phosphor using Eu_2O_3@B_2O_3 Core-Shell for White LED Applications – D. Yoon (SungKyunKwan University)

- **3976** Silica-Overcoated Copper-Indium-Sulfide Quantum Dot-Polymer Composite Plate as a Robust Wavelength Converter of White Light-Emitting Diode – W. Song, E. Jang, and H. Yang (Hongik University)
- **3977** Tunable Green-Red- Emitting $Ca_{14}Mg_2[SiO_4]_8:Eu^{2+}$,Mn^{2+} Phosphor : the Structural and Optical Properties, and Their Application to Near-UV LED-based White LEDs – K. Lee and W. Im (Chonnam National University)
- **3978** The Formation of the Hexagonal Pyramid Facets on Wet Etching Patterned Sapphire Substrate – Y. Chen (Nation Chiao Tung University), F. Hsiao, and Y. Wu (National Chiao Tung University)
- **3979** High Brightness III – V Light-Emitting Diodes on Diamond/Silicon Composite Substrate – T. Chang, J. Hu (Nation Chiao Tung University), Y. Wu, and B. Lin (National Chiao Tung University)
- **3980** Organic Light-Emitting Diodes with Contact-Printed Red Emissive Layer – S. Peng, J. Jou, S. Chen, and P. Wu (National Tsing Hua University)
- **3981** Color Tuning of Red-Emission $Eu_{1-x}Ba_xSi_2O_2N_2$ Phosphors for White-Light-Emitting Diode – K. Park, K. Seo, J. Kim (Pukyong National University), T. Kim (Lumimicro Co., LTD), and G. Kim (Korea University of Technology and Education)
- **3982** Blue Excitability of Yellow Zn_{1-x} Mn_xS Phosphor and It's LED Application – K. Park, K. Seo, H. Lim, J. Kim (Pukyong National University), T. Kim (Lumimicro Co., LTD), and G. Kim (Korea University of Technology and Education)
- **3983** Green $CaSc_2O_4$: Ce^{3+} Phosphor for White-Light-Emitting Diode – K. Park, K. Seo, S. Lim, H. Lim, J. Lim, J. Kim, L. Jiang, J. Kim (Pukyong National University), T. Kim (Lumimicro Co., LTD), and G. Kim (Korea University of Technology and Education)
- **3984** Luminescence Properties and Stability Improvement by SiO_2 Coating on Various Phosphors for Near UV-Emitting LEDs – J. Han (University of California, San Diego), M. Hannah, A. Piquette (Osram Sylvania), J. Talbot (University of California, San Diego), K. C. Mishra (Osram Sylvania), and J. Mckittrick (University of California, San Diego)

Wednesday, October 10

09:00h..... Technical Exhibit

09:00h..... Professional Development Series: Career Fair

09:30h..... Technical Session Coffee Break

18:00h..... General Poster Session

A2 Nanotechnology General Session

All Divisions / New Technology Subcommittee

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

A2 – Nanotechnology General Session Poster Session – 18:00 – 20:00
Co-Chairs: Fanglin (Frank) Chen, Oana Leonte, Sirikanda Nuansaeng, and William Mustain

- **269** Functionalized Nanoporous Membrane Electrodes for ASV Analysis of Water – H. Bessbousse, T. Wade, and M. Clochard (CEA-CNRS-Ecole Polytechnique)
- **270** Silicon Nanowire Based Thermoelectric Device – M. Jang, Y. Park, Y. Hyun (ETRI), W. Choi (KAIST), and T. Zyung (ETRI)
- **271** Studies of Boron Diffusivities on (001) and (110) Substrate Orientation in Si and Ge along Vertical/Out-Of Plane and Lateral/In-Plane Directions by SIMS and C-V Measurement on the Designed Test Pattern – M. Liao, C. Chen, L. Chang, C. Yang (National Taiwan University), C. Hsieh (Industrial Technology Research Institute), and M. Lee (National Taiwan Normal University)
- **272** Measurement of the Band Gap of Amorphous Silicon Based Thin Film with STEM-EELS – T. Motoya, T. Furuhata (Mitsubisi Electric Corporation), and H. Kurata (Kyoto University)
- **273** Electrical Properties and Microstructures of ZnO:Ga Films Formed by Magnetron Sputtering – N. Yamamoto, K. Morisawa, H. Makino, and T. Yamamoto (Kochi University of Technology)
- **274** Size effect on Photocatalytic Activity of Magnetite Nanoparticles under Visible-Light Irradiation – Y. Chen (National Cheng Kung University)
- **275** Liquid Phase Synthesis of Quantum Dots without Rare Metals and Toxic Elements – T. Makimura, S. Takeshita, and T. Isobe (Keio University)
- **276** Diameter-Dependent Performance of the Metal Oxide Nanowire Lithium-Ion Battery Anodes Controlled by a Simple Contact Printing Method – S. Lee, J. Kim, and W. Kim (Gwagnju Institute of Science and Technology)
- **277** Quantum Chemical Molecular Dynamics Simulations of Mechano-Chemical Reactions during Copper Chemical Mechanical Polishing Processes – K. Kawaguchi, T. Ishikawa, Y. Higuchi, N. Ozawa, T. Shimazaki, and M. Kubo (Tohoku University)

- **278** Surface Potential Measurement of PCBM/CuPc Films on Indium Tin Oxide Electrode by DFM/KPFM – N. Satoh (Chiba Intitute of Technology), S. Katori, K. Kobayashi, K. Matsushige, and H. Yamada (Kyoto University)
- **279** Template-Free Electrochemical Growth of One-Dimensional Metal Nanostructures – S. Park (University of Science and Technology), H. Shin, Y. Kim (Korea Research Institute of Standards and Science), H. Park (University of Science and Technology), and J. Song (Korea Research Institute of Standards and Science)
- **280** First-Principles Calculations on the Chemical Mechanical Polishing Mechanism of SiO_2 Glasses by $CaZrO_3$ and $SrFeO_3$ Abrasive Particles – M. Nakamura, T. Ishikawa, Y. Higuchi, N. Ozawa, T. Shimazaki, and M. Kubo (Tohoku University)
- **281** Synthesis and Characterization of Mesoporous Silica-Magnetite Nanocomposites – J. Lee, M. Yoon, and H. Hwang (Inha University)
- **282** Nitrogen Incorporated Ultrananocrystalline Diamond/Nonhydrogenated Amorphous Carbon Composite Films Prepared by Pulsed Laser Deposition – S. S. Al-Riyami and T. Yoshitake (Kyushu University)
- **283** Development of High Efficient Sulfur-Doped TiO_2 Photocatalysts Hybridized with Graphitic Carbon Nitride – K. Kondo, N. Murakami, and T. Ohno (Kyushu Institute of Technology)
- **284** Tight-Binding Quantum Chemical Molecular Dynamics and First-Principles Molecular Dynamics Studies of Super-Low Friction Mechanism on Carbon Nitride Coatings – S. Sato, S. Bai, T. Ishikawa, Y. Higuchi, N. Ozawa, T. Shimazaki, K. Adachi (Tohoku University), J. Martin (Ecole Centrale de Lyon), and M. Kubo (Tohoku University)
- **285** Preparation of Au Nano or Micro Pattern on Hydrogels for Optical Applications – N. Shimamoto, Y. Tanaka, H. Mitomo (Hokkaido University), R. Kawamura (Riken), K. Ijiro, K. Sasaki (Hokkaido University), and Y. Osada (Riken)
- **286** Polymer-Nanocrystal Composites for Electrochromic Devices – E. Runnerstrom, G. Garcia, R. Buonsanti, A. Llordes, T. Pick, B. Helms, and D. Milliron (Lawrence Berkeley National Laboratory)
- **287** Visible Light Response of Shape Controlled Rutile TiO_2 Nanorod Photocatalyst by LSPR Absorption – A. Tanibata, N. Murakami, and T. Ohno (Kyushu Institute of Technology)
- **288** Effect of Sintering Temperature on the Microstructure of Nanocrystalline Ni-yttria Stabilized Zirconia Cermets – K. Park, J. Kim, C. Kim (Sejong University), S. Nam, K. Cho, and J. Choi (Samchun Pure Chemical Co.)
- **289** Synthesis, Characterization and Electrochemical Property of Graphene-Doped $LiFePO_4$ Cathode Material – H. V. Nguyen, E. Jin, and H. Gu (Chonnam National University)
- **290** Electrochemical Characteristics of Zn Doped TiO_2 for Dye-Sensitized Solar Cells – E. Jin, X. Zhao, H. V. Nguyen, and H. Gu (Chonnam National University)
- **291** Electrochemical Properties of Quasi-Solid Electrolyte Containing Graphene Oxide Dye Sensitized Solar Cell – X. Zhao, E. Jin, and H. Gu (Chonnam National University)
- **292** Electrochemical Characteristics of ZrO_2 Nanofiber added TiO_2 for Dye-Sensitized Solar Cells – E. Jin, W. Wang (Chonnam National University), J. Park (Southwestern Research Institute of Green Energy Technology), and H. Gu (Chonnam National University)
- **293** Fabrication of Dye-Sensitized Solar Cell with Community of Electrolyte and Pt Counter Electrode – X. Zhao, E. Jin, and H. Gu (Chonnam National University)
- **294** New Prepared TiO_2 was used in Photoelectrode with High Efficiency on Dye-Sensitised Solar Cells – W. Wang, E. Jin, and H. Gu (Chonnam National University)
- **295** Densification and Crystallization of Conducting $La_{0.7}Sr_{0.3}VO_3$ Nanopowder Derived from Hydrothermal Process – K. Fung, C. Cho, C. Liu, C. Ni, and S. Tsai (National Cheng Kung University)
- **296** Gallium Phosphide Nanowires for Solar Energy Conversion – W. Wen and S. Maldonado (University of Michigan)
- **297** *In Situ* Monitoring of Photodegradation of Methylene Blue on Recyclable Gold Modified TiO_2 Nanotube (TiO_2-NTs) Arrays by Using Surface-Enhanced Raman Scattering – R. Li and A. Zhou (Utah State University)
- **298** Controllable Variable Memory States Using Capacitive Coupling of Trapped Electrons – M. Lee, Y. Kim, and J. Lee (Kookmin University)
- **299** Electrical Conductivity and Microstructure of NiO-CGO Composites Prepared By One Step Synthesis – D. A. Macedo (Federal University of Rio Grande do Norte), F. M. Figueiredo, S. G. Patrício (University of Aveiro), R. M. Nascimento, A. E. Martinelli, C. A. Paskocimas (Federal University of Rio Grande do Norte), and F. M. Marques (University of Aveiro)
- **300** Toxicity Assay-On-Chip for Engineered Nanomaterials – K. Garde and S. Aravamudhan (North Carolina A&T State University)
- **301** n-Type Ultrananocrystalline Diamond/Hydrogenated Amorphous Carbon Composite Films Prepared by Pulsed Laser Deposition – S. Al-Riyami (Kyushu University), H. Setoyama, K. Sumitani, Y. Hirai (Kyushu Synchrotron Light Research Center), and T. Yoshitake (Kyushu University)
- **302** Active Targeting, Fluorescence Imaging, and NIR Photothermal Therapy of Malignant Tumors – H. Green, E. Rosenthal, C. Rodenburg, D. Martyshkin, S. Mirov, and W. Grizzle (The University of Alabama at Birmingham)

A3 Contemporary Issues and Case Studies in Electrochemical Innovation

All Divisions / New Technology Subcommittee

306B, Level 3, Hawaii Convention Center

Co-Chairs: E. J. Taylor and C. Bock

08:00 **303** (Invited) Addressing a Medical Need: Introduction of the Battery for the Implantable Cardiac Defibrillator – E. S. Takeuchi, A. C. Marschilok, and K. J. Takeuchi (Stony Brook University)

08:40 **304** Fuel Cell Technology Readiness – S. Petrovic (Oregon Institute of Technology)

09:00 **305** Catalysis Research for Polymer Electrolyte Fuel Cell (CaRPE-FC): A Case Study on an Academic Led, Tri-Party Research Program in Canada – T. Navessin (Blueprime Technology Consulting) and S. Holdcroft (Simon Fraser University)

09:20 **306** (Invited) Next Generation Heavy Duty Bus Fuel Cells: An Industry-Academic Collaboration – S. Knights (Ballard Power Systems), E. Kjeang, S. Holdcroft, K. Malek (Simon Fraser University), J. Kolodziej, M. Lauritzen, M. Watson, and J. DeVaal (Ballard Power Systems)

09:40 Intermission (20 Minutes)

10:00 **307** (Invited) Academia-Industry Synergy for Innovative PEFC Catalyst Layer and its Materials – A. Ohma (Nissan Motor Co., Ltd.)

10:20 **308** Creating a Sustainable Business in the Hydrogen and Fuel Cell Market – K. E. Ayers, E. B. Anderson, C. B. Capuano, L. T. Dalton, and A. Roemer (Proton OnSite)

10:40 **309** DMFC Power Modules for Materials Handling Vehicles – J. Mergel (Forschungszentrum Jülich)

11:00 **310** Technology Transfer between University and Industry in Uzbekistan: Techno Park Model – N. Mahamatov (Turin Polytechnic University in Tashkent)

11:20 **311** Electrochemical Discrimination of Ascorbic Acid Diastereomers Using Dihydroxyalkanedithiol-modified Au Electrode – M. Komatsu, T. Ando, and S. Suzuki (Tokai University)

11:40 **312** Through the Looking Glass: A Journey into Innovation – R. Jalan (ElectroChem, Inc.)

Co-Chairs: K. Malek and M. Inman

14:00 **313** (Invited) From Lab Bench to Marketplace: Building New Electrochemical Technologies – Y. Chiang (Massachusetts Institute of Technology)

14:20 **314** Turning the Tides: New Mexico Materials for Japanese Cars – P. Atanassov (The University of New Mexico)

14:40 **315** A Case Study of Technological Innovation Related to ElectroPolishing of Stainless Steel Valves and Fittings – E. J. Taylor and M. Inman (Faraday Technology Inc.)

15:00 Intermission (20 Minutes)

15:20 **316** Electrochemical Cesium Recovery Using Nanoparticle Film of Copper Hexacyanoferrate – H. Tanaka, R. Chen, C. Fukushima, M. Asai, T. Kawamoto (AIST), M. Kurihara (Yamagata University), M. Arisaka, T. Nankawa, and M. Watanabe (Japan Atomic Energy Agency)

15:40 **317** Integration of a New Electroplated Magnetic Alloy with Power Semiconductor Wafer Manufacturing Processes – T. Liakopoulos (Enpirion Inc.), A. Panda, M. Wilkowski, and A. Lotfi (Enpirion Inc)

16:00 **318** A Novel Technique of Quantifying Micro Insulation Defects on Grain-Oriented Electrical Steel Using the Scanning Vibrating Electrode Technique – L. T. Cassemis, J. H. Sullivan (Swansea University), and D. Power (Orb Works-Tata Steel)

16:20 **319** Role of Dimensional Parameters for Determination of Diffusion Coefficient (D) and Surface Exchange Coefficient (K) Case Study for Oxygen Storage Materials, Electrode Materials for SOFCs, and Materials for Li-Ion and Na Batteries – K. Zheng, D. Baster, J. Molenda, and K. Swierczek (AGH University of Science and Technology)

B1 Batteries and Energy Technology Joint General Session – In Honor of James McBreen

Battery / Energy Technology

Coral 1, Mid-Pacific Conference Center, Hilton Hawaiian Village

Flow Battery Membrane – 08:00 – 12:00
Co-Chairs: M. Hickner and Alex Papandrew

08:00 **402** Polymer Membrane for Redox Flow Battery Application – D. Kim, E. Mi Choi, E. Kang, and K. Kang (Honam Petrochemical Corp.)

08:20 **403** Role of Membrane Properties on Species Crossover and Capacity Loss of a Vanadium Redox Flow Battery – K. W. Knehr, E. Agar, C. R. Dennison, A. R. Kalidindi (Drexel University), D. Chen, M. Hickner (The Pennsylvania State University), and E. C. Kumbur (Drexel University)

08:40 **404** Redox Flow Battery in Combination with Hydrogen Evolution/Oxidation Electrode – Z. Siroma, S. Yamazaki, M. Yao, N. Fujiwara, M. Asahi, and T. Ioroi (National Institute of Advanced Industrial Science and Technology)

09:00 **405** Nonaqueous Redox Flow Battery Development at Pacific Northwest National Laboratory – W. Wang, W. Xu, L. Cosimbescu, D. Choi, L. Li, and Z. Yang (Pacific Northwest National Laboratory)

09:20 **406** Effect of Porous Electrode Configuration on Redox Flow Battery Performance – S. Kim (Pacific Northwest National Laboratory), D. Stephenson (Brigham Young University), G. Xia, Z. Nie, and V. Sprenkle (Pacific Northwest National Laboratory)

09:40 Intermission (20 Minutes)

10:00 **407** Vanadium Redox Flow Battery Efficiency and Durability Studies of Sulfonated Diels Alder Poly(Phenylene)s – C. H. Fujimoto (Sandia National Laboratories), S. Kim (Pacific Northwest National Laboratory), R. Stanis (Gas Technology Institute), and M. Hickner (The Pennsylvania State University)

10:20 **408** Direct Measurement of Vanadium Crossover in an Operating Vanadium Redox Flow Battery – D. C. Sing and J. P. Meyers (The University of Texas at Austin)

10:40 **409** Component Optimization for High Performance Redox Flow Batteries – S. Kim (Pacific Northwest National Laboratory), D. Chen (The Pennsylvania State University), Z. Nie (Pacific Northwest National Laboratory), M. Hickner (The Pennsylvania State University), C. H. Fujimoto (Sandia National Laboratories), and V. Sprenkle (Pacific Northwest National Laboratory)

11:00 **410** Redox-Active Organic Molecules for Non-Aqueous Flow Batteries – F. R. Brushett, L. Zhang, J. T. Vaughey, and A. N. Jansen (Argonne National Laboratory)

11:20 **411** Crossover Measurements for Vanadium Redox Flow Batteries Using Electron Spin Resonance – J. S. Lawton, A. M. Jones, D. S. Aaron, Z. Tang (The University of Tennessee Knoxville), A. Papandrew, and T. A. Zawodzinski Jr. (The University of Tennessee)

11:40 **412** Cationic Uptake Influence on PFSA Membrane Performance in Vanadium Redox Flow Battery – Z. Tang, J. S. Lawton, D. S. Aaron (The University of Tennessee Knoxville), A. Papandrew, and T. A. Zawodzinski Jr. (The University of Tennessee)

Coral 2, Mid-Pacific Conference Center, Hilton Hawaiian Village

Solid Oxide Fuel Cells I – 08:00 – 11:40
Co-Chairs: J. S. Hardy and Ryan O'Hare

08:00 **413** Fabrication and Performance Evaluation of Direct Methane Fueled Ni-GDC Anode-Supported SOFC Unit Cells Operated at Intermediate Temperature (650°C) – H. Ko, J. Myung, J. Lee, and S. Hyun (Yonsei University)

08:20 **414** Effects of Sn-Doped Ni-Based Anodes on Performance and Durability of CH_4-Fueled SOFCs – J. Myung, H. Ko, J. Lee, and S. Hyun (Yonsei University)

08:40 **415** Enhanced Densification of SDC Barrier Layers on Anode Supported Solid Oxide Fuel Cells – J. W. Templeton (Pacific Northwest National Laboratory), Z. Lu (Praxair Inc.), J. S. Hardy, and J. W. Stevenson (Pacific Northwest National Laboratory)

09:00 **416** Tubular Segmented-in-Series Solid Oxide Fuel Cell with Metallic Interconnect Films: Performance Study through Mathematical Modeling – J. Lee, B. Son, S. Park, S. Lee, T. Lim, and R. Song (Korea Institute of Energy Research)

09:20 **417** Anode-Supported Flat-Tubular SOFCs with Ag-Infiltrated Cathodes: Performance and Durability – R. Song, J. Lee, S. Lee, T. Lim, and S. Park (Korea Institute of Energy Research)

09:40 Intermission (20 Minutes)

10:00 **418** Non Noble Metal Thin Film Solid Oxide Fuel Cell – I. Chang, S. Ji, Y. Lee, and S. Cha (Seoul National University)

10:20 **419** Sputtered Thin Film Pt vs LSCF for Low Temperature Solid Oxide Fuel Cells – Y. Lee, I. Chang, S. Ji, and S. Cha (Seoul National University)

10:40 **420** Enhanced Oxide Ion Kinetics in Low-Temperature Solid Oxide Fuel Cells by Atomic Layer Deposited Cermet Interlayer – J. An, Y. Kim, T. M. Gür, and F. B. Prinz (Stanford University)

11:00 **421** Performance and Stability of Zn-Doped BSCF Cathode for IT-SOFCs – D. Jung, H. Park, J. Kim, K. Moon, S. Seo, and C. Kwak (Samsung Advanced Institute of Technology)

11:20 **422** Fabrication of Ni-YSZ Nano-Composite Electrode for Solid Oxide Fuel Cells via Thin Film Technique – G. Cho, Y. Lee, J. Choi, and S. Cha (Seoul National University)

Coral 1, Mid-Pacific Conference Center, Hilton Hawaiian Village

Fuel Cell/Energy Conversion – 14:00 – 17:00
Co-Chairs: S. Mukerjee and Aswin Manohar

14:00 **423** A New-Style Energy Conversion Scheme: Photo-Assist Fuel Cell Based on Titania Nanotube Arrays – P. Xiao, H. He, F. Liu, and Y. Zhang (Chongqing University)

14:20 **424** CdS/CdSe Co-Sensitized Quantum Dots Solar Cells with Different Density of ZnO Nanowire Arrays – J. Tian, Z. Liang, R. Gao, Q. Zhang, and G. Cao (University of Washington)

14:40 **425** Regenerative Fuel Cells for Grid Applications – V. Yufit and N. Brandon (Imperial College London)

15:00 **426** The Hydrogen Fuel Cell Vehicles Powertrain Possible Roles in the Post Kyoto Perspective in the Pacific RIM Area – M. Romeri (Independent Consultant)

15:20 **427** Preparation and Characterization of Ti Based Supports for Electrochemical Energy Conversion Devices – S. Siracusano, A. Stassi, E. Modica, V. Baglio, and A. Aricò (CNR-ITAE)

15:40 Intermission (20 Minutes)

16:00 **428** Understanding Oxygen Reduction in Complex Metal Organic and Inorganic Composites for Fuel Cell, Electrolyzer and Energy Storage Applications – S. Mukerjee (Northeastern University), T. M. Arruda (Oak Ridge National Laboratory), K. Abraham, M. Trahan, and N. Ramaswamy (Northeastern University)

16:20 **429** Electrochemical Reactions on Oriented Pt-V and Pt-Ni-V Metal Alloy Thin Films – C. C. Hays, M. A. Johnson, P. Bahrami, J. G. Kulleck, and H. Greer (California Institute of Technology)

16:40 **430** Remote Performance Monitoring of Photovoltaic Systems with Battery Storage – S. Petrovic, G. Kirby, J. Bockelman, M. Payne, J. Fuscaldo, N. Oester, J. Belanger, and P. Lackey (Oregon Institute of Technology)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

B1 – Poster Session – 18:00 – 20:00

- **431** Electrical Explosion Synthesis of Si/C Nanocomposites for Li Secondary Batteries – D. Kim, Y. Ha, C. Cho, H. Choi, S. Choi, and C. Doh (Korea Electrotechnology Research Institute)
- **432** Modifications in Nernst-Planck Equation for Solid State Electrochemistry in the 21st Century – T. Miyashita (Miyashita Clinic)
- **433** Composite Cathodes Based on $Sm_{0.5}Sr_{0.5}CoO_{3-\delta}$ for Anode Supported Solid Oxide Fuel Cells – H. Kim (Yeungnam University) and Y. Park (Research Institute of Industrial Science and Technology)
- **434** Surface Modification of Si/C Composite Materials for Improving Distribution of Si Nano-Particles – H. Seo, K. Kim (Korea University), and C. Yi (Sungshin Women's University)
- **435** Fe-Substituted $Li_3V_2(PO_4)_3$ as High Rate Cathode Materials for Li-Ion Batteries – S. Wu, M. Chen, W. Pang, and F. Liu (Tatung University)
- **436** Lithium-Sulfur Battery Development – S. Urbonaite (Paul Scherrer Institute), A. Garsuch (BASF SE), and P. Novák (Paul Scherrer Institute)
- **437** Effect of Synthesis Method on the Activity of Carbon-Supported Copper Catalysts toward CO_2 Electroreduction – B. Spigarelli, Z. Wang, W. Li (Michigan Technological University), and O. A. Baturina (Naval Research Laboratory)
- **438** The Comparative Performance of Carbon Felt Electrodes for Vanadium-Redox Flow Batteries According to Surface Treatment and Heat Treatment Conditions – T. Jung, S. Kim, H. Jeon, K. Kwon, and H. Lee (Hyundai Heavy Industries)
- **439** Performance Test of a Direct Methanol Fuel Cell and $LiFePO_4$ Battery Hybrid Electric Vehicles – B. Lee, D. Peck, S. Kim, S. Lim, and D. Jung (Korea Institute of Energy Research)
- **440** Tape Casting, Lamination and Sintering of Calcium-Doped Lanthanum Chromite for SOFC Interconnects – D. Hernandez Rubio, A. C. Hoffmann (University of Bergen), E. Dorolti (Babes-Bolyai University), and C. Suciu (University of Bergen)
- **441** Three-Dimensional Modeling on the effect of Active Cooling for a Lithium-Ion Battery Pack – J. Yi, C. Shin (Ajou University), Y. Hong, and C. Kim (EIG Ltd.)
- **442** A Novel SOFC Anode Material: Cu Doped $La_{0.75}Sr_{0.25}Cr_{0.5}Mn_{0.5}O_{3-\delta}$ – L. Sun, Y. Yin, T. Ze, and Z. Ma (Shanghai Jiao Tong University)
- **443** Performances of Aqueous Lithium-Ion Battery with Hydrogel Electrolyte – K. Nakamoto, S. Park, S. Okada (Kyushu University), and S. Mitsui (Nissan Chemical Industries, Ltd.)
- **444** Synthesis of Highly Redox Stable Double-Perovskite Oxide $Sr_2MgMoO_{6-\delta}$ in Air – J. Yin, Y. Yin, Z. Tong, and Z. Ma (Shanghai Jiao Tong University)
- **445** Atomic Layer Deposition of Platinum Electrodes for LT-SOFCs – Y. Kim, J. An, and F. B. Prinz (Stanford University)
- **446** Physico-Chemical and Electrochemical Properties of Ni Perovskite Solid Oxide Fuel Cell Anode for Glycerol Oxidation – G. Monforte, M. Lo Faro, M. Minutoli, V. Antonucci, and A. Aricò (CNR-ITAE)
- **447** Application of Anion-Exchange Membranes for Vanadium Redox Flow Battery – J. Shim, J. Jeon, S. Park, B. Lee, and K. Shin (Korea Institute of Energy Research)
- **448** Synthesis and Physical Properties of Proton Conductors, $A\text{-}Mg(PO_3)_3 \cdot yH_2O$ (A : Li^+, Na^+, K^+, Rb^+, Cs^+ and NH_4^+) – M. Hirayama, Y. Matsuda (Tokyo Institute of Technology), M. Yonemura (High Energy Accelerator Research Organization), and R. Kanno (Tokyo Institute of Technology)
- **449** Acetylene Black Modified 3D SnS_2 Nanoflowers with High Electrochemical Performance for Lithium-Ion Battery – M. He, L. Yuan, and Y. Huang (Huazhong University of Science and Technology)
- **450** Electrochemical Properties of NAFION Coated Hydriding Combustion Synthesized Mg Based Alloy – S. Kim, M. Chourashiya, C. Park, and C. Park (Chonnam National University)
- **451** Preparation of $Ni(OH)_2$ Nanowall/Ni Electrode and Its Application in Lithium-Ion Battery – T. Li, S. Ni, and X. Yang (Three Gorges University)
- **452** A One-Dimensional Model for Air-Breathing Direct Methanol Fuel Cells – J. Park (Seoul National University), S. Ha (Nanyang Technological University), and S. Cha (Seoul National University)
- **453** Novel Synthesis of SnO_2/Graphite Composite as Anode Material for Lithium-Ion Batteries – Y. Zhou, X. Yang, and S. Ni (Three Gorges University)
- **454** Preparation of 3D Porous Silicon Powders with Fluoride-Free Technology – C. Shi, X. Yang, D. Yu, and L. Zhang (Three Gorges University)
- **455** Preparation of Chitosan /GPTMS Anion-Exchange Membranes via the Sol-Gel Routes for Vanadium Redox Flow Battery Applications – Y. Huang, S. Huang, K. Hsueh, and B. Wong (National United University)
- **456** Electrochemical Properties of MnO_2/Carbon Composites by Microwave Heating – Y. Chun (Korea Institute of Energy Research)
- **457** Study of the Kinetics of Vanadium (II)/(III) Redox Reaction – H. Yang, K. Hsueh (National United University), C. Hsieh (Institute of Nuclear Energy Research), and J. Hung (National United University)
- **458** Membrane Permeability Measurement of Vanadium Ions – C. Wu (Industrial Technology Research Institute), Y. Huang, Y. Chiu, S. Huang, and K. Hsueh (National United University)
- **459** Function and Performance of the Separator Membrane in Red-Ox Flow Batteries and Why Proton Exchange Based Membrane Might Not Be the Best Choice – K. A. Lewinski (3M)
- **460** A Numerical Study of the Electrochemical Performance with the Electrolytic Flow Conditions in Vanadium Redox Flow Battery – J. Kim (Hyundai Heavy Industries Co. Ltd.) and H. Lee (Hyundai Heavy Industries)

• **461** A Novel High Power – Long Cycle Life Energy Storage System for Large-Scale Applications – H. Jin, D. Ren (National Institute of Clean-and-Low-Carbon Energy), G. H. Brilmyer (Batt-Tek Consulting LLC), and M. T. Nispel (Sierra Power Group)

B2 Electrochemical Capacitors

Battery / Physical and Analytical Electrochemistry
South Pacific 4, Mid-Pacific Conference Center, Hilton Hawaiian Village

Devices and Applications I – 08:00 – 09:40
Co-Chairs: E. Frackowiak and K. Naoi

08:00 **515** Advanced Capacitors for Next Generation and Their R&D of Material in Nippon Chemi-Con – K. Tamamitsu, S. Suematsu (Nippon Chemi-con Corp.), S. Ishimoto, and H. Uchi (Nippon Chemi-Con Corporation)

08:40 **516** Electrochemical Capacitor Usable Power for Hybrid Electric Vehicle Applications as Determined from Transient Electrical Response – D. A. Corrigan, C. Fortin, and A. Zabik (Wayne State University)

09:00 **517** Characteristics of Electric Double Layer Capacitor Based on an Electrode Utilizing SWCNT on "Three-Dimensional Porous Aluminum" – Improvement of Electric Performance at Low Temperature – D. Iida, T. Noguchi, M. Kuramoto (Meidensha Corporation), K. Okuno, A. Hosoe, M. Majima, and Y. Nakai (Sumitomo Electric Industries Ltd.)

09:20 **518** A New Aqueous Hybrid Electrochemical Capacitor with a 4 V Operating Voltage – W. Sugimoto, T. Ban, Y. Shinohara, S. Makino, and W. Shimizu (Shinshu University)

Devices and Applications II – 10:00 – 12:00
Co-Chairs: K. B. Kim and J. Miller

10:00 **519** The Next Generation "Nanohybrid" and "SuperRedox" Capacitors – K. Naoi (Tokyo University of Agriculture and Technology)

10:20 **520** Development and Evaluation of an Asymmetric Capacitor with a Nickel/Carbon Foam Positive Electrode – B. C. Cornilsen, J. Wang, P. Sasthan Kuttipillai, T. N. Rogers, W. Yeo, M. B. Chye, and A. Singh Bhatia (Michigan Technological University)

10:40 **521** Asymmetric Supercapacitors Consisting of a Graphene-Based Anode and Oxide-Based Cathodes in Aqueous Electrolytes – C. Hu, C. Liu, C. Chen, T. Wu, and K. Chang (National Tsing Hua University)

11:00 **522** Testing of MnO_2 Aqueous Hybrid Supercapacitors under Extreme Climatic Conditions – A. J. Roberts and R. Slade (University of Surrey)

11:20 **523** Structured EDLC Electrode with Through-Plane Microchannel – T. Okura, A. Morimoto, G. Inoue, and M. Kawase (Kyoto University)

11:40 **524** Tailoring Carbons for Energy Storage Via Hydrogen Evolution and Capture under Anodic Biasing Conditions in Neutral pH Aqueous Electrolytes – S. Chun (Carnegie Mellon University), S. Shanbhag (Aquion Energy), and J. F. Whitacre (Carnegie Mellon University)

Young Investigators – 14:00 – 16:20
Co-Chairs: P. Simon and Y.-Y. Xia

14:00 **525** Understanding the Charging Mechanism of Nanoporous Carbon Electrodes from Molecular Dynamics Simulations – M. Salanne, C. Merlet, B. Rotenberg (Universite Pierre et Marie Curie), P. Madden (University of Oxford), P. Taberna, P. Simon (Université Paul Sabatier), and Y. Gogotsi (Drexel University)

14:20 **526** A Powerful Approach for Preparing Single-Phase Unitary/Binary Oxides-Graphene Composites – K. Chang (Taiwan Bluestone Technology Co., Ltd.) and C. Hu (National Tsing Hua University)

14:40 **527** Nanoporous Carbon Materials for Electrical Double Layer Capacitors – G. Y. Yushin (Georgia Institute of Technology)

15:00 **528** High Voltage Electrochemical Double Layer Capacitors Containing Adiponitrile-Based Electrolytes – A. Balducci, A. Brandt (Westfälische Wilhelms University of Muenster), P. Isken, and A. Lex-Balducci (Westfälische Wilhelms-University Münster)

15:20 **529** Dramatic Improvements in Electric Double-Layer Capacitors by Using Polysaccharides – M. Yamagata, S. Ikebe, Y. Kasai, K. Soeda, and M. Ishikawa (Kansai University)

15:40 **530** NMR Studies on the Mechanism of Electrochemical Double Layer Capacitors – H. Wang, T. K. Köster (University of Cambridge), N. Trease (Stony Brook University), J. Ségalini, P. Taberna, P. Simon (Université Paul Sabatier), Y. Gogotsi (Drexel University), and C. P. Grey (University of Cambridge)

16:00 **531** "Nanohybrid Capacitor" Utilizing $Li_4Ti_5O_{12}$ Composited with Single-Walled Carbon Nanotube – J. Miyamoto (Tokyo University of Agriculture and Technology), S. Suematsu, K. Tamamitsu (Nippon Chemi-con Corp.), K. Hata (National Institute of Advanced Industrial Science and Technology), S. Iijima (Advanced Industrial Science and Technology), and K. Naoi (Tokyo University of Agriculture and Technology)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

B2 – Poster Session – 18:00 – 20:00

• **532** Double Templates Synthesis of Mesoporous Nanowires – J. Lee (Nanyang Technological University)

• **533** Influence of Organic Solvents on Carbon-Layer Structure in Electrical-Double-Layer Capacitors – A. Banerjee, P. Suresh Kumar, and A. K. Shukla (Indian Institute of Science)

- **534** Polypyrrole-Covered MnO_2 as Electrode Material for Hydrid Supercapacitor – A. Bahloul, B. Nessark (Université de Ferhat Abbas), E. Briot, H. Groult, A. Mauger, and C. M. Julien (Université Pierre et Marie Curie)
- **535** 3-D Graphene/Metal Oxide Composite Material for Supercapacitors – S. Guo, W. Wang, C. Ozkan, and M. Ozkan (University of California, Riverside)
- **536** Influence of Electrode Mass on the Electrochemical Performance of Asymmetric Supercapacitors with Nano-$Ni(OH)_2$ and Activated Carbon Electrodes – Y. Tian, J. Yan, R. Xue, H. Lixing, and B. Yi (Chinese Academy of Sciences)
- **537** A General Model for Porous Layer Pseudo-Capacitive Impedance Spectrum – P. Guillemet, O. Crosnier, and T. Brousse (University of Nantes)
- **538** Promising Bio-Carbon for Oxygen Reduction and Supercapacitor – X. Yang and H. Zhu (Chinese Academy of Sciences)
- **539** Nitrogen-Enriched Metallophthalocyanine/Graphene Oxide Nanocomposites for High-Energy Asymmetric Electrochemical Capacitors in Aqueous Electrolytes – K. I. Ozoemena (Council for Scientific and Industrial Research), J. Lekitima, K. Makgopa (University of Pretoria), C. J. Jafta (CSIR), and S. Chen (University of California)
- **540** Ar^+ Plasma Enhanced Vertically Oriented Graphene Supercapacitors – M. Cai, R. A. Outlaw (College of William and Mary), S. M. Butler, and J. R. Miller (JME Inc.)
- **541** Graphene Nanowall Supercapacitors with Ultra-High Performance – H. Yen (Academia Sinica), Y. Horng (National Taiwan University), M. Hu (Academia Sinica), W. Yang, Y. Tai (National Taiwan University of Science and Technology), L. Chen (National Taiwan University), and K. Chen (Academia Sinica)
- **542** Polyacrylonitrile and 1-Ethyl-3-Methylimidazolium Thiocyanate Based Gel Polymer Electrolyte for Solid-State Supercapacitors with Graphene Electrodes – G. Pandey and A. Rastogi (Binghamton University (SUNY))
- **543** Cathodic Synthesis of Birnessite Films for Pseudocapacitor Application – T. Tanimoto, H. Abe, K. Tomono, and M. Nakayama (Yamaguchi University)
- **544** EQCM Investigation on Electrodeposition and Charge Storage Behavior of Birnessite-Type MnO_2 – M. Shamoto, T. Tanimoto, K. Tomono, and M. Nakayama (Yamaguchi University)
- **545** Study of Storage Capacity in Electrochemical Double Layer Capacitor Using Graphene and Blends of Graphene with Carbon – C. Subramaniam (VIT University), T. Maiyalagan (Nanyang Technological University), G. Velayutham (Anabond Sainergy Fuel Cell India Pvt. Ltd.), and S. Bollepalli (Sainergy Tech Inc.)
- **546** Ordered Mesoporous/Microporous Carbon Sphere Arrays Derived from Chlorination of Mesoporous TiC/C Composite and Their Application for Supercapacitors – D. D. Zhou, H. Liu, Y. Wang, C. Wang, and Y. Xia (Fudan University)
- **547** Ion-Exchange/Activation Combination Method to Synthesize 3D Hierarchical Porous Graphitic Carbon with Interconnected Pore Structure as Electrode Material for Supercapacitors – Y. Li and P. Shen (Sun Yat-Sen University)
- **548** Designing Porous Microstructures of $NiCo_2O_4$ Spinel Nanoparticles by Using CTAB-Assisted Dispersion – C. Hsu (National Tsing-Hua University), K. Chang, and C. Hu (National Tsing Hua University)
- **549** Effect of Manufacturing Factors on Electrochemical Performance of Carbon-PTFE Electrode for EDLC – I. Kim, S. Yang, and S. Lee (Korea Electrotechnology Research Institute)
- **550** A New Porous Anode Material Electrochemically Synthetized from Polycyclic Aromatic Hydrocarbons – M. Wagner (Åbo Akademi University), C. Kvarnström (University of Turku), A. Ivaska, and J. Bobacka (Åbo Akademi University)
- **551** $NaClO_4$ and $NaPF_6$ as Potential Non-Aqueous Electrolyte Salts for Electrical Double Layer Capacitor Application – A. Laheäär, A. Jänes, and E. Lust (University of Tartu)
- **552** Gel-Based Activated Carbon Electrode for EDLC Supercapacitors – V. Jouille, C. Galindo, M. Paté, P. Le Barny, and M. Pham Thi (Thales Research & Technology)
- **553** Alginate Binder for High Power EDLC – S. Ikebe (Kansai University), S. Yamazaki (DAIKIN INDUSTRIES, ltd.), M. Yamagata, and M. Ishikawa (Kansai University)
- **554** The effect of Electrolyte on the Hybrid Capacitor of $LiMn_2O_4$/AC and $LiCoO_2$/AC Prepared by Chemical Activation – J. Lee and H. Yoon (Chungbuk National University)
- **555** Quinone-Functionalized Carbon Nano-Onion for Pseudocapacitor Applications – D. M. Anjos (Oak Ridge National Laboratory), V. Presser, J. McDonough, Y. Gogotsi (Drexel University), G. M. Brown, and S. Overbury (Oak Ridge National Laboratory)
- **556** Electrochemical Characteristic of CNT Sphere by Aggregation of W/O Emulsion Process – H. Kim (Chungbuk National University), J. Yang (Chunghuk National University), H. Kim, and S. Park (Chungbuk National University)
- **557** Nonaqueous Proton Conducting Gel Electrolyte for Supercapacitors – A. A. Ojrzynska (Warsaw University of Technology), I. Rukowska (University of Warsaw), P. Simon (Université Paul Sabatier), P. J. Kulesza (University of Warsaw), and W. Wieczorek (Warsaw University of Technology)
- **558** The Electrochemical Behavior of CNFs by Liquid Phase Carbonization Using Polyethylene Oxide(PEO) – S. Ahn, J. Yang (Chungbuk National University), H. Kim (PureEchem Co. Ltd.), H. Habazaki (Hokkaido University), and S. Park (Chungbuk National University)
- **559** Activated Mesophase Pitch for High Performance Electric Double Layer Capacitors – C. Huang, M. Hsueh, and H. Teng (National Cheng Kung University)

- **560** Comparative Study of Using Chlorine and Hydrogen Chloride for Synthesis of Titanium Carbide Derived Carbon – I. Tallo, T. Thomberg, A. Jänes, and E. Lust (University of Tartu)
- **561** The Contribution of N-Containing Functional Groups on Graphene for EDLC in Acidic and Alkaline Electrolytes – Y. Lee, K. Chang, and C. Hu (National Tsing Hua University)
- **562** A 3.9 V Lithium/Activated Carbon Hybrid Capacitor Based on an Aqueous Electrolyte – W. Shimizu, S. Makino, and W. Sugimoto (Shinshu University)
- **563** Chemical Vapor Deposition Synthesis of Carbon Coated Graphite for Hybrid Capacitor – Y. Kim (Battery R&D Association of Korea)
- **564** Performance of Supercapacitors Based on Graphene Oxide and Mesoporous Carbon by Screen Printing – I. Carrera Leon, J. Baas López, and D. Pacheco Catalán (Centro de Investigación Científica de Yucatán)
- **565** Potential Control with AC Electrode Capacity for Hybrid Capacitor – J. Yang (Chunghuk National University), Y. Yuk, H. Kim (PureEchem Co. Ltd.), and S. Park (Chungbuk National University)
- **566** Fabrication and Optimization of Nanoparticulate Manganese Dioxide Thin-Film Electrochemical Capacitor Prototypes – S. Pang, B. Wee, and S. Chin (Universiti Malaysia Sarawak)
- **567** Electrochemical Properties of Electrochemical Capacitors Using NiO Electrode – M. Chiku, M. Toda, E. Higuchi, and H. Inoue (Osaka Prefecture University)
- **568** N-Butyl-N-Methylpyrrolidinium-Dicyanamide Ionic Liquid as the Electrolyte for Manganese Oxide Pseudo-Capacitor – H. Cheng, I. Sun, C. Su (National Cheng Kung University), M. Lee (National Central University), W. Tsai (National Cheng Kung University), J. Chang (National Central University), and Y. Fu (National University of Tainan)
- **569** Capacitance Enhancement of Anodic ZrO_2 Films by Simultaneous Incorporation of Silicon and Yttrium Species – M. Ishizuka, E. Tsuji, Y. Aoki, and H. Habazaki (Hokkaido University)
- **570** N-doped Graphite Oxide Synthesized from Photocatalytic Reduction for Electrochemical Capacitors – H. Huang and H. Teng (National Cheng Kung University)
- **571** Organic-Inorganic Hybrid Materials for Supercapacitors – V. Ruiz, J. Suarez-Guevara, and P. Gomez-Romero (CIN2-CSIC)
- **572** Electrochemical Properties of Layered (Ni,Co,Mn) Oxide Prepared by Co-Precipitation Method as Electrodes for Electrochemical Capacitors – M. Yano, S. Suzuki, and M. Miyayama (The University of Tokyo)
- **573** Substrate effects on the Supercapacitive Behavior of Electrodeposited Manganese Oxides – M. Glenn and S. W. Donne (University of Newcastle)
- **574** Li Distribution in Carbon Anode with Li Pre-Doping for Li-Ion Capacitor – T. Toki, M. Yamagata, and M. Ishikawa (Kansai University)
- **575** Study of Polypyrrole-Manganese Oxide Composites as Supercapacitor Electrode Materials – P. Ningsih, C. Z. Holdsworth, and S. W. Donne (University of Newcastle)
- **576** Aqueous Asymmetric Electrochemical Capacitors: From Fundamental Electrode Design to Practical Considerations – J. W. Long, M. B. Sassin (U.S. Naval Research Laboratory), B. Willis, C. Hoag (U. S. Naval Research Laboratory), D. R. Rolison (U.S. Naval Research Laboratory), A. Mansour (Naval Surface Warfare Center), S. G. Greenbaum (Hunter College of NY), J. M. Wallace, and K. Pettigrew (U. S. Naval Research Laboratory)
- **577** Pulse-Electropolymerization of Polypyrrole on Free-Standing Graphene Films for Efficient Flexible Supercapacitors – F. M. Hassan, Z. Chen, A. Davies, J. Choi, and A. Yu (University of Waterloo)
- **578** Optimization of Activated Carbon Materials for Lithium-Ion Capacitor Applications – D. A. Totir, S. Letaj, D. Carruthers, M. Petruska, M. King, and M. Wodjenski (Advanced Technology Materials, Inc.)
- **579** Double Layer Capacitor Performances of Porous Carbon Electrodes Derived from Cyclic Oligosaccharide – M. Tokita, M. Egashira, N. Yoshimoto, and M. Morita (Yamaguchi University)
- **580** Selective Adsorption of Ions into Nanoporous Carbons: A View Beyond Just the Mere Ion Size – S. Sigalov, M. Levi, G. Salitra, D. Aurbach (Bar-Ilan University), A. Jänes, E. Lust (University of Tartu), and I. C. Halalay (General Motors Global R&D)
- **581** An Asymmetric Electrochemical Capacitor with Activated Carbon Electrodes in Organic Electrolyte – X. Tian, S. Dsoke, C. Täubert, and M. Wohlfahrt-Mehrens (ZSW-Center for Solar Energy and Hydrogen Research)
- **582** Addressing the Conductivity Issue in Electrochemical Supercapacitor Electrodes – X. Pétrissans, D. Giaume, J. Badot, and P. Barboux (CNRS)
- **583** Electrochemically Reduced Graphene Oxide Sheets as High Performance Supercapacitors – J. Yang and S. Gunasekaran (The University of Wisconsin-Madison)
- **584** Exploring the Cycle Behavior of Electrodeposited Vanadium Oxide Supercapacitor Electrodes in Various Aqueous Environments – A. M. Engstrom and F. M. Doyle (University of California, Berkeley)
- **585** Fabrication of Graphite Oxide/ PEDOT-PSS/ Carbon Nanotubes Composite Paper Via One Step Solution-Casting Synthesis for High Performance Flexible Electrode – Y. Weng and N. N. Wu (National Taiwan University)
- **586** Synthesis and Characterization of N-Methylacetamide/$LiBF_4$ Complex as an Ionic Liquid Electrolyte for Supercapacitor – B. Bang and T. Yeu (Chung-Ang University)
- **587** *In Situ* Electrochemical Deposition of MnO_2 on CNTs for Ultracapacitor Applications – S. Raina, S. Hsu, W. Kang, J. Huang, and M. Yilmaz (Vanderbilt University)
- **588** Highly Conductive Activated Carbon for the Application of Supercapacitor – Y. Lin, W. Wang, and C. Cheng (Industrial Technology Research Institute)

- **589** Characterization of $LiNi_{1/3}Mn_{1/3}Co_{1/3}O_2$/C Composite Positive Electrodes for Non-Aqueous Supercapacitors – B. Bang and T. Yeu (Chung-Ang University)
- **590** Enhanced Electrochemical Supercapacitors Integrated with Polythiophene Using Oxidative Chemical Vapor Deposition – S. Nejati, C. Tran (Drexel University), T. E. Minford (Drexel Univeristy), V. Kalra (Drexel University), and K. K. Lau (Drexel Unversity)
- **591** Comparative Study of Electrode Stabilization Technique for Graphene-Polyaniline Nanocomposite Electrodes Using Dielectrics for Supercapacitor Applications – S. A. Ketkar, M. Ram, A. Kumar, T. Weller, and A. M. Hoff (University of South Florida)
- **592** Pseudo-Capacitive Performance of Sol-Gel Manganese Oxide/Graphene Electrodes with Various Heat-Treatments – M. Lee (National Central University), C. Lin (Taipei Medical University), C. Wu, C. Wang, C. Chen (Feng Chia University), and J. Chang (National Central University)
- **593** Electrochemical Behavior of Electrolytes at Porous Electrode Investigated with Transmission-Line Model – N. Nambu and T. Satoh (Tokyo Polytechnic University)

B4 Intercalation Compounds for Rechargeable Batteries

Battery

South Pacific 2, Mid-Pacific Conference Center, Hilton Hawaiian Village

Anode – 08:20 – 12:20
Co-Chairs: Pedro Gomez-Romero and Christian Julien

08:20 **652** Rechargeable Batteries: From Hybrid Materials to Hybrid Electrodes and Devices – P. Gomez-Romero (CIN2-CSIC)

09:00 **653** Novel Fabrication of Highly Conductive Titania/Carbon Electrodes for Lithium-Ion Batteries and Supercapacitors – M. J. Sussman and G. P. Demopoulos (McGill University)

09:20 **654** Improvement of Cycle Performance of Lithium-Ion Batteries at Elevated Temperature of 60°C Using Graphite Coated with Metal Oxide – N. Inoue (Semiconductor Energy Laboratory Co. Ltd.), K. Kimura, S. Kataniwa, J. Momo, T. Moriwaka, M. Takahashi, and S. Yamazaki (Semiconductor Energy Laboratory Co., Ltd.)

09:40 Intermission (20 Minutes)

10:00 **655** MXenes – A New Family of Two Dimensional Transition Metal Carbides Used as Intercalation Compounds – M. Naguib (Drexel University), J. Come (Universite Paul Sabatier), O. Mashtalir, V. Presser (Drexel University), P. Taberna, P. Simon (Université Paul Sabatier), M. W. Barsoum, and Y. Gogotsi (Drexel University)

10:20 **656** Characterization of Graphitic Nano-Onions as Lithium-Ion Anodes – J. D. Cardema, G. Radhakrishnan, and P. M. Adams (The Aerospace Corporation)

10:40 **657** Preparation of Reduced Graphene Oxide -Sn Composite Through Electroless Deposition and Its Use as an Anode Material in Lithium-Ion Battery – H. Noguchi, G. Kido, and W. Zhao (Saga University)

11:00 **658** Improved Electrochemical Performance of Graphite Negative Electrodes by Covalently Bound Surface Coatings – H. Meyer, T. Placke, S. Lux (University of Münster), F. Homeyer, F. Jöge (Leibniz University of Hannover), C. Engelhardt (Friedrich-Alexander-University Erlangen-Nürnberg), M. Binnewies (Leibniz University of Hannover), K. Wirth (Friedrich-Alexander-University Erlangen-Nürnberg), S. Passerini, and M. Winter (University of Münster)

11:20 **659** Anion Intercalation into Graphitic Carbon from Ionic Liquid based Electrolytes for High Performance Dual-Ion Batteries – T. Placke, O. Fromm, R. Klöpsch, G. Schmülling, P. Bieker, S. Lux, H. Meyer, S. Passerini, and M. Winter (University of Münster)

11:40 **660** Kinetic Behavior of Anion Intercalation into Graphite Electrodes in Organic Solutions – F. Sagane (Shizuoka University), K. Miyazaki, T. Fukutsuka, and T. Abe (Kyoto University)

12:00 **661** Carbon Coated α-Fe_2O_3 Nano-Particles as High Performance Anodic Material for Lithium-Ion Batteries – A. Brandt and A. Balducci (Westfälische Wilhelms University of Muenster)

New Electrochemistry – 14:00 – 18:00
Co-Chairs: Masashi Okubo and Alain Demourgues

14:00 **662** Enhanced Electrochemical Ion Insertion/Extraction Reaction in Cyano-Bridged Coordination Polymer Electrodes for Rechargeable Battery – M. Okubo, Y. Mizuno, D. Asakura, T. Kudo, and H. Zhou (National Institute of Advanced Industrial Science and Technology)

14:40 **663** Intercalation of α-MnO2 as Mg battery cathode – L. Chen, T. S. Arthur, R. Zhang, and F. Mizuno (Toyota Research Institute of North America)

15:00 **664** Towards the Development of Calcium-Ion Batteries – J. Rogosic and D. R. Sadoway (Massachusetts Institute of Technology)

15:20 **665** Electrochemical Properties of Li_5FeO_4/C Composite Positive Electrode Materials – T. Okumura, M. Shikano, and H. Kobayashi (National Institute of Advanced Industrial Science and Technology (AIST))

15:40 Intermission (20 Minutes)

16:00 **666** New Fe-Based Oxyfluorides as Rechargeable Lithium-Ion Battery at High Voltage (Average > 3V vs. Li^+/Li) – A. Demourgues, N. Penin, A. Wattiaux, D. Carlier-Larregaray, L. Bourgeois, E. Durand, A. Tressaud (ICMCB, University of Bordeaux, CNRS), H. Groult (Université Pierre et Marie Curie), D. Dambournet (Argonne National Laboratory), C. M. Julien (Université Pierre et Marie Curie), and K. Zaghib (Institut de Recherche d'Hydro-Québec)

16:40 **667** Splash Combustion Synthesis and Exploration of Lithium Metal Pyrophosphate ($Li_{1\pm y}MP_2O_7$) Cathodes – P. Barpanda, T. Ye, J. Lu, Y. Yamada, S. Chung, S. Nishimura, and A. Yamada (The University of Tokyo)

17:00 **668** Oxalic Dihydrazide Assisted Novel Combustion Synthesized Pyrophosphate Compounds for Rechargeable Batteries – N. Kalidoss, K. Nallathamby (Central Electrochemical Research Institute), and M. Minakshi (Murdoch University)

17:20 **669** $LiTi_2(PO_4)_3$/Reduced Graphene Oxide Hybrids for High Performance Cathode Materials in Lithium-Ion Batteries – C. Lim, A. G Kannan, H. Lee, and D. Kim (Korea Advanced Institute of Science and Technology)

17:40 **670** An Energy Storage Principle Delivered by Bipolar Porous Polymeric Frameworks – K. Sakaushi (IFW Dresden), G. Nickerl, F. Wisser (TU Dresden), E. Hosono, H. Zhou (National Institute of Advanced Industrial Science and Technology), S. Kaskel (TU Dresden), and J. Eckert (IFW Dresden)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

B4 – Poster Session I – 18:00 – 20:00
Co-Chairs: Karim Zaghib and Shirley Meng

- **671** $LiNi_{1/3}Mn_{,1/3}Co_{1/3}O_2$ Synthesized by Sol-Gel Method: Structure and Electrochemical Properties – A. M. Hashem, A. Abdel-Ghany, H. M. Abuzeid (National Research Centre), H. Ehrenberg (Karlsruhe Institute of Technology), A. Mauger, and C. M. Julien (Université Pierre et Marie Curie)
- **672** Electronic Properties of Olivine Materials for Positive Electrodes in Li-Ion Batteries – C. M. Julien, A. Mauger (Université Pierre et Marie Curie), K. Zaghib (Institut de Recherche d'Hydro-Québec), and H. Groult (Université Pierre et Marie Curie)
- **673** $LiMn_yFe_{1-y}PO_4$ Cathode Materials Grown by Hydrothermal Route: Structure and Morphology – M. Mathieu, J. Trottier, P. Hovington, A. Guerfi, K. Zaghib (Institut de Recherche d'Hydro-Québec), M. Trudeau (Institut de Recherches d'Hydro-Québec), A. Mauger, and C. M. Julien (Université Pierre et Marie Curie)
- **674** $LiMn_yFe_{1-y}PO_4$ Cathode Materials Grown by Hydrothermal Route: Electrochemical Performance – J. Trottier, M. Mathieu, A. Guerfi, K. Zaghib (Institut de Recherche d'Hydro-Québec), A. Mauger, and C. M. Julien (Université Pierre et Marie Curie)
- **675** Synthesis, Structural and Electrochemical Properties of $LiNi_{1/3}Mn_{1/3}Co_{1/3}O_2$ Prepared by Sol-Gel Method Using Table Sugar as Chelating Agent – A. M. Hashem, H. M. Abuzeid (National Research Centre), N. Kiziltas, M. Herklotz (IFW Dresden), H. Ehrenberg (Karlsruhe Institute of Technology), A. Mauger, and C. M. Julien (Université Pierre et Marie Curie)
- **676** Surface and Bulk Properties of $LiFePO_4$: The Magnetic Analysis – A. Mauger, H. Groult (Université Pierre et Marie Curie), K. Zaghib (Institut de Recherche d'Hydro-Québec), and C. M. Julien (Université Pierre et Marie Curie)
- **677** MnO_2 Nano-Rods Prepared by Redox Reaction as Cathodes in Lithium Batteries – A. M. Hashem, H. M. Abuzeid, A. Abdel-Latif, H. Abbas (National Research Centre), H. Ehrenberg, S. Indris (Karlsruhe Institute of Technology), A. Mauger, and C. M. Julien (Université Pierre et Marie Curie)
- **678** Orthorhombic MoO_3 Nanofibers as Cathode Materials for Li Batteries – C. V. Ramana (University of Texas at El Paso), A. M. Hashem (National Research Centre), H. Groult, A. Mauger, and C. M. Julien (Université Pierre et Marie Curie)
- **679** Carbon-Coated Nano-Structured MoO_3 as Cathode Materials for Lithium Batteries: Synthesis, Structure and Electrochemical Performance – C. V. Ramana (University of Texas at El Paso), H. Groult, A. Mauger, and C. M. Julien (Université Pierre et Marie Curie)
- **680** Single Crystal $Li_{1.2}Mn_{0.56}Ni_{0.12}Co_{0.12}O_2$ Hexagonal Nanoplates with Lateral {010} Facets Exposed as cathode of Lithium-Ion Batteries with Excellent Cycleability – F. Fu, Y. Deng, X. Li, J. Li, L. Huang, and S. Sun (Xiamen University)
- **681** Synthesis and Electrochemical Characterization of Carbonophosphates; A New Family of Intercalation Compounds Discovered by Ab Initio Computing – I. L. Matts, H. Chen, G. Hautier, and G. Ceder (Massachusetts Institute of Technology)
- **682** Improved Initial Coulombic Efficiency of Spinel Battery Cathode by Fluorine-Doping – J. Kim, C. Nguyen, Y. Bae, K. Lee, J. Song, J. Min (Chungnam National University), H. Ko, T. Kim (POSCO ES Materials), Y. Paik (Korean Basic Science Institute), and S. Song (Chungnam National University)
- **683** Investigation on the (de)Lithiation Mechanism of Li_2MoO_3 – J. Lee, S. Kim, J. Kim, and G. Ceder (Massachusetts Institute of Technology)
- **684** Cathode Properties of P-Doped Li_2MnO_3 – H. Komaki, A. Kitajo, and S. Okada (Kyushu University)
- **685** Synthesis and Electrochemical Performance of a Lithium-Transition Metal-Fluoride as a New Cathode Material for Lithium-Ion Batteries – N. Twu, L. Liu, and G. Ceder (Massachusetts Institute of Technology)
- **686** The Electrical Properties of Amorphous TiO_2-B Prepared from Lepidocrocite Type Precursors as an Anode Material in Lithium-Ion Battery – Y. Furuya, T. Iida, and H. Noguchi (Saga University)
- **687** Structural and Magnetic Studies on Initial Cycling of Li-Excess Type Layered Rock-Salt Oxide Cathode – T. Nakamura, K. Nakao (University of Hyogo), H. Takahara, H. Yashiro (Rigaku Corporation), Y. Oka, and Y. Yamada (University of Hyogo)
- **688** Relation between Synthesis Conditions and Electrochemical Properties of Lithium Excess Li-Ni-Mn-O Compounds – H. Yamada, M. Oyama, H. Nakamura, and H. Noguchi (Saga University)
- **689** Facile Synthesis of FeF_3 and Its Application to Positive Electrode for Rechargeable Lithium Batteries – S. Myung, S. Kim (Sejong University), and Y. Hitoshi (Iwate University)

- **690** Electrochemical Properties of $Mg_{0.22}MnO_2$ as a Cathode Material for Mg Rechargeable Batteries – T. Kakibe (University of Hyogo), K. Miyazaki, T. Fukutsuka, T. Abe, and Y. Uchimoto (Kyoto University)
- **691** Micro-Sized $NaNi_{0.5}Mn_{0.5}O_2$ Layered Materials as a Cathode Material for Rechargeable Na Batteries – M. Jang (Hanyang University), S. Myung (Sejong University), S. Oh, and Y. Sun (Hanyang University)
- **692** Crystal and Electronic Structures of Layered Li_2MnO_3-$LiMO_2$ Materials during Stepwise Pre-Cycling Treatment – H. Kobayashi, T. Okumura, M. Shikano (National Institute of Advanced Industrial Science and Technology (AIST)), Y. Arachi (Kansai University), and H. Nitani (KEK)
- **693** $LiCoO_2$ Cathode Nanosheets with Enlarged Surface Area Induced by Hydrothermal Process – K. Fung, C. Ni, C. Liu, and S. Tsai (National Cheng Kung University)
- **694** Diffusion of Lithium-Ion and Polaron in Pyrophosphate $Li_2FeP_2O_7$:First-Principles Study – Y. Asari, Y. Suwa, and T. Hamada (Hitachi, Ltd.)
- **695** Crystal Structure and Electrochemical Properties of Ni-Substituted Li_2CuO_2 as a Positive Electrode – T. Ide, T. Nakagawa, Y. Arachi (Kansai University), and Y. Nakata (IwakiMeisei University)
- **696** Synthesis and Electrochemical Property of CuO-Containing Li_2MnO_3 – S. Akiyama, Y. Arachi, K. Hinoshita (Kansai University), and Y. Nakata (IwakiMeisei University)
- **697** Kinetics and Stability Studies on $Li_{1+x}M_{1-x}O_2$ Single Crystals – H. Duncan, B. Hai, A. K. Shukla, and G. Chen (Lawrence Berkeley National Laboratory)

B5 Interfaces and Interphases in Battery Systems

Battery / Energy Technology

Honolulu 1, Tapa Conference Center, Hilton Hawaiian Village

Interfaces and Interphases in Battery Systems V – 08:00 – 12:00
Co-Chairs: Xiao-Qing Yang and Ryoji Kanno

08:00 **757** *In Situ* Analysis of Interfacial Reactions between Edge Plane Graphite Negative-Electrodes and EC-Based Electrolyte Solutions – T. Doi, Y. Domi, H. Nakagawa, S. Tsubouchi, M. Ochida, T. Yamanaka, T. Abe, and Z. Ogumi (Kyoto University)

08:40 **758** Ultrafast Laser Spectroscopy of Electrode/Electrolyte Interfaces – J. S. Syzdek (Lawerence Berkeley National Laboratory), V. Zorba, X. Mao, R. E. Russo, and R. M. Kostecki (Lawrence Berkeley National Laboratory)

09:00 **759** Effects of Electrolyte Additives on the Suppression of Mn Deposition on the Edge Plane of HOPG for Lithium-Ion Battery – M. Ochida, S. Tsubouchi, H. Nakagawa, Y. Domi, T. Yamanaka, T. Doi, T. Abe, and Z. Ogumi (Kyoto University)

09:20 **760** Studies of Interfacial Processes of Lithium-Ion Batteries by *In Situ* Fourier Transform Infrared Spectroscopy – J. Li, X. Zheng, H. Su, X. Zeng, L. Huang, and S. Sun (Xiamen University)

09:40 Intermission (20 Minutes)

10:00 **761** Materials Design and Analysis of Electrode/Solid Electrolyte Interface by *In Situ* Methods – Y. Iriyama (Shizuoka University)

10:40 **762** Investigation of the Solid Electrolyte Interphase (SEI) with Pre-Lithiated Graphite – N. J. Dudney, L. A. Adamczyk, R. R. Unocic, G. M. Veith, P. Ganesh, and P. R. Kent (Oak Ridge National Laboratory)

11:00 **763** Transport Properties and Chemical Stability of LISICON-Based Glass Ceramics in Contact with Lithium – P. Hartmann (Justus-Liebig-University Giessen), M. Reich (SCHOTT AG), T. Leichtweiss (Justus-Liebig-University Giessen), M. Schneider, W. Schmidbauer (SCHOTT AG), and J. Janek (Justus Liebig University Gießen)

11:20 **764** Bias Imposed Interface between Solid Li-Ion Conductor $LiBH_4$ and Li Metal: First Principles Molecular Dynamics Simulations – T. Ikeshoji (Tohoku University), E. Tsuchida, M. Otani (National Institute of Advanced Industrial Science and Technology), S. Takagi, M. Matsuo, and S. Orimo (Tohoku University)

11:40 **765** Investigation of the Interface Between Li_2S-P_2S_5 Solid Electrolyte and Li Metal Electrode by Using Electrochemical Methods with Microelectrodes – M. Chiku, W. Tsujiwaki, E. Higuchi, and H. Inoue (Osaka Prefecture University)

Interfaces and Interphases in Battery Systems VI – 14:00 – 17:00
Co-Chairs: Yasutoshi Iriyamaand Nancy Dudney

14:00 **766** Studies on the Formation and Stability of Solid Electrolyte Interphase on the Surface of Anode and Cathode of Lithium-Ion Batteries – X. Yu (Brookhaven National Laboratory), H. Li (Chinese Academy of Sciences), K. Xu (U. S. Army Research Laboratory), K. Nam, H. Lee (Brookhaven National Laboratory), X. Huang, L. Chen (Chinese Academy of Sciences), A. Von Cresce (U. S. Army Research Laboratory), and X. Yang (Brookhaven National Laboratory)

14:40 **767** Artificial Solid Electrolte Interface (SEI) for Improving Cycle-Ability on Lithium-Ion Battery – F. Wang (National Taiwan University of Science and Technology)

15:00 **768** Ultrathin Multifunctional Coatings as the Artificial Solid Electrolyte Interphases to Improve Performance of Lithium-Ion Batteries – X. Xiao, D. Ahn (General Motors Global R&D Center), P. Lu (Trison Business Solution Inc.), and M. W. Verbrugge (General Motors Global R&D Center)

15:20 **769** Li-Ion Transfer at the Interface between Solid Electrolyte/Ionic Liquid – Y. Ishihara, K. Miyazaki, T. Fukutsuka, T. Abe, and Z. Ogumi (Kyoto University)

15:40 Intermission (20 Minutes)

16:00 **770** Atomistic Mechanisms of the Phase Boundary Evolution during Initial Lithiation into Crystalline Silicon – S. Kim, D. Datta, M. J. Chon, V. A. Sethuraman, P. R. Guduru, and V. B. Shenoy (Brown University)

16:20 **771** *In Situ* Optical Microscopic Observation of Lithium Electrodeposited in Room Temperature Ionic Liquids Containing Quaternary Ammonium Cation – H. Sano (National Institute of Advanced Industrial Science and Technology), H. Sakaebe (National Institute of Advanced Industrial Science and Technology (AIST)), and H. Matsumoto (National Institute of Advanced Industrial Science and Technology)

16:40 **772** Analytical Studies of Flow Battery Redox Reaction Electrokinetics on a Thin Fiber Film Rotating Disk Electrode – K. L. Hawthorne, J. S. Wainright, and R. F. Savinell (Case Western Reserve University)

B6 Lithium-Ion Batteries

Battery / Energy Technology

Coral 3, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Cathodes III (Metal Oxide Systems) – 08:00 – 09:40
Co-Chairs: Xiaofeng Zhang and Michael Thackeray

08:00 **848** Preparation and Electrochemical Performances of Sn^{4+} Doped V_2O_5 as Cathode material for Li Ion Battery – Y. Li and G. Cao (University of Washington)

08:20 **849** V_2O_5 Network Structure as Cathode for Lithium Ion Batteries – Y. Xu, M. Dunwell, and H. Luo (New Mexico State University)

08:40 **850** Developing 1400 Wh/kg Graphene-V_2O_5 Aerogel Composites as Cathodes for Li-Ion Batteries – Q. Liu, Y. Liu, and J. Xie (Indiana University Purdue University Indianapolis)

09:00 **851** Synthesis of FeOF Using Roll-Quench Method and the Charge-Discharge Mechanism – A. Kitajou, R. Nagano, and S. Okada (Kyushu University)

09:20 **852** Investigation of Graphite Foil as Current Collector for Cathodes of Li-Ion Batteries – B. Ziv, O. Haik, E. Zinigrad, M. Levi, D. Aurbach (Bar-Ilan University), and I. C. Halalay (General Motors Global R&D)

Coral 4, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Anodes I (Silcon Based Systems) – 08:00 – 09:40
Co-Chairs: Yoon-Chang Kim and Karim Zaghib

08:00 **853** Electrochemical Properties of C_{60} Coated Silicon Nanowires as Anodes in Lithium Secondary Batteries – A. Arie (Parahyangan Catholic University) and J. Lee (Korea Institute of Science and Technology)

08:20 **854** *In Situ* TEM Studies of Silicon Nanostructures for Li-Ion Batteries – K. Karki, C. Sun, E. Epstein (University of Maryland), J. Cho, T. Picraux (Los Alamos National Laboratory), C. Wang, Y. Wang, and J. Cumings (University of Maryland)

08:40 **855** Silicon Nitride Thin Film Electrode for Lithium-Ion Batteries – N. Suzuki, R. B. Cervera, T. Ohnishi, and K. Takada (National Institute for Materials Science)

09:00 **856** Investigation on Si Anode Materials for Lithium-Ion Batteries Using X-ray Absorption Spectroscopy – X. Yu, K. Nam (Brookhaven National Laboratory), C. Ma (Chinese Academy of Sciences), E. Hu, Y. Zhou (Brookhaven National Laboratory), H. Li (Chinese Academy of Sciences), and X. Yang (Brookhaven National Laboratory)

09:20 **857** Negatively and Positively Nanopatterned Silicon for Use in Lithium-ion Batteries – S. Nam (Gwangju Institute of Science and Technology), D. Park, J. Lee, J. Lee (Gwangju Institute of Science & Technology (GIST)), and W. Kim (Gwagnju Institute of Science and Technology)

Coral 3, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Cathodes III (Metal Oxide Systems) – 10:00 – 12:20
Co-Chairs: Michael Thackeray and Xiaofeng Zhang

10:00 **858** Retardation of Phase Transformation of Li_xCoO_2 in Fast Discharge – T. Kawaguchi, T. Ichitsubo, E. Matsubara, Y. Uchimoto, and Z. Ogumi (Kyoto University)

10:20 **859** Low Temperature Synthesis of Manganospinel Based Cathodes for Li-ion Batteries – X. Hao and B. Bartlett (University of Michigan)

10:40 **860** Effects of Heat Treatment on the Electrochemical Performance of $LiNi_{0.5}Mn_{1.5}O_4$ Cathode Materials via Spray Pyrolysis Method – J. Shiu, W. Pang, and S. Wu (Tatung University)

11:00 **861** Electrochemical Properties of High-Voltage $LiNi_{0.5}Mn_{1.5}O_4$ and High-Capacity $Li_{1.5}Ni_{0.25}Mn_{0.75}O_{2.5}$ Blends – X. Zhang (Argonne National Laboratory), L. Li (Beijing Institute of Technology), and I. Belharouak (Argonne National Laboratory)

11:20 **862** Combined *In Situ* X-ray Absorption Spectroscopy and First-Principle Calculation Studies on Local Structural and Electronic Structural Alternations of $LiNi_{1/3}Co_{1/3}Mn_{1/3}O_2$ – H. Imai, K. Kubobuchi, M. Mogi, M. Matsumoto (NISSAN ARC Ltd.), M. Nishijima (Nissan Motor Co., Ltd.), T. Yamamoto (Waseda University), T. Matsumoto (NISSAN ARC Ltd.), and Y. Nitta (Nissan Motor Co., Ltd.)

11:40 **863** ^6Li NMR Spectroscopic Investigation on Local Structures and Battery Properties of Li_2MnO_3 Cathode Materials – H. Imai (NISSAN ARC Ltd.), K. Hashi (National Institute for Materials Science), T. Sanada (Nissan Motor Co., Ltd.), K. Kamiguchi (NISSAN ARC Ltd.), A. Ito, M. Watanabe (Nissan Motor Co., Ltd.), K. Kubobuchi, M. Mogi, M. Matsumoto (NISSAN ARC Ltd.), N. Chiba (Nissan Motor Co., Ltd.), S. Ohki, T. Shimizu (National Institute for Materials Science), M. Hatano (Nissan Motor Co., Ltd), and T. Matsumoto (NISSAN ARC Ltd.)

12:00 **864** Impact of the Calendaring Process on the Interfacial Structure and the Related Electrochemical Performance of Secondary Lithium-Ion Battery Electrodes – W. Haselrieder, H. Seeba, and A. Kwade (TU Braunschweig)

Coral 4, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Anodes I (Silcon Based Systems) – 10:00 – 11:40
Co-Chairs: Karim Zaghib and Yoon-Chang Kim

10:00 **865** Si-C and SiO_x Versus Lithium Metal Anodes for High-Energy Rechargeable Batteries – A. Guerfi, D. Leblanc, P. Hovington, M. Lagacé, J. Trottier, J. Hamel-Paquet, M. Dontigny, A. Vijh, and K. Zaghib (Institut de Recherche d'Hydro-Québec)

10:20 **866** Implementation and Characterization of Silicon Anode with Metal Alloy Inactive Matrix for Lithium-Ion Secondary Batteries – C. Lee, S. Kwon, J. Kim, S. Suh (Samsung SDI), J. Cho, J. Moon (MK Electron Co., Ltd.), J. Choi, S. Kang, and Y. Kim (Samsung SDI)

10:40 **867** First Principles Studies of the Electrochemical Lithiation and Delithiation of Crystalline Silicon – M. K. Chan (Argonne National Laboratory), C. Wolverton (Northwestern University), and J. Greeley (Argonne National Laboratory)

11:00 **868** Novel Nanostructured Si anode Behavior on Nanorod Array Polymer Substrate – M. Jung (Seoul National University), M. Moon (Korea Institute of Science and Technology), Y. Joo (Seoul National University), and I. Choi (Korea Institute of Science and Technology)

11:20 **869** Well Controlled Array of Si Nanopillar with Metal Core as Negative Electrode for Lithium Ion Batteries – T. Oguni, R. Tajima, T. Osada, T. Muraoka, M. Kurata, S. Sasagawa, S. Adachi, T. Takeuchi, T. Kakehata, J. Momo, T. Moriwaka, M. Takahashi, and S. Yamazaki (Semiconductor Energy Laboratory Co., Ltd.)

Coral 3, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Cathodes IV (Manganese Spinel Systems) – 14:00 – 15:40
Co-Chairs: Ram Katiyar and Mani Nagasubramanian

14:00 **870** Cycling Behavior of a High Voltage Spinel Using an Original Three Electrodes $Li_{1-x}Ni_{0.4}Mn_{1.6}O_4$// Li//$LiNi_{0.4}Mn_{1.6}O_4$ Symmetric Cell: Application to $LiNi_{0.4}Mn_{1.6}O_4$Electrolyte Interface Degradation Studies – J. Demeaux (CEA/DAM Le Ripault), M. Caravanier (Université F. Rabelais de Tours), H. Galiano (CEA/DAM Le Ripault), B. Montigny, and D. Lemordant (Université F. Rabelais de Tours)

14:20 **871** A Study of the High Rate Performance Polypyrrole-TiC Nanocomposite Anode Materials for Lithium-ion Battery – Y. Weng and N. N. Wu (National Taiwan University)

14:40 **872** Enhanced High Temperature Stability of $LiMn_2O_4$ Cathodes by Prussian Blue Coatings – C. Chen and K. Chiu (Feng Chia University)

15:00 **873** Spinel Manganese Based Cathode Materials: A Thermal Stability Study – S. El Khakani and D. MacNeil (Université de Montréal)

15:20 **874** Effect of Cr-Oxide Partial Coating on the Electrochemical Behavior of Thin Film High-Voltage Spinel – E. Garcia Tamayo, J. Ros, A. Kaas, R. Fredon (Delft University of Technology), and E. M. Kelder (TUDelft)

Coral 4, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Anodes I (Silcon Based Systems) – 14:01 – 15:41
Co-Chairs: Robert Huggins and Khalil Amine

14:01 **875** Carbon – Silicon Nanocomposite Anodes for Lithium-Ion Batteries – G. Y. Yushin (Georgia Institute of Technology)

14:21 **876** Thin-film Nanoporous Silicon Coated with PEO Polymer Electrolyte for Lithium-Ion Battery Anodes – C. R. Becker, J. Read, J. Wolfenstine, J. Allen, and C. Lundgren (U.S. Army Research Laboratory)

14:41 **877** Real-Time Measurements of Stress and Damage Evolution during Initial Electrochemical Lithiation and Delithiation of Crystalline Silicon – M. Chon, V. A. Sethuraman, and P. R. Guduru (Brown University)

15:01 **878** High Performance Silicon Freestanding Anodes Fabricated by Low Pressure and Plasma-Enhanced Chemical Vapor Deposition onto Carbon Nanotube Electrodes – M. W. Forney, R. DiLeo, A. Raisanen, M. Ganter, J. Staub, R. Rogers, and B. Landi (Rochester Institute of Technology)

15:21 **879** Impact of Electrolytes on Solid Electrolyte Interphase (SEI) Formation and Electrochemical Performance of a Silicon Anode in Lithium-Ion Cells – J. J. Wu (NASA/Glenn Research Center)

Coral 3, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Cathodes V (General) – 16:00 – 18:00
Co-Chairs: Mani Nagasubramanian and Ram Katiyar

16:00 **880** TEM Study of Surface Region of Sol-Gel Coated Cathode Materials for Li Ion Battery – N. Taguchi, H. Sakaebe, T. Akita, T. Takeuchi, K. Tatsumi (National Institute of Advanced Industrial Science and Technology (AIST)), and Z. Ogumi (Kyoto University)

16:20 **881** Electronic and Transport Properties of High-Capacity Silicate Cathode Materials for Li-Ion Batteries – R. Longo Pazos, K. Xiong, and K. Cho (University of Texas at Dallas)

16:40 **882** High-Performance Lithium-ion Battery Cathodes Based on Porous FeF3 Nanowires – L. Li and S. Jin (University of Wisconsin-Madison)

17:00 **883** Scale Bridging via Surrogate Modeling for Multi-Scale Analysis of Li-Ion Cathodes – W. Du, N. Xue, A. Sastry, J. Martins (University of Michigan), and W. Shyy (Hong Kong University of Science and Technology)

17:20 **884** Metal Oxide/Graphene Hybrid Nanostructured Electrodes for High Performance Lithium Batteries – H. Gullapalli, A. Reddy, and A. Pulickel (Rice University)

17:40 **885** Thermal Aging on the Cycleability of Cells Made of $\{LiMn_{1/3}Ni_{1/3}Co_{1/3}O_2 + LiMn_2O_4\}$ Composite Electrodes – B. Lochner, E. Wong, M. Dubarry, C. Truchot, B. Liaw (University of Hawaii at Manoa), K. L. Gering, S. V. Sazhin, D. Jamison, and C. Michelbacher (Idaho National Laboratory)

Coral 4, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Anodes II (Tin Based Systems) – 16:00 – 18:00
Co-Chairs: Khalil Amine and Robert Huggins

16:00 **886** Electrochemical Characterization of Sn as an Alternative Anode Material in Li-Ion Batteries – D. X. Liu, J. Black, and A. Co (The Ohio State University)

16:20 **887** Cu-Sn Thin Films as Anodes for Thin Film Rechargeable Lithium Batteries – B. Polat (ITU), N. Sezgin (Istanbul Technical University), Ö. Keles (ITU), K. Kazmanlı (Istanbul Technical University), A. Abouimrane, and K. Amine (Argonne National Laboratory)

16:40 **888** Investigating the Performance of Si- and Sn-Based Anode Materials in Electrovaya's Lithium Ion SuperPolymer Cells – L. Davis and R. DasGupta (Electrovaya Inc.)

17:00 **889** Large Scale Production of Titanate and Tin Oxide Nanowire Powders and Arrays for Anodes – A. K. Thapa, T. Nguyen, V. Vendra, G. Sunkara, and M. K. Sunkara (University of Louisville)

17:20 **890** Porous SnO_2 Helical Nanotubes and Sheets for Lithium-Ion Batteries – H. Luo, L. Fei, and Y. Xu (New Mexico State University)

17:40 **891** XPS Depth Profiling of Tin Anodes for Lithium Ion Batteries – J. M. Black and A. Co (The Ohio State University)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

B6 – Poster Session – 18:00 – 20:00
Co-Chairs: Marshall Smart and Ratnakumar Bugga

- **892** Feedback Controlled Multistage Constant Current (FCMCC) Charging Protocol for Improving Performance on Lithium-Ion Battery – H. Wang, Y. Chen, and F. Wang (National Taiwan University of Science and Technology)
- **893** The Effect of Oxy-Nitride Formation in Lithium-Ion Conductivity for LiMe(Ge, Si and Ti)PS – S. Lee, D. J. Kalita, S. Woo, K. Lee, and Y. Yoon (Yonsei University)
- **894** Investigation of High-Temperature Endurance Test for Lithium-Ion Batteries in Vehicles – K. Maeda, K. Komatsu, and M. Takahashi (Japan Automobile Research Institute)
- **895** Electron Energy Loss Structures in the Oxygen *K*-edge Spectra of Li-Inserted $Li_4Ti_5O_{12}$ – M. Kitta (National Institute of Advanced Industrial Science and Technology), T. Akita (National Institute of Advanced Industrial Science and Technology (AIST)), S. Tanaka, and M. Kohyama (National Institute of Advanced Industrial Science and Technology)
- **896** Synthesis and Electrochemical Properties of Carbon-Coated $Li_2FeP_2O_7$ for Li-Ion Batteries – M. Saito, S. Yano, A. Tasaka, and M. Inaba (Doshisha University)
- **897** Structure-Related Electrochemistry of Sulfur-Poly(Acrylonitrile) Composite Cathode Materials for Rechargeable Lithium Batteries – J. Fanous, M. Wegner, J. Grimminger, M. Rolff, Ä. Andresen (Robert Bosch GmbH), and M. Buchmeiser (University of Stuttgart)
- **898** Electrochemical Properties and Morphology of $Li[Fe_{1-x}Mn_x]PO_4$ (x = 0, 0.1, 0.3) Cathode Materials by Electrospinning Process – C. Kang, C. Kim, G. Yoo, and J. Son (Korea National University of Transportation)
- **899** Structural-Tunable Graphene Anode via Controlling Oxidation Processes for Li-Ion Batteries Applications – W. Liu (Chung Yuan Christian University), S. Kuo, Y. Chen, and H. Wu (Industrial Technology Research Institute)
- **900** Improvement of Tap Density of TiO_2(B) Powder as High Potential Negative Electrode – Y. Nakano, M. Takagi, N. Honda, M. Saitou, A. Tasaka, and M. Inaba (Doshisha University)
- **901** The Binary $Li_4Ti_5O_{12}$-$Li_2Ti_3O_7$ Nanocomposite as Anode for Improving the SOC Estimation of Li-Ion Batteries – G. Zhu and Y. Xia (Fudan University)
- **902** Electrochemical Test Cell Using Diamond Windows for *In Situ* XRD Measurement – S. Kawasaki, A. Alzubaidi, Y. Ishii, and T. Matsushita (Nagoya Institute of Technology)
- **903** Improvement of Electrochemical Properties of Silicon Negative Electrode Prepared with Polyimide Binder – S. Uchida, M. Mihashi, M. Yamagata, and M. Ishikawa (Kansai University)
- **904** Correlation between Polydopamine Coating Effects and Separator-Types for High Power Lithium Ion Batteries – Y. Lee, M. Seo (Hanbat National University), B. Kim (W-SCOPE KOREA CO., LTD.), M. Ryou, J. Choi (Korea Advanced Institue of Science and Technology), and Y. Lee (Hanbat National University)
- **905** Surface Modification of $Li[Ni, Co, Mn]O_2$ Cathode Using FeF_3 Coating – C. Kim, S. Kim, and Y. Park (Kyonggi University)
- **906** Electrochemical Properties of Graphite-Silicon Milled Nanocomposite as a Lithium Battery Anode Material – K. Kang, D. Shin, Y. Lee, and K. Kim (Electronics and Telecommunications Research Institute)
- **907** Which One is the More Severe Test Method, Cycling or Storage at High Temperatures? – H. Lee, J. Jeong, B. Son, J. Choi, Y. Kim, and Y. Lee (Hanbat National University)
- **908** Study on Phase Transformation Characteristics of $LiFePO_4$ during Charge-Discharge Process of Graphite/Lithium Iron Phosphate Battery – Y. Lou (Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Science), Q. Wang (Chinese Academy of Science), J. Zhang, C. Yang, and B. Xia (Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Science)
- **909** Poly(Hydroquinone) Cathodes for a Sustainable Lithium-Ion Battery – K. Takeshi (Sony Corp.), J. Kadokawa (Kagoshima University), and H. Morioka (Sony Corporation)
- **910** TiO_2/Marimo Carbon Composite as a New Material for Lithium Ion Battery – K. Iwasawa, S. Ueda, M. Eguchi, Y. Kobayashi (Ibaraki University), M. Kobori, M. Nishitani-Gamo (Toyo University), and T. Ando (National Institute for Materials Science)

- **911** Effect of Ionic Liquid Electrolytes on Anode Properties of $LaSi_2$/Si Composite Thick-Film Electrodes for Li-Ion Battery – M. Shimizu, H. Usui, and H. Sakaguchi (Tottori University)
- **912** Sandwiched MWCNT@TiO_2-C Nanocables for Ultrafast Lithium Storage – J. Cheng (Lawrence Berkeley National Laboratory) and J. Kerr (Lawrence Berekeley National Laboratory)
- **913** Modified SiO as a High Performance Anode for Li-Ion Batteries – Y. Hwa (Seoul National University), C. Park (Kumoh National Institute of Technology), and H. Sohn (Seoul National University)
- **914** Simple Preparation of Nanoporous Si/C Composites with Naphthalene for Li-Ion Batteries – B. Yu (Seoul University) and H. Sohn (Seoul National University)
- **915** Enhanced Electrochemical Performance of $LiFePO_4$ Cathode Material Promoted by CdO and Carbon Co-Coating – G. Peng, X. Yang (Three Gorges University), G. Liang (Sam Houston State University), and L. Zhang (Three Gorges University)
- **916** Sub-Nano Tunnel-Structured Manganese Oxide Exhibiting Extremely Large Reversible Lithium Storage – D. Yonekura, Y. Igarashi, M. Hiraga, N. Ota, J. Miyamoto, and K. Naoi (Tokyo University of Agriculture and Technology)
- **917** Nanohybridization of nc-SnO_2 with Hollow-Structured Carbon for High Performance Li-Ion Battery Anode – K. Kisu, M. Iijima, Y. Nagano, J. Miyamoto, and K. Naoi (Tokyo University of Agriculture and Technology)
- **918** Cycling Stability of Li_2MnO_3 Composite Materials by Co-Precipitation for Lithium Ion Battery – K. Kim, J. Kang, D. Chang, and K. Kim (Korea Institute of Industrial Technology)
- **919** Electrochemical Performance of Li-Rich Based Cathode Materials for Lithium Ion Battery – K. Kim, J. Kang, S. Boo, and K. Kim (Korea Institute of Industrial Technology)
- **920** High-Rate Capability of Hollow Carbon Microspheres as Anode Materials for Lithium-Ion Batteries – J. Hwang, H. Lim, T. Kang, Y. Sun, and K. Suh (Hanyang University)
- **921** Hollow Fe_3O_4 Microspheres as Anode Materials for Lithium-Ion Batteries – H. Lim, Y. Sun, and K. Suh (Hanyang University)
- **922** Facile Synthesis of a Unique Interleaved Graphene-Embedded Sulfur Nanocomposite as Cathode of Li-S Batteries with Excellent Lithium Storage Performance – Y. Wang, L. Huang, Y. Xu, J. Li, and S. Sun (Xiamen University)
- **923** *In Situ* Separating Layer Coating upon the Wire-type Electrode for Flexible Lithium Batteries – K. V. Luu (Hanbat National Univesity), Y. Lee (Hanbat National University), S. Song (Hanbat National Univesity), C. Kim (Shine Co., Ltd.), and Y. Lee (Hanbat National University)
- **924** Improvement of High-Capacity Behavior of Layered $Li_{1.23}Ni_{0.13}Co_{0.14}Mn_{0.56}O_2$ Cathodes by Fluorine Substitution for Li-Ion Batteries – J. Min, J. Gim, J. Song, J. Kim, and W. Im (Chonnam National University)
- **925** First-Principles Study of K-edge XANES for Li-Rich Solid-Solution Layered Cathode Material – T. Tamura, R. Kobayashi, S. Ogata (Nagoya Institute of Technology), T. Ohwaki (Nissan Motor Co., Ltd), A. Ito (Nissan Motor Co., Ltd.), and Y. Ohsawa (Nissan Motor Co., Ltd)
- **926** Novel 3-Dimensional Electrochemical Energy Storage Systems – F. Roumi (Caltech), C. Cid (California Institute of Technology), J. Roumi (Parthian Energy LLC), and M. Hoffmann (California Institute of Technology)
- **927** Highly Interconnected Silicon Nanowires Embeded in Porous Graphite as Anodes in Li-ion Batteries – S. Jeong, J. Lee (UNIST), D. Yoon, H. Hwang, J. Kim, S. Kim, H. Sun (SK Innovation), S. Park (UNIST), and J. Cho (Ulsan National Institute of Science and Technology)
- **928** A Study on Structural and Electrochemical Properties of Overcharged Ni-based Cathode Materials for Li-Ion Batteries – W. Chang, D. Kim, H. Chang, B. Cho (Korea Institute of Science and Technology), J. Lee (Korea Institute of Energy Research), and K. Chung (Korea Institute of Science and Technology)
- **929** Anode Performance of Ni-P-coated Si Thick-film Electrodes for Li-ion Battery – M. Narita, H. Usui, N. Uchida, and H. Sakaguchi (Tottori University)
- **930** Electrochemical Property of Anderson-Type Polyoxometalates as Cathode Material of Lithium Battery – S. Uematsu, E. Ni, and N. Sonoyama (Nagoya Institute of Technology)
- **931** Microstructure Study of Si Thin Film Anode with Different Adhesion Layers for Li-Ion Batteries – M. Oh, Y. Song (Sungkyunkwan University), T. Yoon (Korea Advanced Institute of Science and Technology), C. Woo, J. Jeong (Korea Institute of Machinery and Materials), H. Lee (Sungkyunkwan University), and S. Hyun (Korea Institute of Machinery and Materials)
- **932** Hydrothermal Synthesis of $LiCoPO_4$ in the Presence of Carboxymethylcellulose – Y. Namiki, H. Munakata, and K. Kanamura (Tokyo Metropolitan University)
- **933** Fabrication of $Li_7La_3Zr_2O_{12}$-Based All-Solid-State Rechargeable Li-Metal Battery – J. Wakasugi, T. Nishioka, H. Munakata, and K. Kanamura (Tokyo Metropolitan University)
- **934** Preparation and Conductivity of Novel Ionic Liquid using Dianionic Hexacoordinated Silicates – M. Nanjo, Y. Nakano, and T. Esaka (Tottori University)
- **935** Structure and Electrochemical Properties of Oxygen-Deficient Li_2MnO_{3-x} – K. Kubota, M. Hirayama, R. Kanno (Tokyo Institute of Technology), M. Yonemura (High Energy Accelerator Research Organization), Y. Imanari, K. Nakane (Sumitomo Chemical Co. Ltd.), M. Cuisinier, N. Dupré (Institut des Materiaux Jean Rouxel (IMN)), and D. Guyomard (IMN – CNRS)
- **936** A Study on the Thermal Behavior of $LiMnPO_4$ Cathode for Li Secondary Battery by Using Synchrotron Based X-ray Techniques – H. Kim, J. Kim, S. Lee, D. Jang, S. Muhammad, W. Yoon (Sungkyunkwan University), Y. Choi, and K. Park (Samsung Advanced Institute of Technology)

- **937** Analysis of Solid Electrolyte Interphase by Glow Discharge Optical Emission Spectroscopy for Li-Ion Battery Electrodes – H. Takahara (Rigaku Corporation), H. Miyauchi (Mitsui Engineering and Ship-Building Co. Ltd.), H. Kobayashi (National Institute of Advanced Industrial Science and Technology (AIST)), Y. Kobayashi (Central Research Institute of Electric Power Industry), and T. Nakamura (University of Hyogo)
- **938** Investigation of the Irreversible Reaction Mechanism on SiO Anode Material for Li-Ion Batteries – H. Yamamura, K. Nobuhara, S. Nakanishi, and H. Iba (Toyota Motor Corporation)
- **939** SiOx Nanoparticles Preparation by an Evaporation and Condesation Process Using Induction Melting – J. Kim (Korea Institute of Energy Research), B. Jang, and J. Lee (Korea Insitute of Korea Research)
- **940** Copper Nanofiber-embedded Cobalt Oxide Thin-Film for High Performance Lithium-Ion Batteries – D. Park (Gwangju Institute of Science & Technology (GIST)), S. Nam (Gwangju Institute of Science and Technology), J. Lee, J. Lee (Gwangju Institute of Science & Technology (GIST)), and W. Kim (Gwagnju Institute of Science and Technology)
- **941** $LiMPO_4$ (M = Fe , Mn) for High Energy Rechargeable Lithium Battery by Solid State Reaction – T. Mahara, H. Miyauchi, H. Tomita, and Y. Sakaguchi (Mitsui Engineering and Ship-Building Co. Ltd.)
- **942** Surface Modified High Capacity Li-Excess Transition Metal Oxide by Metal Phosphates – J. Lim, J. Yeon, S. Lee, H. Sun, and H. Lee (SK Innovation)
- **943** Morphological, Structural and Electrochemical Study of Layered-Spinel Mixed Structure of Li-Mn-Ni-O as Cathode for Lithium ion Batteries – Y. Hwang, J. Choi, M. Christy, A. Zahoor (Chonbuk National University), S. Park (Korean Intellectual Property Office), P. Kim, and K. Nahm (Chonbuk National University)
- **944** Density Functional Theory Studies of Lithium Diffusion on the Step Edge of Graphene Sheets – Y. Kubota (The Kansai Electric Power Company)
- **945** Novel Flux Growth of $Li_{1+x}Mn_{2-x}O_4$ Crystals and Films for All-Crystal-State Lithium Ion Rechargeable Batteries – H. Wagata, H. Inagaki (Shinshu University), T. Ishizaki (Shibaura Institute of Technology), T. Sakaguchi, K. Kohama, S. Oishi (Toyota Motor Corporation), and K. Teshima (Shinshu University)
- **946** Electrochemical Fabrication of Si Nanoparticles on Carbon Nanofiber for High Capacity Anodes of Lithium Ion Battery – S. Choi, S. Woo (Sungkyunkwan University), J. Park, S. Hwang (Samsung Advanced Institute of Technology), and D. Whang (Sungkyunkwan University)
- **947** Lithium Extraction Reaction for the Thin Films of Titanium Dioxide under UV Irradiation – S. Suzuki and M. Miyayama (The University of Tokyo)
- **948** Structural Analysis and Electrochemical Property of Trance Metal Substituted Calcium Ferrite-Type $Li(Mn_xM_{1-x})_2O_4$ (M= Ni, Ti) – M. Mamiya, K. Kataoka, J. Akimoto (AIST), S. Kikuchi, Y. Terajima, and K. Tokiwa (Tokyo University of Science)
- **949** Graphene Oxide: Corrosion Inhibitor on LIB Cathode Current Collector – R. Prabakar and M. Pyo (Sunchon National University)
- **950** Silicon Nanowires Prepared by Zinc-Thermal Reduction of Silicon Tetrachloride and Their Application to Lithium Ion Batteries – R. Han, M. Yamagata (Kansai University), T. Nohira, R. Hagiwara (Kyoto University), and M. Ishikawa (Kansai University)
- **951** $LiNi_{0.6}Co_{0.2}Mn_{0.2}O_2/LiMn_{0.8}Fe_{0.2}PO_4$ Blends as Cathode Materials for High Energy Density Li Ion Battery – G. Choi, N. Kim, H. Lim, and S. Cho (EIG Ltd.)
- **952** A Study on Synthesis and Properties of Nano-Sized Metal Oxide Coated on Carbonnanotubes – Y. Kim, J. Yoon, A. Choi, S. Choi, K. Palanisamy, and W. Yoon (Sungkyunkwan University)
- **953** Electrochemical Performance of $LiNi_{0.5}Mn_{1.5}O_4$ Cathode Material Fabricated from Nanothorn Sphere Structured MnO_2 – S. Lim, W. Ryu, W. Kim, and H. Kwon (Korea Advanced Institute of Science and Technology)
- **954** Electrochemical Characteristics of Structure-modified Soft Carbon as an anode in Lithium Ion Batteries – Y. Jo, E. Lee (Korea Electronics Technology Institute), H. Jeong (Ulsan National Institute of Science and Technology), Z. Lee (UNIST), K. Hong, S. Lee (GS Caltex Corporation), and Y. Kim (Korea Electronics Technology Institute)
- **955** Exploration of Manganese Oxide Based Cathodes for Alkali Metal Ion Batteries – X. Hao and B. Bartlett (University of Michigan)
- **956** Electrochemical Lithiation and Delithiation of Stoichiometric Cu_3Sn and Cu_6Sn_5 Prepared Using Reduction-Diffusion Method – N. Fukuda, A. Kitada, K. Murase, T. Ichii, and H. Sugimura (Kyoto University)
- **957** Preparation of $LiNi_{0.5}Ni_{1.5}O_4$ Cathode Material through Spray Drying Assisted Annealing Process and Its Electrochemical Performance – J. Li (Shanghai Jiao Tong University), M. Lu (Shanghai Jiao tong univerisity), X. Liao (Shanghai Jiaotong University), and Z. Ma (Shanghai Jiao Tong University)
- **958** Highly Dispersed Sulfur in Porous Aromatic Framework as Cathode for Lithium-Sulfur Batteries – B. Guo, X. Sun, and S. Dai (Oak Ridge National Laboratory)
- **959** In-Plane Ionic Conductivity of Li(3x)La(2/3-x) TiO_3 Thin Films Deposited on Perovskite Substrates – F. Aguesse, T. Rojo (CIC Energigune), and J. A. Kilner (Imperial College London)
- **960** Structural and Electrochemical Studies of Mesoporous $Li_4Ti_5O_{12}$-TiO_2 Composite Spheres as Anode Material for Lithium Ion Batteries – S. Ting, C. V. Li, and K. Chan (The University of Hong Kong)
- **961** Method for Mitigating the Effects of Manganese Dissolution in Li-Ion Batteries – N. Levi, M. Levi, D. Aurbach (Bar-Ilan University), Z. Li (Optimal Staffing Solutions), L. Zou (General Motors Company), T. Fuller, and I. C. Halalay (General Motors Global R&D)

- **962** Local Structure Investigations on $Li[Li_{0.2}Mn_{0.4}Co_{0.4}]O_2$ via *In Situ* X-ray Absorption Spectroscopy – R. Kloepsch (University of Muenster), J. Rana (Helmholtz Zentrum Berlin), J. Li (University of Muenster), G. Schumacher (Helmholtz Zentrum Berlin), J. Banhart (Helmholtz-Zentrum Berlin), S. Passerini, and M. Winter (University of Münster)
- **963** Electrochemical Properties of Silicon 1D Nanostructures Prepared by Means of Electrochemical Deposition – D. Kim, H. Seo, and Y. Kang (Korea Research Institute of Chemical Technology)
- **964** Capacity Fading Research on High Voltage Spinel $LiNi_{0.5}Mn_{1.5}O_4$ Coupled with Graphite – Y. Fu, X. Song, P. Ridgway, G. Liu, and V. Battaglia (Lawrence Berkeley National Laboratory)
- **965** Development of Thin Films Si Based Anode Materials for Li^+ Ion Batteries Application – S. T. Hossain and S. Mitra (Missouri State University)
- **966** Stabilized Lithium Metal Powder (SLMP®) – Performance Improvement of Silicon Based Anodes – B. Fitch, Y. Li, and M. Yakovleva (FMC Lithium)
- **967** Cu-Sn Thin Film Production on Copper Substrate – B. Polat (ITU), N. Sezgin, Ö. Keleş, K. Kazmanlı (Istanbul Technical University), A. Abouimrane, and K. Amine (Argonne National Laboratory)
- **968** Use of Cu-Sn/C Multilayered Thin Film in Lithium Ion Batteries – B. D. Polat, N. Sezgin, Ö. Keleş, K. Kazmanlı (Istanbul Technical University), A. Abouimrane, and K. Amine (Argonne National Laboratory)
- **969** The Synthesis and Electrochemical Characterization of Tin Encapsulated by Highly Graphitic Carbon Nanospheres as Anodes for Li-Ion Batteries – K. A. Hays, M. Li, K. Osea-Kwapong, R. P. Kopreski, N. A. Banek, and M. Wagner (The George Washington University)
- **970** *In Situ* Energy Dispersive X-ray Diffraction Study of Prototype $LiMnO_4$- and $LiFePO_4$-Based Coin Cell Batteries – G. Liang (Sam Houston State University), M. Croft (Rutgers – The State University of New Jersey), and Z. Zhong (Brookhaven National Laboratory)
- **971** Hollow Carbon Nanosphere with Germanium Nanoparticles Anode Material for Li-ion Battery – M. Li, K. Hays, R. P. Kopreski, N. Banek, and M. Wagner (The George Washington University)
- **972** The Synthesis and Electrochemical Characterization of Silicon Encapsulated by Highly Graphitic Carbon Nanospheres as Anodes for Li-ion Batteries – R. P. Kopreski, K. Hays, M. Li, N. A. Banek, and M. Wagner (The George Washington University)
- **973** Preparation of Manganese Oxide Cathodes for Lithium Secondary Batteries – J. Moon, H. Munakata, and K. Kanamura (Tokyo Metropolitan University)
- **974** Structural and Optical Properties Study of Porous Silicon Membrane Filled with Lithium Bromide – M. Jaouadi, M. Khardani, W. Dimassi, and H. Ezzaouia (CRTEn)
- **975** Synthesis of Coherent SnO_2/Carbon Cryogel Nanocomposites at Large-Scale for Efficient Lithium Ion Storage – M. Zhang, L. Shen, E. Uchaker (University of Washington), T. Wang (Hunan University), and G. Cao (University of Washington)
- **976** Mesoporous Thin Films: Model Structures to Assess the Role of Porosity in Composite Electrodes – N. Krins, R. Buonsanti, A. K. Shukla, G. Chen, B. Helms, D. Milliron, and T. J. Richardson (Lawrence Berkeley National Laboratory)
- **977** Effects of Maleic Anhydride Electrolyte Additive on Silicon Anode for Lithium-Ion Battery – M. Suguro, M. Yamashiro, K. Nakahara, and K. Nakano (NEC Corporation)
- **978** Cycle Life Characterization of Lithium-Ion Batteries with Artificial Solid-Electrolyte Interphase Coating on Both Electrodes – Y. Eun, S. Woo (Sejong University), D. Kim (Hanyang University), and W. Lee (Sejong University)
- **979** Long-term Cycling of High Energy Li-Ion Battery with NCM Electrode and High Voltage Electrolyte – W. Zhang (Lawrence Berkeley National Lab), G. Liu, and V. Battaglia (Lawrence Berkeley National Laboratory)
- **980** Electrochemical Properties of Delithiated Li_2MnO_3-$LiMO_2$ – S. Yamahara, A. Mineshige, Y. Daiko, and T. Yazawa (University of Hyogo)
- **981** Direct Observation of Battery Reaction Inhomogeneity in Operating Electrode – H. Murayama, T. Fujimoto, T. Kawaguchi, Y. Orikasa, H. Arai, E. Matsubara, Y. Uchimoto, and Z. Ogumi (Kyoto University)
- **982** The Effects of the Slurry Mixing Procedure on Silicon Based Composite Electrodes for Li-Ion Batteries – M. Wu (Lawrence Berkeley National Laboratory), K. Eberman (3M Co.), and G. Liu (Lawrence Berkeley National Laboratory)
- **983** $LiFePO_4$ Cathode Materials prepared by Spray Pyrolysis and Its Electrical Characteristics as a Cathode Material – C. Lee, S. Eun, and S. Kim (Hanbat National University)
- **984** Fabrication of NCM ($LiNi_xCo_yMn_zO_2$)Cathode Materials Prepared by Spray Pyrolysis – J. Park, C. Lee, and S. Kim (Hanbat National University)
- **985** Synthesis and Performance of Anode Material $Li_4Ti_5O_{12}$ by Sol-Gel Method for Lithium Ion Batteries – B. Na and S. Kim (Chungbuk National University)
- **986** Encapsulation of Rechargeable Solid-State Lithium Batteries – J. Ribeiro, R. Sousa, J. Sousa, B. Pereira, M. Silva, L. Goncalves (University of Minho), M. M. Silva (Universidade do Minho), and J. Correia (University of Minho)
- **987** Influence of Fe^{3+} Ions Content for Electrochemical Properties of Nano-Sized Phospho-Olivine as Cathode Material for Li-Ion Batteries – D. Baster, W. Zając, and J. Molenda (AGH University of Science and Technology)

B7 Metal-Air Batteries

Battery / Energy Technology / Fullerenes, Nanotubes, and Carbon Nanostructures
Nautilus 1, Mid-Pacific Conference Center, Hilton Hawaiian Village

Anode – 08:00 – 12:00
Co-Chairs: Jordi Cabana and Jie Xiao

08:00 **1153** (Invited) Protective Layers for the Lithium Electrode Based on Ceramic Phases – J. Cabana (Lawrence Berkeley National Laboratory)

08:40 **1154** (Invited) Factors Affecting the Cycle Life of a Nonaqueous Li-Air Cell with a Protected Anode – D. Im, D. Lee, T. Kim, V. Roev, S. Ma (Samsung Electronics Co.), and S. Doo (Samsung Electronics)

09:20 **1155** Lithium Dendrite Formation between PEO_{18}LiTFSI and Lithium Metal – H. Wang, N. Imanishi, Y. Takeda, and O. Yamamoto (Mie University)

09:40 Intermission (20 Minutes)

10:00 **1156** (Invited) Ultra-High Energy Density Lithium-Air Batteries Based on Protected Lithium Electrodes (PLEs) – S. J. Visco, E. Nimon, B. Katz, M. Chu, and L. De Jonghe (PolyPlus Battery Company)

10:40 **1157** Ionic Conductivity of Garnet-Type $Li_{7-x}La_3Zr_2O_{12-0.5x}$ Solid Electrolyte for Lithium Metal Electrode – Y. Nakata, K. Ishiguro, N. Imanishi, Y. Takeda, and O. Yamamoto (Mie University)

11:00 **1158** Nickel Foam, a Probable Current Collector in Rechargeable Li-Air Batteries – X. Liu and D. Wang (Chinese Academy of Science)

11:20 **1159** Degradation Products on Li-Negative Electrode and the Carbon Cathode in Li-O_2 Batteries – R. Younesi, M. Hahlin, and K. Edström (Uppsala University)

11:40 **1160** Metal-Free "Li-Ion" Air Battery Realized by Controlling Solvation State in Electrolyte – Y. Yamada, M. Yaegashi, K. Furukawa, F. Li (The University of Tokyo), H. Zhou (National Institute of Advanced Industrial Science and Technology), and A. Yamada (The University of Tokyo)

Fundamental Investigation – 13:20 – 17:00
Co-Chairs: Nobuyuki Imanishi and Yi-Chun Lu

13:20 **1161** (Invited) Investigation of Rechargeable Li-Air Battery – D. Zheng, Q. Wang, D. Qu (University Of Massachusetts Boston), and X. Yang (Brookhaven National Laboratory)

14:00 **1162** Effect of Substitution of Cobalt by Manganese on the Properties of Calcium-Doped Lanthanum Cobalt Oxide for Oxygen Reduction Reaction in Alkaline Medium – S. Malkhandi, P. Trinh, A. Manohar, G. Prakash, S. Narayanan (University of Southern California), and A. Manivannan (U.S. Department of Energy)

14:20 **1163** Towards Understanding the Mechanism of the Electrochemical Oxygen Reduction: DFT Modeling and Spectroelectrochemical Validation – P. Biedermann, S. Nayak, and A. Erbe (Max-Planck-Institut für Eisenforschung GmbH)

14:40 **1164** Predictive Modeling of Size-Dependent Dendritic Growth in Dilute-Electrolyte Lithium Metal Batteries with Potentiostatic Cycling – A. Aryanfar, M. Hoffmann, and A. Colussi (California Institute of Technology)

15:00 **1165** Computational Investigations of the Electronic Transport in Lithium-Air Battery Materials – T. Vegge, J. Garcia-Lastra, J. Myrdal, and K. Thygesen (Technical University of Denmark)

15:20 **1166** A Transient Model of an Aqueous Li/Air Battery Forming LiOH (aq) and LiOH•H_2O – P. Albertus (Robert Bosch Research and Technology Center), V. Viswanathan (Stanford University), and J. Christensen (Robert Bosch Research and Technology Center)

15:40 **1167** Oxygen Reduction Catalyst Selection for Lithium Air Batteries via Rotating Ring Disc Electrode Voltammetry and *In Situ* X-ray Absorption Spectroscopy – M. Trahan, S. Mukerjee, and K. Abraham (Northeastern University)

16:00 **1168** Probing Reaction Mechanisms of Li-O_2 Batteries via *In Situ* Ambient Pressure X-ray Photoelectron Spectroscopy – Y. Lu, E. J. Crumlin (Massachusetts Institute of Technology), G. M. Veith (Oak Ridge National Laboratory), J. R. Harding, E. Mutoro (Massachusetts Institute of Technology), L. Baggetto, N. J. Dudney (Oak Ridge National Laboratory), Z. Liu (Lawrence Berkeley National Laboratory), and Y. Shao-Horn (Massachusetts Institute of Technology)

16:20 **1169** Electrochemistry and Transport Limitations of Non-Aqueous Li-Air Batteries from First-Principles – V. Viswanathan, J. S. Hummelshøj, A. C. Luntz, and J. K. Nørskov (Stanford University)

16:40 **1170** Electrochemical Strain Spectroscopy: Monitoring Partially Reversible Electrochemical Processes *In Situ* on Li-Air Battery Electrolytes – T. M. Arruda, A. Kumar, S. Jesse, and S. V. Kalinin (Oak Ridge National Laboratory)

B8 Non-Aqueous Electrolytes for Lithium Batteries

Battery / Energy Technology / Physical and Analytical Electrochemistry
South Pacific 3, Mid-Pacific Conference Center, Hilton Hawaiian Village

Liquid Electrolytes, Ionic Liquid 3 – 08:00 – 09:40
Co-Chairs: Dr. Trulove and Dr. Henderson

08:00 **1223** Ionic Liquid-Lithium Salt-Glyme Mixtures: Understanding the Thermophysical and Transport Properties of Ternary Mixtures – J. E. Weaver, E. T. Fox, E. Parrish, W. A. Henderson (North Carolina State University), and R. A. Mantz (U.S. Army Research Office)

08:20 **1224** Electrochemical Performance of Vitreous Eutectic Electrolytes for Li-Ion Batteries – Y. Shilina, M. Levi, D. Aurbach (Bar-Ilan University), O. Geiculescu, D. DesMarteau (Clemson University), and I. C. Halalay (General Motors Global R&D)

08:40 **1225** Electrolyte Performance of LiFTA-CsFTA Molten Salt for Lithium Secondary Battery – K. Kubota (Advanced Industrial Science and Technology) and H. Matsumoto (National Institute of Advanced Industrial Science and Technology)

09:00 **1226** Ionic Liquid-In-Salt: Characterization of Electrolytes for High Temperature Lithium Batteries – M. J. Marczewski, Y. Choi, J. Scheers, A. Matic, P. Jacobsson, and P. Johansson (Chalmers University of Technology)

09:20 **1227** Joint Theoretical and Experimental Study of Novel Electrolytes Based on Eutectic Mixtures of DMMSA with LiFSI and LiTFSI Salts – D. Bedrov, L. Xing, J. Hooper (The University of Utah), Y. Shilina, M. Levi, D. Aurbach (Bar-Ilan University), O. Geiculescu, D. DesMarteau (Clemson University), and I. C. Halalay (General Motors Global R&D)

Liquid Electrolytes, Organic 1 – 10:00 – 12:00
Co-Chairs: Dr. Jow and Dr. Trulove

10:00 **1228** Development of Electrolytes for Stable Operation and Highly Safe Lithium-Ion Batteries – H. Tokuda (Mitsubishi Chemical Corporation)

10:40 **1229** Concentrated Electrolytes: Improving Oxidative Stability for Use in High Voltage Li-Ion Batteries – D. W. McOwen, J. L. Allen, D. M. Seo, and W. A. Henderson (North Carolina State University)

11:00 **1230** Polyfluorinated Electrolyte Solutions and Additives for High Voltage Non-Flammable Lithium Batteries – H. Sun and Q. Wei (University of South Dakota)

11:20 **1231** Effect of Electrolyte and Additives on Performance of $LiNi_{0.5}Mn_{1.5}O_4$ – M. Xu, D. Lu (The University of Rhode Island), A. Garsuch (BASF SE), and B. L. Lucht (The University of Rhode Island)

11:40 **1232** Electrochemical Stability of an Electrolyte of $LiPF_6$ in Carbonate Ester Containing Trialkoxyboroxine with $LiNi_{0.5}Mn_{1.5}O_4$ Cathode – Y. Tanaka, K. Yamashita, S. Onoda, Y. Iriyama, and T. Fujinami (Shizuoka University)

Liquid Electrolytes, Organic 2 – 14:00 – 15:40
Co-Chairs: Dr. Lucht and Dr. Zhang

14:00 **1233** Tailored Redox Shuttle Additives for Overcharge Protection of Lithium-Ion Batteries – Z. Zhang, L. Zhang, W. Weng, and K. Amine (Argonne National Laboratory)

14:40 **1234** Perfluoronated Phosphazene Based Additives for Improvement of Safety and Battery Lifetimes in Lithium-Ion Batteries – M. K. Harrup, K. L. Gering, H. W. Rollins, S. V. Sazhin, M. T. Benson, D. Jamison, and C. Michelbacher (Idaho National Laboratory)

15:00 **1235** Wide Operating Temperature Range Electrolytes for High Voltage and High Specific Energy Li-Ion Cells – M. C. Smart, C. Hwang, F. C. Krause, J. Soler, W. C. West, B. Ratnakumar (Calfornia Institute of Technology), and K. Amine (Argonne National Laboratory)

15:20 **1236** Initial Decomposition of $LiPF_6$-Based Lithium Battery Electrolytes with Additives – S. Wilken, M. Treskow, J. Scheers, P. Johansson, and P. Jacobsson (Chalmers University of Technology)

Liquid Electrolytes, Organic 3 – 16:00 – 17:40
Co-Chairs: Dr. Zhang and Dr. Lucht

16:00 **1237** Structure of the Graphite Anode Solid Electrolyte Interphase in Lithium-Ion Batteries – B. L. Lucht, M. Nie (The University of Rhode Island), D. P. Abraham (Argonne National Laboratory), Y. Chen, and A. Bose (The University of Rhode Island)

16:40 **1238** The Electrochemical Performance Improvement of Water as an Additive to Graphene-Based Anode Materials – C. Cheng (National Taiwan University of Science and Technology), W. Liu (Chung Yuan Christian University), and F. Wang (National Taiwan University of Science and Technology)

17:00 **1239** Highly Quantitative Electrochemical Characterization of Non-Aqueous Electrolytes and Solid Electrolyte Interphases – S. V. Sazhin, K. L. Gering, M. K. Harrup, and H. W. Rollins (Idaho National Laboratory)

17:20 **1240** A Study of the Solid/Liquid Li^+-Electrolytes Interface – C. O'Laoire, J. S. Syzdek (Lawerence Berkeley National Laboratory), and R. M. Kostecki (Lawrence Berkeley National Laboratory)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

B8 – Poster Session – Electrolytes – 18:00 – 20:00
Co-Chairs: Dr. Jow, Dr. Lucht, and Dr. Trulove

- **1241** Formulation and Properties of Vitreous Eutectic Electrolytes for Li-Ion Batteries – O. Geiculescu, D. DesMarteau, S. Creager (Clemson University), D. Hirschberg, O. Haik, Y. Shilina, E. Zinigrad, M. Levi, D. Aurbach (Bar-Ilan University), and I. C. Halalay (General Motors Global R&D)
- **1242** Synthesis and Electrochemical Performance of Fluorinated Orthoborate Salts as Additives for Li-Ion Battery Electrolytes – O. Geiculescu, D. DesMarteau, S. Creager (Clemson University), V. Borgel, M. Levi, D. Aurbach (Bar-Ilan University), and I. C. Halalay (General Motors Global R&D)
- **1243** Enhanced the Safety of the Lithium-Ion Batteries by the Electrolyte Additive – T. Yeh, J. Chen, S. Liao (Industrial Technology Research Institute), M. Shen, and C. Liu (Formosa Plastics Corporation)
- **1244** Effects of $LiNO_3$ Additive on the Electrochemical Properties of Lithium-Sulfur Batteries – H. Kim (Korea Institute of Science and Technology)

B9 Polymer Electrolyte Fuel Cells 12 (PEFC 12)

Energy Technology / Corrosion / Physical and Analytical Electrochemistry / Battery / Industrial Electrochemistry and Electrochemical Engineering

Tapa 1, Tapa Conference Center, Hilton Hawaiian Village

A.2.1 Visualization – 08:00 – 12:00
Co-Chairs: Daniel Hussey and Ugur Pasaogullari

08:00 **1486** *In Situ* Water Distribution Visualization in MEA by Soft X-ray Radiography – S. Tsushima, P. Deevanhxay, T. Sasabe, and S. Hirai (Tokyo Institute of Technology)

08:40 **1487** Visualization of Liquid Water Accumulation in PEMFCs Operating at Different Temperatures by Soft X-ray Radiography – P. Deevanhxay, T. Sasabe, S. Tsushima, and S. Hirai (Tokyo Institute of Technology)

09:00 **1488** Visualized Liquid Water Evolution in a PEM fuel cell using Synchrotron Radiography – J. Hinebaugh, J. Lee, and A. Bazylak (University of Toronto)

09:20 **1489** Three-Dimensional Studies on Compressed Gas Diffusion Layers and the Water Distribution in Operating Fuel Cells Using Synchrotron X-ray Imaging – C. Tötzke (Technische Unversität Berlin), I. Manke, T. Arlt, H. Markötter, A. Hilger, F. Wieder (Helmholtz-Zentrum Berlin für Materialien und Energie), J. Bohner (Forschungszentrum Jülich), W. Lehnert (Forschungszentrum Jülich GmbH), G. Gaiselmann (Universität Ulm), V. Schmidt (Ulm University), J. Haußmann, J. Scholta (Zentrum für Sonnenenergie- and Wasserstoff-Forschung Baden Württemberg), H. Riesemeier, A. Kupsch (Bundesanstalt für Materialforschung und -prüfung), and J. Banhart (Helmholtz-Zentrum Berlin)

09:40 Intermission (20 Minutes)

10:00 **1490** Neutron Imaging PEMFCs with ~1 μm Spatial Resolution – D. S. Hussey, D. Jacobson (National Institute of Standards and Technology), B. Khaykovich (Massachusetts Institute of Technology), M. V. Gubarev (NASA), D. Spernjak, J. D. Fairweather, R. Mukundan, R. Lujan, and R. L. Borup (Los Alamos National Laboratory)

10:20 **1491** 3D-Visualization of Cathode Catalyst Layer in MEA of Polymer Electrolyte Membrane Fuel Cell by X-ray Computed Laminography XAFS – T. Saida (Natinal Insitute of Natural Sciences Insitute for Molecular Science), O. Sekizawa (The University of Electro-Communications, Tokyo), N. Ishiguro (Natinal Insitute of Natural Sciences Insitute for Molecular Science), K. Uesugi, M. Hoshino (Japan Synchrotron Radiation Research Institute, SPring-8,), T. Uruga (JASRI/SPring-8), S. Ohkoshi (Department of Chemistry, The University of Tokyo), T. Yokoyama (Natinal Insitute of Natural Sciences Insitute for Molecular Science), and M. Tada (Insitute for Molecular Science)

10:40 **1492** Electron Tomography Based 3D Reconstruction of Fuel Cell Catalysts and Catalyst Layers – J. Jankovic (Automotive Fuel Cell Cooperation Corp.), D. Susac (AFCC), T. Soboleva, and J. Stumper (Automotive Fuel Cell Cooperation Corp.)

11:00 **1493** 3D Chemical Mapping of PEM Fuel Cell Cathodes by Scanning Transmission Soft X-ray Spectro-Tomography – V. Berejnov (McMaster University), D. Susac (AFCC), J. Stumper (Automotive Fuel Cell Cooperation Corp.), and A. P. Hitchcock (McMaster University)

11:20 **1494** Heterogeneous Porosity Distribution Under Compression of Gas Diffusion Layer Using Synchrotron X-Ray Tomography – J. Je, S. Doh (Pohang University of Science and Technology), J. Kim (The Korea Atomic Energy Research Institute), and M. Kim (Pohang University of Science and Technology)

11:40 **1495** Effects of Channel Structure and Wettability on Liquid Water Transport in Cathode of PEFC – Y. Ishizaki (Kyoto Institute of Technology), R. Taniguchi (Daikin Industries, LTD.), K. Nishida (Kyoto Institute of Technology), S. Tsushima, and S. Hirai (Tokyo Institute of Technology)

Tapa 3, Tapa Conference Center, Hilton Hawaiian Village

B-2.1 Stack Structure/Components (1) – 08:00 – 12:00
Co-Chairs: Yuichio Tabuchi and Tom Fuller

08:00 **1496** Higher Current Density Operation in PEMFC for Automobile applications – Y. Tabuchi, T. Shiomi, Y. Fukuyama, K. Sato, and N. Kubo (Nissan Motor Co., Ltd)

08:40 **1497** Missions and Progressions of NEDO's Cell Evaluation Project – M. Hori (Daido University), K. Kobayashi (Fuel Cell Research Center, DAIDO University), Y. Oono, and A. Daimaru (Daido University)

09:00 **1498** A 2 kW Power System Based on an Alkaline Membrane Fuel Cell Stack Developed at Cellera Technologies – S. Gottesfeld (cellera Technologies)

09:20 **1499** Investigation on Effect of PTFE Treatment on GDL Micro-structure by High-resolution X-ray CT – T. Sasabe (Tohoku University), G. Inoue (Kyoto University), S. Tsushima, S. Hirai (Tokyo Institute of Technology), T. Tokumasu (Tohoku University), and U. Pasaogullari (University of Connecticut)

09:40 Intermission (20 Minutes)

10:00 **1500** Dynamic Analysis and Diagnostics of a High Temperature PEM Fuel Cell Stack – Y. Zhu, W. Zhu, and B. J. Tatarchuk (Auburn University)

10:20 **1501** Fabrication and Optimization Membrane Electrode Assembly with Support-Less Platinum Catalysts for Space Applications – X. Huang (USC), W. A. Rigdon (University of South Carolina), K. Billings, and T. I. Valdez (California Institute of Technology)

10:40 **1502** Novel Metallic Glass Micro Fuel Cell Architecture – R. C. Sekol, G. Kumar, M. Carmo, S. Mukherjee, F. Gittleson, N. Hardesty-Dycke, J. Schroers, and A. D. Taylor (Yale University)

11:00 **1503** Screening Balance of Plant Materials to Understand their effect on Fuel Cell Performance – H. N. Dinh (National Renewable Energy Laboratory), M. Das (University of South Carolina), K. Neyerlin (National Renewable Energy Laboratory), M. S. Opu (University of South Carolina), H. Wang, C. S. Macomber (National Renewable Energy Laboratory), M. Ohashi, and J. Van Zee (University of South Carolina)

11:20 **1504** Investigating the Performance of Catalyst Layer Micro-Structures with Different Platinum Loadings – M. Khakbaz Baboli, D. B. Harvey, and J. G. Pharoah (Queen's University)

11:40 **1505** Development of Ultra-Low Pt Alloy Cathode Catalyst for PEM Fuel Cells – B. N. Popov, T. Xie, T. Kim, W. Jung, A. Kriston, P. Ganesan (University of South Carolina), and H. Kim (Yonsei University)

Honolulu 2, Tapa Conference Center, Hilton Hawaiian Village

C-2.1 High Temperature PEMFC Membranes 1 – 08:00 – 12:00
Co-Chairs: Deborah Jones and Akihiro Ohira

08:00 **1506** Synthesis and Properties of High Temperature Proton Exchange Membranes Based on Polybenzimidazoles Containing Hydroxypyridine – L. Zhou and R. He (Northeastern University)

08:20 **1507** Polymer Electrolyte Membranes for Fuel Cells of Graft-type sulfonated Polybenzimidazoles – J. Park (The University of Tokyo), M. Asano, Y. Maekawa (Japan Atomic Energy Agency), and K. Kudo (The University of Tokyo)

08:40 **1508** Performance of the HT-PEM Membrane Electrode Assembly – H. Hjuler, T. Steenberg, C. Terkelsen, T. Holst, H. Garcia (Danish Power Systems), and K. Cooper (Scribner, Inc.)

09:00 **1509** Performance Analysis of a HT-PEM Fuel Cell under Mechanical Compression Control – A. Diedrichs and P. Wagner (NEXT ENERGY – EWE-Research Centre for Energy Technology)

09:20 **1510** Thermogravimetric and Spectroscopic Investigation of the Interaction between Polybenzimidazole and Phosphoric Acid – A. Majerus, F. Conti, C. Korte, W. Lehnert, and D. Stolten (Forschungszentrum Jülich GmbH)

09:40 Intermission (20 Minutes)

10:00 **1511** Sulfonated-Nanocomposites Incorporated Polybenzimidazole Based Polymer Electrolyte Membranes for Fuel Cells – K. A. Stewart and H. Pal Singh Missan (University of the West Indies)

10:20 **1512** Novel Polybenzimidazole-Phosphoric Acid Membranes for Fuel Cell Applications – G. W. Yeager (General Electric), L. Krishnan, E. Thomas, and T. Zhang (GE Global Research)

10:40 **1513** A Novel, Easy to Synthesize, Anhydrous Derivative of Phosphoric Acid for Use as Electrolyte in H_2/O_2 Fuel Cells – Y. Ansari, T. Tucker, and A. Angell (Arizona State University)

11:00 **1514** Non-Humidified Fuel Cells Using a Protic Ionic Liquid as Electrolyte – T. Yasuda, Y. Honda, R. Tatara, K. Dokko, and M. Watanabe (Yokohama National University)

11:20 **1515** A Non-humidified Fuel Cell Using Fluorohydrogenate Ionic Liquid-Polymer Composite Membrane Prepared by Living Radical Polymerization – P. Kiatkittikul, J. Yamaguchi, T. Nohira, R. Hagiwara, Y. Tsujii (Kyoto University), and T. Sato (Tsuruoka National College of Technology)

11:40 **1516** Intermediate-Temperature Fuel Cells Using an Anhydrous Proton Conductor $A^{III}_{0.5}B^{V}_{0.5}P_2O_7$ – P. Heo (Samsung Advanced Institute of Technology), Y. Shen (Nagoya University), M. Nagao (California Institute of Technology), K. Kim, C. Pak, K. Choi, H. Chang (Samsung Advanced Institute of Technology), and T. Hibino (Nagoya University)

Tapa 2, Tapa Conference Center, Hilton Hawaiian Village

D-2.1 Pt-Based Cathode Catalysts 1 – 08:00 – 12:00
Co-Chairs: Tatsuya Hatanaka and Rohit Makharia

08:00 **1517** U.S. Department of Energy Polymer Electrolyte Membrane Fuel Cell Catalyst Development Activities – T. G. Benjamin (Argonne National Laboratory), K. Epping-Martin, N. L. Garland, D. L. Ho (U.S. Department of Energy), J. P. Kopasz (Argonne National Laboratory), D. C. Papageorgopoulos (U.S. Department of Energy), and W. F. Podolski (Argonne National Laboratory)

08:20 **1518** Performance and Durability Benchmark of Advanced Cathode Catalysts, and Development Target for Platinum Reduction in PEM Fuel Cell Vehicles – R. Makharia, T. Greszler, and N. Subramanian (General Motors)

08:40 **1519** Theoretical Study on Particle Size effect of Oxygen Reduction Reaction on Pt Catalyst – Y. Kawamura (Toyota Motor Corporation) and R. Jinnouchi (Toyota Central R&D Laboratory)

09:00 **1520** The Particle Size Effect on the Oxygen Reduction Reaction Activity of Pt Catalysts: Influence of Electrolyte and Relation to Single Crystal Models – M. Nesselberger (University of Copenhagen)

09:20 **1521** Synthesis of Platinum Catalyst Clusters and Electrochemical Investigation of Stability – R. A. Hackendorn and A. V. Virkar (The University of Utah)

09:40 Intermission (20 Minutes)

10:00 **1522** Pt Nanoparticles Dispersion Influence on the Fuel Cell Performance – M. Darab (NTNU), J. Gómez de la Fuente, M. Skinlo Thomassen (SINTEF), and S. Sunde (Norwegian University of Science and Technology)

10:20 **1523** Electrocatalytic Behavior of Tailored Shape Platinum Nanoparticles – S. Baranton, P. Urchaga, C. Coutanceau (Université de Poitiers), and G. Jerkiewicz (Queen's University)

10:40 **1524** First-Principles Analysis of the Electrocatalytic Activity of Pt(100) Surface for Oxygen Reduction Reaction – B. Han (Daegu Gyeongbuk Institute of Science and Technology (DGIST)), V. Viswanathan (Stanford univerity), and H. Pitsch (Stanford University)

11:00 **1525** Analysis of Pt Oxide Formation on Working Cathode of PEFC by Operando-XAFS – T. Hatanaka, K. Hiroshima, Y. Nishimura, T. Nonaka, K. Dohmae (Toyota Central R&D Labs. Inc.), R. Jinnouchi (Toyota Central R&D Laboratory), and Y. Morimoto (Toyota Central R&D Labs. Inc.)

11:40 **1526** The effect of Platinum Oxide Growth on Platinum Stability in PEMFCs – E. L. Redmond, P. Trogadas, F. M. Alamgir, and T. F. Fuller (Georgia Institute of Technology)

Honolulu 3, Tapa Conference Center, Hilton Hawaiian Village

E-2.1 Small Organic Molecule Oxidation in Acid – 08:00 – 12:00
Co-Chairs: Bruno Pollet and Christophe Coutanceau

08:00 **1527** A Ternary Catalyst for Dimethyl Ether Electrooxidation – Q. Li, G. Wu, C. Johnston, and P. Zelenay (Los Alamos National Laboratory)

08:20 **1528** Pt Decorated Amorphous RuIr Alloys as High Efficiency Electrocatalyst for the Methanol Oxidation Reaction – B. G. Pollet (HySA Systems Competence Centre)

08:40 **1529** Ethanol Oxidation Reaction on Tandem-type Pt/Rh/SnO_x Electrocatalysts – H. Inoue, A. Haze, M. Chiku, and E. Higuchi (Osaka Prefecture University)

09:00 **1530** Development of High Performance Direct Formic Acid Fuel Cell Using Hyper Branched Polymer as a Catalyst Stabilizer – T. Tsujiguchi, M. Kojima, T. Iwakami, N. Nakagawa (Gunma University), and K. Kojima (Nissan Chemical Industries, Ltd.)

09:20 **1531** Carbon-TiO_2 Composite Nanofibers as a Promising Support for PtRu Anode Catalyst of DMFC – M. A. Abdelkareem, Y. Ito, T. Tsujiguchi, and N. Nakagawa (Gunma University)

09:40 Intermission (20 Minutes)

10:00 **1532** O_2-Enhanced Methanol Oxidation at Pt-Ru-C Ternary Sputtered Electrode – S. Shironita, M. Ueda, and M. Umeda (Nagaoka University of Technology)

10:20 **1533** Enhancement of Catalytic Properties for the Electrooxidation of Polyols on Bi-Modified Pt and Pd Nanoparticles – C. Coutanceau, S. Baranton, M. Simoes, and L. Demarconnay (Université de Poitiers)

10:40 **1534** Electrochemical Behavior and Morphology of Nano Catalyst for Fuel Cell: The effect of Ultrasonic and Microwave Techniques – V. Tran, T. Doan, N. Duong, M. Le, and T. Nguyen (Vietnam National University)

11:00 **1535** Novel 3-D Graphite Oxide-Nanoribbon Supported Metal Catalysts for Methanol Oxidation Reaction – H. Wang, B. A. Kakade, T. Tamaki, H. Ohashi, and T. Yamaguchi (Tokyo Institute of Technology)

11:20 **1536** Reaction Analysis of Alcohol Electro-oxidation at Intermediate Temperatures – J. Otomo, I. Shimada, F. Kosaka, K. Ishiyama, and Y. Oshima (The University of Tokyo)

11:40 **1537** The Impact of Formaldehyde and Formic Acid on Methanol Electrooxidation at Pt-film Electrode: A Combined ATR-FTIRS/DEMS Study – R. Reichert, J. Schnaidt, Z. Jusys, and R. Behm (Ulm University)

Tapa 1, Tapa Conference Center, Hilton Hawaiian Village

A-2.2 Diagnostics – 14:00 – 18:00
Co-Chairs: Xinyu Huang and Jian Xie

14:00 **1538** Application of Impedance Spectroscopy to Characterize PEM Fuel Cells – M. E. Orazem (University of Florida)

14:40 **1539** Performance Characterization of PEM Fuel Cell Stacks Using AC impedance Spectroscopy – J. O. Park, J. Yi, J. Kim, T. Song, and J. Ko (Samsung Advanced Institute of Technology)

15:00 **1540** Study on Protocols for Evaluating Reactant Gas Transport in Cathode Catalyst Layers of PEFC – H. Yasuda, K. Kobayashi, A. Daimaru, and M. Hori (Daido University)

15:20 **1541** An Oxygen Flux Interrupt Method and *In Situ* Micro-Sensor for Characterizing Oxygen Transport in PEFCs – W. K. Epting and S. Litster (Carnegie Mellon University)

15:40 **1542** Measurements of Water Vapor and Current Distributions and Prediction of Water Crossover in PEMFC under Low-Humidity Conditions – K. Nishida, M. Asa (Kyoto Institute of Technology), S. Tsushima, and S. Hirai (Tokyo Institute of Technology)

16:00 Intermission (20 Minutes)

16:20 **1543** In-plane Liquid Water Distribution at the Interface Between the Gas Diffusion Layer and Catalyst Layer in the Cathode of a Polymer Electrolyte Fuel Cell with a Hybrid Pattern Flow Field – H. Nakajima, T. Kitahara, Y. Takazono, S. Miyahara, and A. Shimizu (Kyushu University)

16:40 **1544** Segmented PEMFC with Sub-millimeter Resolution – U. Shrivastava, A. Sarkar, and K. Tajiri (Michigan Technological University)

17:00 **1545** Using a Novel Current Distribution Board to Understand Local Water Transport in PEMFCs – V. Lilavivat, S. Shimpalee, J. Van Zee (University of South Carolina), C. Mittelsteadt, and H. Xu (Giner Inc.)

17:20 **1546** Design of An Optical Fiber Sensor for *In Situ* Measurement of Temperature and Water Droplet Detection in a PEM Fuel Cell – K. Inman and X. Wang (Oakland University)

17:40 **1547** Calculating Hydrogen Mass Transport Coefficients in a PEMFC at Different Operating Conditions Using a Hydrogen Pump Configuration – M. Angelo, K. Bethune, and R. Rocheleau (University of Hawaii)

Tapa 3, Tapa Conference Center, Hilton Hawaiian Village

B-2.2 Stack Structure/Components (2) – 14:00 – 15:20
Co-Chairs: Doug Hansen and Kazuhiko Shinohara

14:00 **1548** Manufacturing All-Polymer Laminar Flow-Based Fuel Cells – A. Hollinger (UIUC) and P. J. Kenis (University of Illinois at Urbana-Champaign)

14:20 **1549** Fabricating and Measuring Low-Platinum Content HOR/HER Gas Diffusion Electrodes – Y. Zhang, J. Wang (Brookhaven National Laboratory), Y. Hsieh (National Chiao Tung University), and R. R. Adzic (Brookhaven National Laboratory)

14:40 **1550** Fabrication of Bipolar Plates Based on Graphite Sheet via Stamping Method – T. Park, I. Chang, Y. Lee, and S. Cha (Seoul National University)

15:00 **1551** A Novel Lightweight Polymer Electrolyte Fuel Cell Stack for Robot Systems – S. Hwang, J. Jang, G. Choi, S. Lee, O. Kwon, D. Lee, A. Bates, R. M. Ench (Daegu Gyeongbuk Institute of Science & Technology), and S. Park (University of Louisville)

Honolulu 2, Tapa Conference Center, Hilton Hawaiian Village

C-2.2 Perfluorosulfonic Acid Membranes 2 – 14:00 – 17:40
Co-Chairs: Hideki Nakagawa and Mark Edmundson

14:00 **1552** Copolymeric Short-Long Side Chain PFSA/PTFE Composite Membranes with High Ion Exchange Capacities for Fuel Cell Applications – Y. Zhang and Y. Zhu (Shanghai Jiao Tong University)

14:40 **1553** Effect of Thermal Treatment on the Properties of Ultra-Thin Nafion Film – D. K. Paul (Queen's University & Queen's – RMC Fuel Cell Research Centre) and K. Karan (Queen's University)

15:00 **1554** Role of Chemical-Mechanical Energies in Understanding Structure and Properties of Aged and Degraded Membranes – A. Kusoglu and A. Weber (Lawrence Berkeley National Laboratory)

15:20 **1555** Numerical Validation of Water Transport in Polymer Electrolyte Membranes – R. S. Fu, N. Khajeh-Hosseini-Dalasm, and U. Pasaogullari (University of Connecticut)

15:40 **1556** On the Diffusion Coefficient of Water in Polymer Electrolyte Membranes – T. Berning, A. Olesen, and S. K. Kær (Aalborg University)

16:00 Intermission (20 Minutes)

16:20 **1557** A Study on Structural Property of Ionomer as A Model for Catalyst Layer – A. Ohira (AIST), S. Kuroda (Fuel Cell Cutting-Edge Center, Technology Research Association), M. Yamaguchi, M. Barique, and H. Mohamed (uel Cell Cutting-Edge Center, Technology Research Association)

17:00 **1558** Accelerated Testing of Carbon Corrosion and Membrane Degradation in PEM Fuel Cells – R. Mukundan (Los Alamos National Laboratory), G. James, D. Ayotte (Ballard Power Systems), J. Davey, D. Langlois, D. Spernjak, D. Torraco (Los Alamos National Laboratory), S. Balasubramanian, A. Weber (Lawrence Berkeley National Laboratory), K. L. More (Oak Ridge National Laboratory), and R. L. Borup (Los Alamos National Laboratory)

17:20 **1559** Degradation of Perfluorosulfonic Acid Membrane Water Permeance via Formation of Sulfonic Acid Anhydrides – S. Clapham, F. D. Coms, T. Fuller, and L. Zou (General Motors Company)

Tapa 2, Tapa Conference Center, Hilton Hawaiian Village

D-2.2 Pt-Based Cathode Catalysts 2 – 14:00 – 18:00
Co-Chairs: Bryan Pivovar and Peter Strasser

14:00 **1560** High-Fidelity Simulations of Nano-Structured Thin Film (NSTF) Catalysts – S. Kim, Z. Zhou (Michigan Technological University), and K. Moriyama (Honda R&D)

14:20 **1561** DFT Study of Pt Alloy and Pt Thin Film Catalysts for the Cathode Oxygen Reduction Reaction in PEM Fuel Cells – W. Goddard III, Y. Sha, T. Yu, H. Tsai, B. V. Merinov (California Institute of Technology), and P. Shirvanian (Ford Motor Co.)

14:40 **1562** Development of Alternated Catalyst Layer Structure for PEM Fuel Cells – W. MEI, T. Fukazawa, Y. Nakano, Y. Akasaka, and K. Naito (Toshiba Coporate R&D Center)

15:00 **1563** Theoretical Study of the Structure, Stability and Oxygen Reduction Activity of Ultrathin Platinum Nanotubes – I. Matanovic, F. H. Garzon (Los Alamos National Laboratory), P. R. Kent (Oak Ridge National Laboratory), and N. J. Henson (Los Alamos National Laboratory)

15:20 **1564** Oxygen Reduction Activity of Vapor-Grown Platinum Nanotubes – A. B. Papandrew, R. Atkinson, G. A. Goenaga, D. L. Wilson (The University of Tennessee), S. S. Kocha, K. Neyerlin, J. W. Zack, B. S. Pivovar (National Renewable Energy Laboratory), and T. A. Zawodzinski Jr. (The University of Tennessee)

15:40 **1565** Activity and Durability of Pt Extended Network Electrocatalyst Structures Made from Spontaneous Galvanic Displacement – K. Neyerlin, B. A. Larsen, S. S. Kocha, and B. S. Pivovar (National Renewable Energy Laboratory)

16:00 Intermission (20 Minutes)

16:20 **1566** Important Role of Cerium Oxide in Oxygen Reduction Reaction at Pt-CeOx Nanocomposite Electrocatalyst Studied by *In Situ* Electrochemical XAFS – T. Masuda (NIMS), H. Fukumitsu, K. Fugane, H. Togasaki (National Institute for Materials Science), D. Matsumura, K. Tamura, Y. Nishihata (Japan Atomic Energy Agency), H. Yoshikawa, K. Kobayashi, T. Mori (National Institute for Materials Science), and K. Uosaki (NIMS)

16:40 **1567** Effect of Silicotungstic acid on Cathode Performance in Proton Exchange Membrane Fuel Cells – P. Baker, H. R. Kunz, and L. Bonville (University of Connecticut)

17:00 **1568** Analyzing the effect of Ultra-Low Pt Loading on Mass and Specific Activity of PEM Fuel Cells – A. Kriston, T. Xie, T. Kim, W. Jung, P. Genesan, and B. N. Popov (University of South Carolina)

17:20 **1569** Impact of Platinum Loading and Catalyst Layer Structure on PEMFC Performance – J. Owejan (General Motors Electrochemical Energy Research Laboratory), J. Owejan, and W. Gu (General Motors)

17:40 **1570** Multi-Step Oxygen Reduction Reaction (ORR) Kinetics on Pt including Water Activation – B. Jayasankar, K. Karan, and D. B. Harvey (Queen's University)

Honolulu 3, Tapa Conference Center, Hilton Hawaiian Village

E-2.2 Materials and Fuels for Alkaline Systems – 14:00 – 18:00
Co-Chairs: Zenonas Jusys and Elöd Gyenge

14:00 **1571** Borohydride Electrooxidation: New Insights Based on an Old Paradigm – S. Sun, Z. Jusys, and R. Behm (Ulm University)

14:40 **1572** Hydrazine Electrooxidation of Ni-La Catalysts for Anion Exchange Membrane Fuel Cells – T. Sakamoto, K. Asazawa (Daihatsu Motor Co. Ltd.), U. Martinez, B. Halevi, P. Atanassov (The University of New Mexico), K. Yamaguchi, N. Mizuno (University of Tokyo), D. Matsumura, Y. Nishihata (Japan Atomic Energy Agency), and H. Tanaka (Daihatsu Motor Co. Ltd.)

15:00 **1573** Effect of Carbonate Ion Species on Power Generation Characteristics of Anion Exchange Membrane Fuel Cell – S. Suzuki, H. Muroyama, T. Matsui, and K. Eguchi (Kyoto University)

15:20 **1574** Investigations of the Anodic Oxidation of Ethanol under Forced Convection and Ambient Conditions – J. O. Meier, C. Cremers (Fraunhofer ICT), U. Stimming (Technische Universität München), and J. Tübke (Fraunhofer ICT)

15:40 **1575** Development of a Swiss-Roll Mixed-Reactant Feed Direct Borohydride Fuel Cell – A. Aziznia, C. W. Oloman, and E. L. Gyenge (The University of British Columbia)

16:00 Intermission (20 Minutes)

16:20 **1576** Direct Borohydride Fuel Cells: A Progress Review from Electrocatalysis to Novel Mixed Reactant Fuel Cell Design – E. L. Gyenge (The University of British Columbia)

17:00 **1577** Improvement of Properties of Anion Exchange Membranes for Fuel Cell Applications by Controlling Water State – H. Jung, H. Ohashi, T. Tamaki, and T. Yamaguchi (Tokyo Institute of Technology)

17:20 **1578** Boron and Phosphorus Co-Doped Graphene as Metal-Free Catalysts for Oxygen Reduction Reaction in Alkaline Medium – G. Jo and S. Sangaraju (Daegu Gyeongbuk Institute of Science & Technology)

17:40 **1579** Hydroxide Based Decomposition of Functionalized Benzyltrimethylammonium Cations – C. S. Macomber (National Renewable Energy Laboratory), H. Long, E. Gjersing, C. Engtrakul (National Renewable Energy Lab), C. Lyiza, Y. Yang, D. Knauss (Colorado School of Mines), and B. S. Pivovar (National Renewable Energy Laboratory)

B10 Renewable Fuels from Sunlight and Electricity

Energy Technology / High Temperature Materials / Physical and Analytical Electrochemistry / New Technology Subcommittee

Nautilus 2, Mid-Pacific Conference Center, Hilton Hawaiian Village

Photoelectrochemical Cells and Biological Devices – 08:00 – 09:50
Co-Chairs: Pawel Kulesza and Jae-Joon Lee

08:00 **1749** Photocatalytic Hydrogen Production from Sunlight via Tuning the Band Gaps Using Impurities-Doping Techniques – H. Yun, S. Yu, and J. Yi (Seoul National University)

08:30 **1750** Fueling Vehicles with Sun and Water – K. E. Ayers, E. B. Anderson, K. Dreier (Proton OnSite), and K. W. Harrison (National Renewable Energy Laboratory)

09:00 **1751** Photobiological H_2 Production: Theoretical Maximum Light Conversion Efficiency and Strategies to Achieve it – M. L. Ghirardi (National Renewable Energy Laboratory)

09:30 **1752** Vectorial Enzyme Activation at Illuminated Semiconductor-Enzyme-Electrolyte Junctions – K. Skorupska, H. Lewerenz (Helmholtz Zentrum Berlin), and P. J. Kulesza (University of Warsaw)

Photoelectrochemical Cells and Photocatalysts – 10:00 – 12:20
Co-Chairs: Nick Wu and Hyunwoong Park

10:00 **1753** ITO Nanowire-Based Photoelectrodes for Extremely Fast Charge Collection – J. Noh (KRICT-EPFL Global Research Laboratory), J. Kim (Korea Institute of Science), G. Han (Sungkyunkwan University), H. Shin (Kookmin Universiry), and H. Jung (Sungkyunkwan University)

10:20 **1754** Straightforward Measurement of Photoelectrode Minority Carrier Diffusion Length – A. J. Leenheer, R. A. Pala, and H. A. Atwater (California Institute of Technology)

10:40 **1755** Silicon Based Tandem Cells: A Novel Photocathode for Efficient PEC Water Splitting – E. Murugasen, W. Calvet, B. Kaiser, and W. Jaegermann (Technical University Darmstadt)

11:00 **1756** Enhancement of Photoactivity in Hematite Film with Controlled Morphology and Texture from Direct Spray Pyrolysis for Solar Water Splitting – T. Yang, H. Kang, J. Lee, B. Koo, K. Nam, and Y. Joo (Seoul National University)

11:20 **1757** Photoelectrochemical Hydrogen Production: Insights on Disrupting the Stability/Efficiency Trade-Off – T. Schiros (Columbia University), J. Leisch, H. Ohldag (Stanford Synchrotron Radiation Light Source), H. Ogasawara (Stanford Synchrotron Radiation Lightsource), M. Toney, A. Nilsson (Stanford Synchrotron Radiation Light Source), T. G. Deutsch (National Renewable Energy Laboratory), W. Choi (Lawrence Livermore National Laboratory), M. Mayer (University of California, Berkeley), and J. Turner (National Renewable Energy Laboratory)

11:40 **1758** Photoelectrosynthetic Hydrogen Evolution from Free-Standing Silicon Microwire Arrays – S. Ardo, E. L. Warren, S. Park, B. S. Brunschwig, H. A. Atwater, and N. S. Lewis (California Institute of Technology)

12:00 **1759** Visible-Light-Absorbing Polyoxometalates as Building Blocks for All-Inorganic Photosynthetic Assemblies – R. Nakamura, T. Takashima, A. Yamaguchi, and K. Hashimoto (The University of Tokyo)

Keynote Speech on Electrochemical Devices and Fuels – 14:00 – 16:00
Co-Chairs: Xiao-Dong Zhou and Nick Wu

14:00 **1760** Reversible Fuel Cells for Power Generation and Fuel Production – A. V. Virkar (The University of Utah)

14:40 **1761** Integrative Multiphysics Development of Material Systems for a Renewable Future: The HeteroFoaM Story – K. Reifsnider (University South Carolina), Y. Du (University of South Carolina), W. K. Chiu (University of Connecticut), and K. Brinkman (Savannah River National Laboratories)

15:20 **1762** Solid Oxide Fuel Cell Systems for Small Scale Power Generation – S. C. Singhal (China University of Mining and Technology) and X. Zhou (University of South Carolina)

Keynote/Invited Speech on Eelctrochemical Devices and Fuels – 16:20 – 17:40
Co-Chair: Wilson Chiu

16:20 **1763** Design and Preparation of Pt Nanocatalysts of High Surface Energy for Efficient Energy Conversion of Small Organic Molecule Fuels in Direct Fuel Cells – S. Sun, R. Huang, S. Chen, Z. Liu, Z. Zhou, L. Huang, N. Tian, Y. Jiang, and Y. Cai (Xiamen University)

17:00 **1764** Reversible Solid Oxide Fuel Cells: Status and Technology Development Challenges – N. Q. Minh (University of California, San Diego)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

B10 – Poster Session – Renenable Energy and Fuels – 18:00 – 20:00
Co-Chairs: Nick Wu and Xiao-Dong Zhou

- **1765** Microscopic Properties of III-V Semiconductor Photocathodes at the Interface with Water – B. C. Wood, W. Choi, E. Schwegler, and T. Ogitsu (Lawrence Livermore National Laboratory)
- **1766** Structural and Photoelectrochemical Evaluation of Nano-Textured Sn-Doped $AgInS_2$ Films Prepared by Spray Pyrolysis – Q. Cheng and C. K. Chan (Arizona State University)
- **1767** Photoelectrochemical Hydrogen Production from Silicon Nanostructures – S. Hwang, J. Kye (Myongji University), and I. Oh (Kumoh National Institute of Technology)
- **1768** Lowering Overpotential of Electrochemical Reduction of CO_2 – W. Shin, D. Saravanakumar, and J. Song (Sogang University)
- **1769** Synthesis and Electrochemical Properties of Platinum-Based Films Used as Cathode Materials in the Dye-Sensitized Solar Cells – P. Hien, L. M. Phung, N. T. Hoang, and N. T. Thoa (Vietnam National University)
- **1770** The Properties According to Pore Former with SOFC Unit Cell Using Decalcomania Method – M. Lee, B. Kim, B. Choi, and S. Kim (Korea Institute of Ceramic Engineering and Technology)
- **1771** Solar Hydrogen Generation at Pre-Structured Silicon Photocathodes Activated by Bimetallic Nanoparticles – M. Lublow (Fritz-Haber-Institute of the Max-Planck-Society), C. Merschjann, and T. Schedel-Niedrig (Helmholtz-Centre-Berlin for Materials and Energy)
- **1772** Understanding the Reaction Mechanism in the Sugar-Air Flow Battery – S. Li (University of Hawaii at Manoa), D. Scott (Brigham Young University – Hawaii), and B. Liaw (University of Hawaii at Manoa)
- **1773** Catalytic Reduction of Carbon Dioxide to Carbon Monoxide Using the Rhenium(I) Complex (5,5'-Bisphenylethynyl-2,2'-Bipyridyl)$Re(CO)_3Cl$ – E. Portenkirchner, K. Oppelt, C. Ulbricht, D. A. Egbe, H. Neugebauer, G. Knör, and N. Sariciftci (Johannes Kepler University Linz)
- **1774** New Polyethylene Based Anion Exchange Membranes (PE-AEMs) with High Ionic Conductivity – M. Zhang, H. Kim, E. Chalkova, F. Mark, S. N. Lvov, and T. Chung (The Pennsylvania State University)
- **1775** Ruthenium-Based Materials for Oxygen and Hydrogen Evolution Catalysis in Photoelectrochemical Applications – Y. Chang, J. M. Kaneshiro, and N. M. Gaillard (University of Hawaii at Manoa)
- **1776** Membranes for Solar Water Splitting Devices – S. Ardo (California Institute of Technology), M. McDonald (University of Manitoba), S. Park, M. DiFranco (California Institute of Technology), M. Freund (University of Manitoba), and N. S. Lewis (California Institute of Technology)
- **1777** A Non-Combustible Process for Generating Energy from Bio-Waste – A. Kumar, V. Kamavaram, V. Veedu, and K. Cheung (Oceanit Laboratories Inc)
- **1778** Electrochemistry of Molybdenum and Its Oxides for CIGS Solar Cells – V. S. Saji, S. Lee, Y. Yeon, and C. Lee (Korea University)
- **1779** Interhalogen-Based Binary-Redox Couples for High-Voltage Solar Cells – N. C. Deb Nath, S. Sarker, H. Lee, and J. Lee (Konkuk University)
- **1780** Development of an Artificial Co-Enzyme for Formate Dehydrogenose with the Function of CO_2 Reduction – S. Ikeyma and Y. Amao (Oita University Dannoharu)
- **1781** Photoelectrochemical Dehydrogenation of Ammonia Borane with Pt/n-Si – H. Inoue, C. Matsuda, M. Shimada, M. Chiku, and E. Higuchi (Osaka Prefecture University)
- **1782** The Activity of Ash-free Coal in Direct Carbon Fuel Cells – H. Ju, J. Kim (Gwangju Institute of Science and Technology), J. Lee (Gwangju Institute of Science & Technology (GIST)), S. Lee, R. Song (Korea Institute of Energy Research), and J. Lee (Gwangju Institute of Science & Technology (GIST))

- **1783** *In Situ* FTIR Analysis of CO_2 Electrochemical Reduction at Copper Electrodes – M. Ren, E. Andrews, and J. Flake (LSU)
- **1784** Theoretical Characterization of Ammonia Oxidation Intermediates and Products on Platinum Clusters – D. A. Daramola and G. G. Botte (Ohio University)
- **1785** Evaluation of Current Efficiency of SOEC Using Precise On-Line Gas Analysis – Y. Tanaka (National Institute of Advanced Industrial Science and Technology), S. Nakamura (Tokyo University of Science), K. Sato, K. Nozaki, T. Kato, and A. Yamamoto (National Institute of Advanced Industrial Science and Technology)
- **1786** Metal Tungstates as Oxygen Evolution Catalysts – H. Jia (Toyota Research Institute of North America), T. Sekito (Toyota Motor Corporation), J. Stark, L. Zhou, and L. Chen (Toyota Research Institute of North America)
- **1787** Modified Fe_2O_3 Photoanodes Prepared by Pulse Electrodeposition – W. J. Lee, P. Shinde, and G. Go (Korea Electrotechnology Research Institute)
- **1788** Polycrystalline Cu(In, Ga)Se_2 Thin Films and PV Devices Sputtered from a Binary Target without Additional Selenization – P. Liu (National Chiao Tung University), B. B. Jheng, and M. Wu (National Tsing Hua University)
- **1789** Theoretical Investigations of Transition Metal Nano-Clusters for Electrochemical NH_3 Production – J. G. Howalt and T. Vegge (Technical University of Denmark)
- **1790** Choline Chloride Enhancement of Carbon Dioxide Reduction on Platinum Catalysts – W. Zhu, B. Rosen, A. Salehi-Khojin, and R. Masel (Dioxide Materials Inc.)
- **1791** Structure Sensistivity of CO_2 Conversion on EMIM-BF4 Silver Co-Catalyst System – A. Salehi-khojin, B. Rosen, W. Zhu, and R. Masel (Dioxide Materials Inc.)
- **1792** Basic Study of Alkaline Water Electrolysis – A. Manabe (Chlorine Engineers Corp. Ltd.), T. Hashimoto, M. Kashiwase (Chlorine Engineers Corp., Ltd.), M. Kurosaki, T. Hayashida, K. Hirao (Permelec Electrode Ltd.), I. Shimomura, and I. Nagashima (Kawasaki Heavy Industries, Ltd.)
- **1793** CO_2 Reduction at Glassy Carbon Electrode in the Presence of Pyridine – J. Agullo, M. Morin, and D. Bélanger (Université du Québec à Montréal)
- **1794** Cu Monolayer on Au/C and Pt/C for the Electrochemical Reduction of CO_2 to Hydrocarbons – I. L. Escalante-Garcia, J. S. Wainright, and R. F. Savinell (Case Western Reserve University)
- **1795** Ti-Doped Hematite Nanostructures for Solar Water Splitting with High Efficiency – J. Deng, J. Zhong, A. Pu, D. Zhang, and X. Sun (Soochow University)
- **1796** Electrochemical Synthesis of Disordered Three-Dimensional Cuprous Oxide (Cu_2O) Film and Its Photoelectrochemical Properties – S. Yoon (Hanyang University), M. Kim, J. Lim, K. Lee (Korea Institute of Materials Science), and B. Yoo (Hanyang University)
- **1797** Impact of Nitrogen Treatment on the Electronic and Chemical Structure of $GaInP_2$ Thin-Film Surfaces – M. G. Weir, K. E. George (University of Nevada), T. G. Deutsch, A. Welch (National Renewable Energy Laboratory), R. G. Wilks (Helmholtz Zentrum Berlin), D. C. Hanks, M. Blum (University of Nevada), W. Yang (Lawrence Berkeley National Laboratory), M. Bär (Helmholtz Zentrum Berlin), L. Weinhardt (University of Nevada), J. A. Turner (National Renewable Energy Laboratory), and C. Heske (University of Nevada)
- **1798** A Ceramic-Anode Supported Low Temperature Solid Oxide Fuel Cell – H. Ding, J. Ge, and X. Xue (University of South Carolina)
- **1799** Electrochemical Decomposition of Urea with Ni-Based Catalysts – W. Yan, D. Wang, and G. G. Botte (Ohio University)
- **1800** Transport Phenomena in Acid-Alkaline Membrane Bi-Cell Configurations for Portable Power Sources – K. N. Grew and D. Chu (U.S. Army Research Laboratory)
- **1801** Effect of Photodeposited Metal Catalysts on Oxygen Evolution at Well-Defined TiO_2 (110) Surfaces – M. A. Rigsby, G. E. Alliger, and G. M. Brown (Oak Ridge National Laboratory)
- **1802** Renewable Fuels for SOFCs: Fuel Flexibility by Gradual Internal Reforming – S. Georges, N. Bailly, M. Steil (LEPMI), F. Fonseca, S. D. Nobrega (IPEN), J. Viricelle, A. Hadjar (EMSE), and P. Gélin (IRCELYON)
- **1803** The Co2p Oxidation State in Co-PI Catalysts – M. Richter and D. Schmeißer (Brandenburg University of Technology)
- **1804** Quasi Fermi Energy Tuning of Carbon Nanotubes for Solar Cells – N. C. Deb Nath, S. Sarker, H. Lee, and J. Lee (Konkuk University)
- **1805** Photocatalytic Reduction of CO_2 Using Shape Controlled Anatase TiO_2 with Co-Catalyst Loading – D. Saruwatari (Kyusyu Institute of Technology), N. Murakami, and T. Ohno (Kyushu Institute of Technology)
- **1806** CO_2 Reduction on Tin Oxide-Based Catalysts – Y. Chen and M. Kanan (Stanford University)
- **1807** Fabrication and Characterization of Metal/Ceramic Composite Electrodes for New Electrochemical Cells – A. Lapina, C. Chatzichristodoulou, P. Holtappels, and M. Mogensen (Technical University of Denmark)
- **1808** Photoelectrochemical Activity of Hematite Nanowire Arrays Synthesized Using Plasmas – H. B. Russell (University of Louisville), U. Cvelbar (Josef Stefan Institute), J. B. Jasinski (University of Louisville), T. G. Deutsch (National Renewable Energy Laboratory), and M. K. Sunkara (University of Louisville)

B11 Sodium Batteries

Battery / Energy Technology / High Temperature Materials

Lehua, Kalia Conference Center, Hilton Hawaiian Village

Na Batteries – 08:00 – 10:00
Co-Chair: Christopher Johnson

08:00		Introductory Remarks (10 Minutes)
08:10	**1831**	Sodium Ion Batteries for Grid Applications – M. M. Doeff, M. Shirpour, and J. Cabana (Lawrence Berkeley National Laboratory)
08:40	**1832**	Towards the Development of the Na-Ion Technology: In Search of Suitable Electrodes and Electrolytes – A. Ponrouch, P. Senguttuvan, E. Marchante (ICMAB-CSIC), M. Courty, J. Tarascon (LRCS), and M. Palacin (ICMAB-CSIC)
09:10	**1833**	Understanding the Difference in Intercalation Behavior between Layered Na- and Li-Transition Metal Oxides – S. Kim, X. Ma, S. Ong, and G. Ceder (Massachusetts Institute of Technology)
09:40		Intermission (20 Minutes)

Na-Ion Batteries – Cathodes I – 10:00 – 12:30
Co-Chairs: Marca Doeff and M. Rosa Palacin

10:00	**1834**	P2-type $Na_{2/3}[Fe_{1/2}Mn_{1/2}]O_2$ Made from Earth-Abundant Elements for High-Energy Na-Ion Batteries – N. Yabuuchi, M. Kajiyama, Y. Yamada, and S. Komaba (Tokyo University of Science)
10:30	**1835**	Structure and Electrochemistry of $Na_xFe_xMn_{1-x}O_2$ Na-Ion Cathode Materials – J. S. Thorne, R. A. Dunlap, and M. N. Obrovac (Dalhousie University)
10:50	**1836**	Layered $Na_{1-x}Li_xNi_{0.5}Mn_{0.5}O_2$ Electrodes with O3- and P2- Composite Structure for Na-Ion Batteries – E. Lee, D. Kim, M. Slater, S. Rood, V. Maroni, D. Bass (Argonne National Laboratory), S. Hackney (Michigan Technological University), and C. S. Johnson (Argonne National Laboratory)
11:10		Intermission (20 Minutes)
11:30	**1837**	A Study of the Reactivity of De-Intercalated $NaNi_{0.5}Mn_{0.5}O_2$ with Non-Aqueous Solvent and Electrolyte by Accelerating Rate Calorimetry – X. Xia and J. Dahn (Dalhousie University)
11:50	**1838**	Cathode Properties of Disodium Rhodizonate for Sodium Secondary Battery – K. Chihara, N. Chujo, A. Kitajou, E. Kobayashi, and S. Okada (Kyushu University)
12:10	**1839**	Electrochemical Behavior of Olivine $FePO_4$ Cathode Material for Na-Ion Batteries – P. Kubiak, M. Casas-Cabanas, V. Roddatis, J. Carretero-Gonzalez, D. Saurel, and T. Rojo (CIC Energigune)

Na-Ion Batteries – Cathodes II – 14:00 – 17:40
Co-Chairs: Mark Obrovac and Shinichi Komaba

14:00	**1840**	First Principles Investigations of the Electrochemical Properties of Sodium-Ion Cathode Materials – A. J. Toumar, W. D. Richards, S. Kim, X. Ma, X. Li, S. Ong, and G. Ceder (Massachusetts Institute of Technology)
14:20	**1841**	Development of High Capacity Positive Electrode Material for Sodium Ion Battery – R. Kataoka, T. Mukai, K. Nakatani, A. Yoshizawa (National Institute of Advanced Industry of Science and Technology), and T. Sakai (National Institute of Advanced Industrial Science and Technology (AIST))
14:40	**1842**	Na-Ion Intercalation Cathode with High Rate and Excellent Structural Stability – D. Lee, J. Xu, and Y. Meng (University of California San Diego)
15:00	**1843**	Nanostructured Na-Ion Full-Cells – S. Tepavcevic, H. Xiong, C. J. Johnson, and T. Rajh (Argonne National Laboratory)
15:20		Intermission (20 Minutes)
15:40	**1844**	Sodium Manganese Oxide Thin Film Cathodes: Characterization of a Na-Ion Intercalation Model System – L. Baggetto, C. A. Bridges, R. R. Unocic (Oak Ridge National Laboratory), F. Delnick (Sandia National Laboratory), N. J. Dudney, and G. M. Veith (Oak Ridge National Laboratory)
16:00	**1845**	Phase Change of $NaFeO_2$ during Electrochemical Na Intercalation and Deintercalation: An *In Situ* X-ray Diffraction Study – N. Takeichi (National Institute of Advanced Industrial Science and Technology), K. Kuratani (National Institute of Advanced Industrial Science and Technology (AIST)), M. Yao, M. Tabuchi (National Institute of Advanced Industrial Science and Technology), and T. Kiyobayashi (National Institute of Advanced Industrial Science and Technology (AIST))
16:20	**1846**	Microstructure Evolution with Electrochemical Desodiation Process in Na_xMnO_2 – X. Li, X. Ma, A. J. Toumar, S. Ong, and C. Gerbrand (Massachusetts Institute of Technology)
16:40		Intermission (20 Minutes)
17:00	**1847**	Novel Cathode Materials of Sodium-Containing Metal Phosphates as Highly Voltage Sodium-Ion Batteries – M. Nose, H. Nakayama, K. Nobuhara, S. Nakanishi, and H. Iba (Toyota Motor Corporation)
17:20	**1848**	Structural Investigation of $NaCrO_2$ as a Positive Electrode for Rechargeable Sodium Battery Using Molten NaFSA-KFSA – C. Chen, K. Matsumoto, T. Nohira, R. Hagiwara (Kyoto University), K. Numata, E. Itani (Sumitomo Electric Industries, Ltd.), A. Fukunaga (Kyoto University), S. Sakai, K. Nitta, and S. Inazawa (Sumitomo Electric Industries, Ltd.)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

B11 – Poster Session – 18:00 – 20:00
Co-Chair: Christopher Johnson

•	**1849**	Electrochemical Properties of Sn-Based Electrodes for Na-Ion Batteries – Y. Matsuura, T. Ishikawa, W. Murata, N. Yabuuchi (Tokyo University of Science), S. Kuze (Sumitomo Chemical Co., Ltd.), and S. Komaba (Tokyo University of Science)
•	**1850**	Na Insertion Mechanism in Alpha $NaFeO_2$ as Positive Electrode Materials for Na-Ion Batteries – H. Yoshida, N. Yabuuchi, and S. Komaba (Tokyo University of Science)

• **1851** Synthesis, Characterizations and Electrochemical Studies of $Na_2Ti_6O_{13}$ for Sodium Ion Batteries – N. Trinh (Université du Québec à Montréal), O. Crosnier (University of Nantes), S. Schougaard (Université du Québec à Montréal), and T. Brousse (University of Nantes)

B12 Solid State Ionic Devices 9 – Ion Conducting Thin Films and Multilayers

High Temperature Materials

South Pacific 1, Mid-Pacific Conference Center, Hilton Hawaiian Village

SOFC Electrolytes – 08:00 – 10:00
Co-Chairs: Tatsumi Ishihara and Srikant Gopalan

08:00 **1913** Open-Circuit Voltage Anomalies in Dense Bilayered Electrolytes: Explanation and Implications – K. Duncan (University of the West Indies) and E. D. Wachsman (University of Maryland)

08:20 **1914** Conductivity of New Electrolyte Material $Pr_{1-x}M_{1+x}InO_4$(M=Ba,Sr) with Related Perovskite Structure for Solid Oxide Fuel Cells – X. Li, H. Shimada, and M. Ihara (Tokyo Institute of Technology)

08:40 **1915** Fabrication and Characterization of Nanosized $(DyO_{1.5})_x(WO_3)_y(BiO_{1.5})_{1-x-y}$ for Lower Temperature SOFC Application – A. A. Lidie, K. Lee, and E. D. Wachsman (University of Maryland)

09:00 **1916** Investigation of Electrolyte and Electrode Effects on GDC Electrolyte by Electrochemical Impedance Spectroscopy – L. Zhang, F. Liu, and A. V. Virkar (The University of Utah)

09:20 **1917** Mapping Thermodynamics and Kinetics of Oxygen Vacancies in Fuel Cell Electrolytes on the Nanoscale – S. Jesse, A. Kumar, M. D. Biegalski (Oak Ridge National Laboratory), A. Morozovska, E. Eliseev (National Academy of Science of Ukraine), F. Ciucci (The Hong Kong University of Science and Technology), and S. Kalinin (Oak Ridge National Laboratory)

09:40 Intermission (20 Minutes)

SOFC Anodes – 10:00 – 12:00
Co-Chairs: Elisabeth Djurado and Kazunari Sasaki

10:00 **1918** Effect of Sulfur Poisoning on Exchange Current Density of SOFC Anodes – T. Hosoi, T. Yonekura, T. Yoshizumi (Kyushu University), Y. Tachikawa, S. Taniguchi (International Research Center for Hydrogen Energy), Y. Shiratori, and K. Sasaki (Kyushu University)

10:20 **1919** Thin Film Ceria Based Anodes for a Single Direct Carbon Fuel Cell – M. G. Werhahn, O. Schneider, and U. Stimming (Technische Universität München)

10:40 **1920** Anode Materials and Design for Lower Temperature, Hydrocarbon-Fueled Solid Oxide Fuel Cells – C. Gore, K. Lee, H. Yoon, and E. D. Wachsman (University of Maryland)

11:00 **1921** Degradation Induced by Sintering of Ni-YSZ Anode in SOFCs – Y. Lee, H. Muroyama, T. Matsui, and K. Eguchi (Kyoto University)

11:20 **1922** Electrical Performance of La-Substituted $SrTiO_3$ Anode Material with Deficient in A-Site – G. Chen, H. Kishimoto, K. Yamaji, K. Kuramoto, and T. Horita (National Institute of Advanced Industrial Science and Technology)

11:40 **1923** Infiltrated Ni-ScYSZ Fuel-Electrodes with Improved Carbon and Sulfur Tolerance – C. Graves, S. Ricote, and T. Ramos (Technical University of Denmark)

SOFC Cathodes – 14:00 – 18:20
Co-Chairs: Olga Marina and Fanglin Chen

14:00 **1924** Synergy Effects of Pr_2NiO_4 and Ba(La)CoO_3 on Cathodic Activity for Intermediate Temperature Solid Oxide Fuel Cells – T. Ishihara, J. Xie, Y. Ju, and S. Ida (Kyushu University)

14:40 **1925** Electrochemical Study on LSCF Cathode Reaction as a Function of Microstructure, Temperature and Oxygen Partial Pressure – D. Marinha, L. Dessemond, and E. Djurado (CNRS-Grenoble INP-UDS-UJF)

15:00 **1926** Effects of Strontium Dopant Concentration on the Oxygen Reduction Reaction Rate Limiting Steps in $La_xSr_{1-x}Co_{0.2}Fe_{3-\delta}$ Cathodes – A. Dynkin, S. Basu, U. B. Pal, and S. Gopalan (Boston University)

15:20 **1927** Control of Activity and Stability by Tailoring Microstructure of Electrocatalyst-Modified Composite Cathode of SOFC – S. Lee, P. Ohodnicki, and K. Gerdes (U.S. Department of Energy)

15:40 **1928** Characterization and Modeling of Infiltrated SOFC Cathode – X. Liu, Y. Li, M. Gong (West Virginia University), K. Gerdes (U.S. Department of Energy), R. Gemmen (National Energy Technology Lab), R. Pakalapati, I. Celik (West Virginia University), and T. Horita (National Institute of Advanced Industrial Science and Technology)

16:00 Intermission (20 Minutes)

16:20 **1929** Ab Initio Based Modeling of $LaMnO_{3\pm\delta}$ Defect Chemistry for Solid Oxide Fuel Cell Cathodes – Y. Lee (Massachusetts Institute of Technology) and D. Morgan (University of Wisconsin-Madison)

16:40 **1930** A-Site Diffusion in $La_{1-x}Sr_xMnO_3$: Ab Initio and Kinetic Monte Carlo Calculations – B. Puchala (Univeristy of Wisconsin-Madison), Y. Lee (Massachusetts Institute of Technology), and D. Morgan (University of Wisconsin-Madison)

17:00 **1931** Influence of Water Vapor on Sulfur Distribution Within $La_{0.6}Sr_{0.4}Co_{0.2}Fe_{0.8}O_3$ Cathode – F. Wang, K. Yamaji, D. Cho, T. Shimonosono, M. Nishi, H. Kishimoto, M. Brito, T. Horita, and H. Yokokawa (National Institute of Advanced Industrial Science and Technology)

17:20 **1932** Electrochemical Operation of La(Ni,Fe)O_3 under Cr-Poisoning Conditions – M. K. Stodolny (Energy Research Centre of the Netherlands), B. A. Boukamp, D. H. Blank (University of Twente), and F. P. Van Berkel (Energy Research Centre of the Netherlands)

17:40 **1933** Nonlinear Electrochemistry Impedance Spectroscopy and Its Applications – N. Xu, J. Riley, and J. A. Kilner (Imperial College London)

18:00 **1934** Ultra Small Angle X-ray Scattering Studies of Solid Oxide Fuel Cell Cathode Powders – K. Chang, B. Ingram, M. Hopper, J. Ilavsky, and H. You (Argonne National Laboratory)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

B12 – Poster Session – 18:00 – 20:00
Co-Chairs: Eric Wachsman, John Kilner, Enrico Traversa, and Shu Yamaguchi

- **1935** *In Situ* Examination of Oxygen Kinetics in $La_{1-x}Sr_xCoO_{3-\delta}$ Thin Films at Intermediate and Low Temperatures by X-ray Diffraction – M. D. Biegalski and S. V. Kalinin (Oak Ridge National Laboratory)
- **1936** Preparation of $A_2BB'O_6$ Oxides by Pechini Method for Solid Oxide Fuel Cells – S. Kim, A. Dorai, D. Seo, I. Han, J. Yu, S. Kim, J. Joo, and S. Woo (Korea Institute of Energy Research)
- **1937** Crystal Structure and Electrical Properties of Al-Doped Lanthanum Silicate Solid Electrolytes – T. Funahashi, A. Mineshige, H. Mieda, Y. Daiko (University of Hyogo), H. Yoshioka (Hyogo Prefectural Institute of Technology), and T. Yazawa (University of Hyogo)
- **1938** Power Generation of Rechargeable Direct Carbon Fuel Cells with Batch-type Charging System – H. Tanaka, A. Yabuki, X. Li, and M. Ihara (Tokyo Institute of Technology)
- **1939** A Comparative Study on Microstructural Change of LSM/SDC and LSCF/SDC Interfaces – M. Komoto, H. Muroyama, T. Matsui, and K. Eguchi (Kyoto University)
- **1940** Study of $La_{0.1}Sr_{0.9}Co_{0.8}Fe_{0.2}O_{3-\delta}$ for Ceria-Based IT-SOFC Cathode – M. Choi, H. Im, K. Lee, and S. Song (Chonnam National University)
- **1941** Evaluation of Y and Fe Co-Doped $SrTiO_3$ as Anode Material for SOFC – H. Im, M. Choi, S. Jeon, and S. Song (Chonnam National University)
- **1942** Resistivity and Interfacial Properties of CGO-YSZ Bilayers in Solid Oxide Fuel Cells – J. Hjelm, P. Hjalmarsson, K. Brodersen, and S. Foghmoes (Technical University of Denmark)
- **1943** Cathode Performance and Deposited Cr under Cr Poisoning Condition in the $(La_{0.6}Sr_{0.4})(Co_{0.2}Fe_{0.8})O_3$ Cathode – D. Cho, T. Horita, M. Brito, K. Yamaji, H. Kishimoto, M. Nish, T. Shimonosono, F. Wang, and H. Yokokawa (National Institute of Advanced Industrial Science and Technology)
- **1944** Performance Degradation and Microstructural Change of Ni-YSZ Anode upon Thermal and Redox Cycles – M. Kubota, H. Muroyama, T. Matsui, and K. Eguchi (Kyoto University)
- **1945** Electrochemical Studies of LSCF Powder Prepared using Pechini Process for IT-SOFC Unit Cell – H. Jeon, H. Kim, T. Kim, and H. Kim* (Korea Institute of Industrial Technology)
- **1946** Correlation between Protonic Conductivity and Structure of Phosphate Glasses for Intermediate Temperature Fuel Cells – H. Sumi, Y. Fujishiro (National Institute of Advanced Industrial Science and Technology), T. Oine, and T. Kasuga (Nagoya Institute of Technology)
- **1947** Proton Conduction in $CsH(PO_3H)$ under Dry or Humid Conditions – M. Nagao, A. Ikeda, and S. M. Haile (California Institute of Technology)
- **1948** Structure and Electrochemical Property of Various Valence Metal Ion Co-doped Scandia Stabilized Zirconia – N. Sonoyama, M. Ikeda, Y. Ota (Nagoya Institute of Technology), N. Imanishi, A. Hirano, Y. Takeda, and O. Yamamoto (Mie University)
- **1949** Fabrication of a Micro-tubular Bi-Layered Membrane by Electrophoretic Deposition – K. Lee, J. Seo, J. Yoon, and H. Hwang (Inha University)
- **1950** Analysis of Electrical Conduction Mechanism of $LaNi_{1-x}M_xO_{3-\delta}$ (M = Fe, Mn) – E. Niwa, H. Maeda, C. Uematsu, and T. Hashimoto (Nihon University)
- **1951** Oxygen Transport Properties of Al doped $La_2NiO_{4+\delta}$ – S. Jeon, M. Choi, H. Im, and S. Song (Chonnam National University)
- **1952** Transport Properties of the Proton Conducting $BaCe_{0.45}Zr_{0.4}Y_{0.15}O_{3-\delta}$ – D. Lim, M. Choi, H. Im, K. Lee, and S. Song (Chonnam National University)
- **1953** Performance of $BaCe_{0.85}Y_{0.15}O_{3-\delta}$ Electrolyte for the Proton Conducting Ceramic Fuel Cells – K. Lee, M. Choi, D. Lim, and S. Song (Chonnam National University)
- **1954** Molecular Dynamics Simulation on Oxygen Ion Diffusion in $LaInO_{3-\delta}$ Perovskite Structure Doped with Ba and Sr – S. Jeong, K. Hwang (Korea Institute of Ceramic Engineering and Technology), M. Yoon, and H. Hwang (Inha University)
- **1955** Hydrothermal Synthesis and 3D-Arrangement of CeO_2 Nanocrystals – K. Kobayashi, M. Haneda, and M. Ozawa (Nagoya Institute of Technology)
- **1956** Thin Film Electrodes for Li-Ion Batteries: Improved Electrochemical Properties and Mechanism Study – Z. Cui, P. Yu, and X. Guo (Chinese Academy of Sciences)
- **1957** A Novel All-Solid-State Lithium-Ion Battery with *In Situ* Formed Negative Electrode Material – Y. Amiki, F. Sagane, and Y. Iriyama (Shizuoka University)
- **1958** Ionic and Electronic Conductivity in Telluride Glass Systems: Interfacial Materials for All-Solid-State Devices – I. Alekseev (St. Petersburg University), E. Bychkov, D. Le Coq, M. Kassem, M. Fourmentin (University of Littoral), and T. Usuki (Yamagata University)
- **1959** Mechanistic Study of the Electrochemical Promotion of Catalysis Using Isotopic Exchange – M. Tsampas, F. Sapountzi, A. Boréave, and P. Vernoux (CNRS)
- **1960** Defect Chemistry and Transport Properties in MnO_2 Nanowires – B. C. Solomon, J. Wu (University of South Carolina), E. Thomsen (Pacific Northwest National Laboratory), J. Yang (Beijing University), and X. Zhou (University of South Carolina)

C1 Organic and Biological Electrochemistry General Poster Session

All Divisions

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

C1 – Poster Session – 18:00 – 20:00

- **1983** The Electrolytic Dissociation of 1,3-Cyclobutanedicarboxylic Acids – E. Kvaratskhelia and R. Kvaratskhelia (Iv. Javakhishvili Tbilisi State University)
- **1984** Propagation and Collision of Nonlinear Electrical Responses in *Aloe Vera* L. and *Arabidopsis Thaliana* – L. O'Neal, M. I. Volkova (Oakwood University), V. S. Markin (The University of Texas), and A. G. Volkov (Oakwood University)
- **1985** Effect of Surfactants on the Voltammetric Response and Determination of an Antihypertensive Drug Phentolamine at Boron Doped Diamond Electrode – R. Shrivastav (Dayalbagh Educational Institute), S. Satsangee (USIC), and R. Jain (Jiwaji University)
- **1986** Potential-Induced Conformational Changes in Self-Assembled Monolayers of L-Cysteine at p-GaAs(100) Electrodes – M. Enache (Institute of Physical Chemistry "Ilie Murgulescu"), L. Preda, V. Lazarescu (Institute of Physical Chemistry Ilie Murgulescu), C. Negrila, and M. Lazarescu (National Institute of Material Physics)
- **1987** Effect of Humidity of Atmosphere on Characteristics of Cathodic Film Formed on Ti in Ca^{2+}/Ethanol Solution – T. Haruna and A. Nonaka (Kansai University)
- **1988** Evolution of Cathode Surface Hydrophobicity in Microbial Fuel Cell Using Sessile Drop Technique – C. Santoro, M. Cremins, A. Mackay, U. Pasaogullari (University of Connecticut), M. Guilizzoni, A. Casalegno (Politecnico di Milano), and B. Li (University of Connecticut)
- **1989** Electrodeposition of Poly (Ethyleneglycol) for Constructing the Artificial Scaffold onto Titanium – S. Migita (Tokyo Medical and Dental University), S. Okada (Kyushu University), Y. Tsutsumi, H. Doi, N. Nomura, and T. Hanawa (Tokyo Medical and Dental University)
- **1990** Monitoring of the Processes of Proliferation and Differentiation of Immunocytes by the Impedance Measurement Method – S. Kasai, K. Shoji, M. Tada, H. Kiriu, R. Ishii, and H. Kodama (Tohoku Institute of Technology)
- **1991** Photocurrent Characteristics of Thin Films Produced from Aqueous Colloidal Dispersion of Indolino[60]Fullerene by Using Electrospray Deposition Method – H. Matsutaka, Y. Shigemitsu (FLOX Corporation), T. Orii, T. Aoyama, H. Takaku (RIKEN), and Y. Tajima (FLOX Corporation)
- **1992** Electrochemical Characteristics of Vinylferrocene-Terminated Si(111) Prepared in Diethyl Ether and Dibutyl Ether Grafting Media – M. U. Herrera, T. Ichii, K. Murase, and H. Sugimura (Kyoto University)
- **1993** A Green Electrochemical Method to Remove Protein Surface Fouling and Industrial Dye Wastes – J. Yang and S. Gunasekaran (The University of Wisconsin-Madison)
- **1994** Effects of Cathodic Platinum Loadings and Organic Substrate Concentrations on the Performance of Single Chamber Microbial Fuel Cells Fed with Raw Wastewater – C. Santoro, B. Li (University of Connecticut), U. Karra (University of Connectcut), A. G. Agrios (University of Connecticut), G. Squadrito (CNR-ITAE), and P. Cristiani (RSE- Ricerca sul Sistema Elettrico S.p.A.)
- **1995** Electrosynthesis of Polypyrrole in Low-Viscosity Ionic Liquids – K. Tsunashima, T. Matsubayashi (Wakayama National College of Technology), Y. Ono (University of Toyama), and M. Matsumiya (Yokohama National University)
- **1996** Disc-Like and Bent-Shape Semiconducting Liquid Crystals for Organic Electronics – F. Ely, M. O. Da Silva (CTI Renato Archer), R. Cristiano (Federal University of Paraíba), A. Vieira, and H. Gallardo (Federal University of Santa Catarina)
- **1997** Irreversible Thermodynamics Microbial Fuel Cell Anode Model – J. E. Velez (Universidad Nacional de Colombia) and C. Sanchez (Universidad Nacional of Colombia)
- **1998** Graphene Nanohybrids based on Genetically Engineered Protein for Agrichemical Biosensing – N. Heo (KAIST), S. Lee, K. Lee (NNFC), and T. Park (KAIST)

D1 Corrosion General Poster Session

All Divisions

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

D1 – Poster Session – 18:00 – 20:00
Co-Chair: S. Fujimoto

- **2095** Corrosion Protection of Steel by Conducting Polypyrrole Film Doped with Poly-acids of Mo and W – M. Sasaki, A. Hyono, M. Ueda, and T. Ohtsuka (Hokkaido University)
- **2096** Corrosion under Water-Repellent Coating – H. Saito (Kanazawa University)
- **2097** Monolayer and Bilayer Conducting Polymer Coatings for Corrosion Protection of Copper in Various Aggressive Media – F. Branzoi (Institute of Physical Chemistry), V. Branzoi, and Z. Pahom (University of Politehnica Bucharest)
- **2098** Local Bond Structure of $BaZrO_3$ Doped with Various Dopant Probed by Raman Spectroscopy – D. Kim, E. Patrik, S. Miyoshi, T. Tsuchiya (The University of Tokyo), and S. Yamanguchi (The Unversity of Tokyo)
- **2099** Analysis of Nickel Electrodeposition Process by Using Quartz Crystal Microbalance – M. Shiina, T. Tanabe, and K. Noda (Shibaura Institute of Technology)
- **2100** Analysis of Corrosion Behavior of Zn Thin Film by Using QCM – R. Inoue, T. Tanabe, and K. Noda (Shibaura Institute of Technology)
- **2101** Passivation of AA5083 Aluminium Alloy by Anodic Pre-Treatments in Ionic Liquids – P. Huang, P. Howlett (Deakin University), D. MacFarlane (Monash University), and M. Forsyth (Deakin University)

- **2102** Passivity and Local Activation of Aluminum in Borate Buffer Solution under Action of Bromide-Ions Additives – A. Chikova, T. A. Minakova, and S. A. Kaluzhina (Voronezh State University)
- **2103** Material Performance of Alloys in $NaNO_3/KNO_3$ at 600°C – A. M. Kruizenga and D. Gill (Sandia National Laboratories)
- **2104** Determination of Current Efficiency of Anodic Film Formation in the Molten Melt by ICP-AES – S. Han (Korea Institute of Industrial Technology) and H. Kim (KITECH)
- **2105** Electron Beam Induced Texture Change of the Anodic Films Formed in the Molten Melt – S. Han and H. Kim (Korea Institute of Industrial Technology)
- **2106** Evaluation of Zinc Rich Paint (ZRP) Efficiency on Mild Steel in Seashore Environment – A. H. Sofian and K. Noda (Shibaura Institute of Technology)
- **2107** Evaluation of Degradation of High Performance Organic Coatings under Outdoor Salt Spray Test – D. Ito (Yokohama National University), Y. Akira (Port and Airport Research Institute), Y. Miyata, T. Yokoyama, and S. Okazaki (Yokohama National University)
- **2108** A Novel Nanomaterial Hybrid Corrosion Resistant Coating for Marine Applications – V. Kamavaram, G. Arumugam, V. Veedu, and K. Cheung (Oceanit Laboratories Inc)
- **2109** Electrochemical and Microstructural Characterization of Cr(VI) Free Passivation Layers Applied on Electrogalvanized Steel – V. E. Hernandez, M. P. Segundo (University of São Paulo), C. R. Tomachuk (Nuclear and Energetic Research Institute), and H. G. De Melo (University of Mons)
- **2110** Evaluation of Corrosion Protection of Zinc Rich Paint Coated Steel – A. Tanaka, A. H. Sofian, and K. Noda (Shibaura Institute of Technology)
- **2111** Evaluation of Corrosion Protection Property on Galvanized Steels in Atmospheric Environment – K. Ito and K. Noda (Shibaura Institute of Technology)
- **2112** Effect of Alloy Element in Low Alloy Steels on Corrosion Behavior – A. Sunahara, T. Ohmori, K. Noda (Shibaura Institute of Technology), H. Katayama, and H. Masuda (National Institute for Materials Science)
- **2113** Potential Measurement of High Corrosion Resistance Metals Surface in Atmospheric Environment – Y. Hirohata, K. Noda (Shibaura Institute of Technology), H. Katayama, and H. Masuda (National Institute for Materials Science)
- **2114** Corrosion Inhibition of Carbon Steel in Cooling Water Systems by New Organic Polymers as Green Inhibitors – F. Branzoi (Institute of Physical Chemistry), V. Branzoi (University of Politehnica Bucharest), M. Iordoc (ICPE-Advanced Researches), and Z. Pahom (University of Politehnica Bucharest)
- **2115** *In Situ* Electrochemical Detection of Molybdate in an Absorption Refrigerator – Y. Hitoshi, Y. Hatakeyama (Iwate University), H. Inabe, K. Sekiguchi (Hitachi Building Systems Co., Ltd.), T. Hishinuma, M. Itoh, and N. Ohnaka (Hitachi Kyowa Engineering Co., Ltd)
- **2116** Sodium Nitrite-Based Corrosion Inhibitor for Reinforcing Steel in Simulated Concrete Pore Solutions – R. Du, Y. Guo, Y. Zhu, W. Chen, X. Wang, and C. Lin (Xiamen University)
- **2117** Effect of Stress on Oxide Film Growth on SUS 316L Stainless Steel under High Pressure-High Temperature Water – Y. Hamaguchi and T. Ohtsuka (Hokkaido University)
- **2118** The effect on Impurities of the Properties of Passive Oxides on Stainless Steels – M. Abe, A. Hyono, M. Ueda, T. Ohtsuka (Hokkaido University), and T. Ishii (JFE Steel Co.)
- **2119** Synthesis and Characterization of Modified Nano-TiO_2 Films for Corrosion Protection of Stainless Steel – Y. Zhu, J. Zhang, R. Du, H. Qi, L. Xu, and C. Lin (Xiamen University)
- **2120** Effects of Tritiated Water on Passivation Behavior of SUS304 Stainless Steel – M. Oyaidzu, K. Isobe, and T. Yamanishi (Japan Atomic Energy Agency)
- **2121** Localized Corrosion Behavior of Austenitic Stainless Steel Containing Martensitic Phases in NaCl Solution – S. Abe (Shibaura Institute of Technology), T. Saito (Osaka University), K. Noda (Shibaura Institute of Technology), and Y. Watanabe (Nagoya Institute of Technology)
- **2122** Analysis of Localized Corrosion Behavior of Stainless Steel in Atmospheric Environment – Y. Nakajima (Shibaura Institute of Technology), T. Saito (Osaka University), and K. Noda (Shibaura Institute of Technology)
- **2123** Analysis of Passivation Behavior of Stainless Steel in Na_2SO_4 Solutions – A. Moriyasu (Shibaura Institute of Technology), T. Saito (Osaka University), and K. Noda (Shibaura Institute of Technology)
- **2124** Low Temperature Deposition of SiO_2 Matrix onto the Surface of Stainless Steel as Protective Coating – T. M. Abdel-Fattah (Christopher Newport University) and H. Elsayed-Ali (Old Dominion University)
- **2125** The Electrochemical Properties of the Main Constituent Phases in Magnesium Alloys – Y. Chou, H. Yang, S. Pan, S. Chung, and W. Tsai (National Cheng Kung University)
- **2126** Corrosion Resistance of $Mg(OH_2/Mg$-Al LDH Film Formed on Magnesium alloy by Steam Coating Method – T. Ishziaki (Shibaura Institute of Technology) and K. Teshima (Shinshu University)
- **2127** Characterization of a New Polypropylene+Graphite+Zinc Ternary Composite – J. Agrisuelas, J. García-Jareño, M. Llop, M. Piedras, and F. Vicente (University of Valencia)
- **2128** Non-Destructive Evaluation for Corroded Metal Surface Using Terahertz Wave – H. Kariya, A. Sato, T. Tanabe, K. Saito (Tohoku University), K. Nishihara, A. Taniyama (Sumitomo Metals Co., Ltd.), and Y. Oyama (Tohoku University)
- **2129** The Influences of Roughness of Ti Substrate and Thickness of IrO_2 Intermediate Layer on Oxygen Evolution Anode Performance in Seawater Electrolysis – Z. Kato (Tohoku Institute of Technology), K. Izumiya, N. Kumagai (Daiki Ataka Engineering Co. Ltd.,), and K. Hashimoto (Tohoku Institute of Technology)

- **2130** Electrochemical Impedance Spectroscopy to Characterize Different Materials in Soybean Biodiesel Medium – A. H. Akita, C. Fugivara (Instituto de Química – Univ. Estadual Paulista – UNESP), I. Aoki (Escola Politécnica – Univ. de São Paulo – USP), and A. Benedetti (Instituto de Química – Univ. Estadual Paulista – UNESP)
- **2131** Graphite Layer on Metal Plates for PEMFC Applications – W. Wang and C. Lan (Industrial Technology Research Institute)
- **2132** Surface Morphology Changes during Dealloying – F. U. Renner, G. Ankah, and A. Pareek (Max-Planck-Institut für Eisenforschung)
- **2133** Using LEIS to Evaluate Local Electrochemical Activity of Al 7475 T761/Cu Model Electrodes – J. Ferrari (University of São Paulo), H. G. De Melo (University of Mons), N. Pébère (CIRIMAT UMR CNRS), B. Tribollet, and V. Vivier (CNRS)
- **2134** Triboelectrochemical Characterization of Copper Surface – S. Joo and H. Liang (Texas A&M University)
- **2135** Application to Non-Destructive Inspection of Copper Corrosion via Coherent Terahertz Light Sources – K. Saito, T. Yamagata, H. Kariya, T. Tanabe, and Y. Oyama (Tohoku University)
- **2136** Effect of Alloying Elements on Corrosion Behavior of Zr-Based Binary Alloys in Simulated Body Fluid – Y. Tsutsumi, S. Yalatu, S. Migita, H. Doi, N. Nomura (Tokyo Medical and Dental University), K. Noda (Shibaura Institute of Technology), and T. Hanawa (Tokyo Medical and Dental University)
- **2137** Corrosion Behavior of Nanocrystalline Hydroxyapatite Coating on New Ti Alloy Surface in Ringer Solution – M. Popa, J. Calderon Moreno, C. Vasilescu, and S. Drob (Institute of Physical Chemistry "Ilie Murgulescu")
- **2138** Corrosion Study of Ni-Ti Orthodontic Archwires: An *In Vitro* Study – K. M. Britto, D. A. Macedo, R. M. Nascimento, A. E. Martinelli, and H. S. Júnior (Federal University of Rio Grande do Norte)
- **2139** A Three-Electrode Implantable Micro-Chip for Obtaining Real Time Corrosion Rates during Small Animal Testing – B. A. Shaw, E. Sikora, M. W. Horn, H. A. Basantani, A. Hartsock, D. R. Cook, B. J. Gluckman, and B. A. Bimber (The Pennsylvania State University)
- **2140** *In Vitro* Galvanic Corrosion of Metallic Biomaterials – N. Shida, S. Miyabe, and S. Fujimoto (Osaka University)
- **2141** Analysis of Electrochemical Impedance Spectroscopy Results and Ion Release *In Vitro* of Si^{+} Ion Implanted Medical 316 LVM Steel – J. C. Galván (Centro Nacional de Investigaciones Metalúrgicas), M. Larrea, M. Multigner (CENIM – CSIC), I. Braceras (Inasmet-Tecnalia), L. Saldaña, N. Vilaboa (Unidad de Investigación, Hospital Universitario La Paz), and J. González-Carrasco (CENIM – CSIC)
- **2142** Electrochemical Behavior of Ti-6Al-7Nb in Simulated Physiological Body Fluid Environment – N. A. Al-Mobarak, A. Al-Swayih (Princess Nora Bint Abdul Rahman University), and F. Al-Rashoud (AlKharge University)
- **2143** Evaluation of Corrosion Resistance of Co-Cr Alloy in NaCl Solution – R. Suzuki, K. Noda (Shibaura Institute of Technology), Y. Tsutsumi, and T. Hanawa (Tokyo Medical and Dental University)

D2 Materials Degradation in Energy Systems: Corrosion and Hydrogen-Material Interactions

Corrosion / Battery / Energy Technology

306A, Level 3, Hawaii Convention Center

Fuel Cell Degradation – 08:00 – 11:00
Co-Chairs: N. Missert and S. Fujimoto

08:00 **2148** Degradation Mechanisms in PEM Fuel Cells – R. L. Borup (Los Alamos National Laboratory), R. K. Ahluwalia (Argonne National Laboratory), K. L. More (Oak Ridge National Laboratory), C. Johnston, and R. Mukundan (Los Alamos National Laboratory)

08:30 **2149** Regarding the Enhanced Durability of Platinum Monolayer Electrocatalysts for the Oxygen Reduction Reaction – K. Sasaki (Brookhaven National Laboratory), H. Naohara (Toyota Motor Corporation), K. A. Kuttiyiel, Y. Choi, D. Su, P. Liu, and R. R. Adzic (Brookhaven National Laboratory)

09:00 **2150** Dissolution Mechanism of Platinum in Simulated PEFC Conditions – Y. Sugawara (Tohoku University), T. Okayasu, A. P. Yadav, A. Nishikata, and T. Tsuru (Tokyo Institute of Technology)

09:20 **2151** Selective Dissolution of Binary Pt Alloys in Sulfuric Acid Solution – Y. Hoshi (Tokyo University of Science), R. Ozawa, T. Yoshida, E. Tada, A. Nishikata, and T. Tsuru (Tokyo Institute of Technology)

09:40 Intermission (20 Minutes)

10:00 **2152** Influence of Cathode Polarization on the Chromium Poisoning of SOFC Cathode Materials LSM, LSCF and LNF – E. Park (Kyushu University), S. Taniguchi, Y. Tachikawa (International Research Center for Hydrogen Energy), Y. Shiratori, and K. Sasaki (Kyushu University)

10:20 **2153** Micro Modeling Study of Cathode/Electrolyte Interfacial Stresses for Solid Oxide Fuel Cells – X. Jin, J. Shi, and X. Xue (University of South Carolina)

10:40 **2154** High Temperature Oxidation of Ferritic Steels for Solid Oxide Electrolysis Stacks – S. Molin, M. Chen, J. J. Bentzen, and P. Hendriksen (Technical University of Denmark)

Corrosion Issues in Nuclear Energy – 11:00 – 12:00
Co-Chair: S. Fujimoto

11:00 **2155** On the Shape of Stress Corrosion Cracks in Water-Cooled Nuclear Power Reactor Piping – D. Kramer, S. Lee, and D. D. Macdonald (The Pennsylvania State University)

11:20 **2156** Electrochemical Impedance Modeling of the Passivity of Iron in Simulated Concrete Pore Water – D. D. Macdonald, S. Sharifiasl (The Pennsylvania State University), and G. R. Engelhardt (OLI Systems, Inc.)

11:40 **2157** Comparative Study of Oxide Film Formation as a Function of Potential on High-Purity Co and Stellite-6 – M. Behazin, X. Zhang, M. Biesinger, J. J. Noël, and J. Wren (Western University)

Degradation Issues and Mitigation in Batteries, Photoanodes, and Solar Panels – 14:00 – 15:40
Co-Chair: N. Missert

14:00 **2158** Materials and Interfaces Degradation in High-Energy Cathodes for Li-ion Batteries – R. M. Kostecki, I. T. Lucas, N. S. Norberg (Lawrence Berkeley National Laboratory), and J. S. Syzdek (Lawerence Berkeley National Laboratory)

14:30 **2159** Corrosion Behavior of Nitride Coatings for Anodic Protection in Liquid Metal Batteries – S. Phadke and D. R. Sadoway (Massachusetts Institute of Technology)

14:50 **2160** Metal-Oxide-Semiconductor Nanocomposites for Photoelectrochemical Water Splitting – P. C. McIntyre (Stanford University)

15:20 **2161** Materials Degradation in Solar Panels – H. G. Wheat (The University of Texas at Austin)

Degradation During Production, Transportation, and Storage of Fuels – 16:00 – 17:50
Co-Chair: J. Noel

16:00 **2162** Degradation of Electrocatalysts Used in the Reduction of CO_2 – A Review – N. Sridhar (Det Norske Veritas (USA) Inc.), A. S. Agarwal, S. Guan, and E. Rode (Det Norske Veritas (USA), Inc.)

16:30 **2163** Computational Study on Nickel Catalyst Degradation Mechanism by Carbon Deposit in Hydrogen Production – T. Ogura, H. Tsukikawa, and M. Tajima (Kyushu University)

16:50 **2164** Electrochemistry of Ferroelectric $PbZr_{0.52}Ti_{0.48}O_3$ Thin Films in Sulfuric Acid – L. J. Small (Rensselaer Polytechnic Institute), C. Apblett, J. Ihlefeld, G. Brennecka (Sandia National Laboratories), and D. Duquette (Rensselaer Polytechnic Institute)

17:10 **2165** Electrochemical Mechanism and Model of H_2S Corrosion of Carbon Steel – Y. Zheng, B. Brown, and S. Nesic (Ohio University)

17:30 **2166** Corrosivity Comparison between Petroleum and Blended Hydro-Refined Diesel and Jet Fuels – J. S. Lee, R. Ray, and B. Little (Naval Research Laboratory)

D3 Corrosion, Passivity, and Energy: A Symposium in Honor of Digby Macdonald

Corrosion

301B, Level 3, Hawaii Convention Center

Corrosion – 08:00 – 10:00
Co-Chairs: Mark Orazem and Behzad Bavarian

08:00 **2236** Electrochemical Corrosion Measurements in Supercritical CO_2 – Water Systems with and without Membrane Coating – J. Beck, M. Fedkin, and S. N. Lvov (The Pennsylvania State University)

08:15 **2237** Enhanced Corrosion Resistance of Interstitially Hardened 316L Stainless Steel: Gas Phase Nitridation under Paraequilibrium Conditions – N. R. Tailleart, F. Martin (US Naval Research Laboratory), R. Rayne, P. M. Natishan (US Naval Research Laborator), H. Kahn, and A. Heuer (Case Western Reserve University)

08:30 **2238** Corrosion Maps for Aluminium Alloys: Defining the Property Space and the Role of Microstructure and Chemistry in Corrosion – N. L. Sukiman, R. K. Gupta (Monash University), R. G. Buchheit (Ohio State University), and N. Birbilis (Monash University)

08:45 **2239** Corrosion Protection by Trivalent Chromium Process (TCP) Coatings on Aluminum Alloys – L. Li and G. Swain (Michigan State University)

09:00 **2240** Corrosion Resistance of Nanoporous Superhydrophobic Surfaces of Anodic Aluminum Oxide – C. Jeong, W. Xu, K. Du, and C. Choi (Stevens Institute of Technology)

09:15 **2241** Enhanced Corrosion Resistance of Stainless Steels Interstitially Hardened with Carbon or Nitrogen under Paraequilibrium Conditions – P. M. Natishan (US Naval Research Laborator), N. R. Tailleart, F. Martin (US Naval Research Laboratory), R. Bayles (Naval Research Laboratory), R. Rayne (US Naval Research Laborator), H. Kahn, and A. Heuer (Case Western Reserve University)

09:30 **2242** Effect of Acetic Acid on the Cathodic Reaction of Carbon Steel Corrosion – T. Tran, B. Brown, and S. Nesic (Ohio University)

09:45 Intermission (15 Minutes)

Corrosion – 10:00 – 12:00
Co-Chairs: Phillipe Marcus and Simon Hall

10:00 **2243** Corrosion of Nickel and Iron Based Superalloys in High Temperature Gas Environments – H. Chang and T. Yeh (National Tsing Hua University)

10:30 **2244** Investigation of the Corrosion Behavior of Zinc Magnesium Aluminium Alloys with a Novel Quaternary Addition Using SVET and Time-Lapse Microscopy – J. H. Malone, S. Mehraban, J. H. Sullivan, J. Elvins, and D. Penney (Swansea University)

10:45 **2245** Redox Transformations in the Oxide Films on Ni-Cr-Mo Alloys and Their Influence on Corrosion Susceptibility – X. Zhang, A. Mishra, D. Zagidulin, J. J. Noël (Western University), and D. W. Shoesmith (University of Western Ontario)

11:00 **2246** Transition Metal Inhibition of Titanium Corrosion: Electrochemical Behavior of Titanium in Alkaline Electrolyte – W. B. Utomo and S. W. Donne (University of Newcastle)

11:15 **2247** Overview of the Mg Corrosion Mechanism – A. Atrens (The University of Queensland)

11:30 **2248** Investigation of Zinc Dimercaptothiadiazole as a Corrosion Inhibitor for Steel – R. L. Mercado, J. Fury, M. B. Kiely (Crosslink), D. Buhrmaster (University of Dayton Research Institute), C. E. Miller (U.S. Army Research Laboratory), and P. Zarras (NAWCWD)

11:45 **2249** *In Situ* Electrochemical Measurement of Acid Dew Point Corrosion of Carbon Steel – T. Zhang (Harbin Engineering University)

Electrochemistry – 13:30 – 16:00
Co-Chairs: Tom Devine and Wen-Ta Tsai

13:30 **2250** Incorporation of Modifiers to Improve the Anticorrosion Behavior of Organic-Inorganic Hybrid Coatings Applied to High Strength Al Alloys – R. P. Hernandez, B. M. Vasconcelos, V. R. Capelossi (University of São Paulo), M. Olivier, and H. G. De Melo (University of Mons)

13:45 **2251** Effect of Halogen Ions and Inhibitors on Corrosion Behavior of 13 Cr Stainless Steel in Packer Fluid – M. Sakairi, R. Fujita, A. Kageyama (Hokkaido University), M. Kimura, and Y. Miyata (JFE Steel Corporation)

14:00 **2252** Hydration and Structural Transformations during Titanium Anodization under Alkaline Conditions – P. Acevedo Peña (Universidad Autónoma Metropolitana), J. G. Vazquez Arenas (University of Waterloo), R. Cabrera Sierra (Instituto Politécnico Nacional), and I. Gonzalez Martinez (Universidad Autónoma Metropolitana)

14:30 **2253** The Palladium Hydrogen System; Corrosion Monitoring and Energy Production – M. C. McKubre, J. Bao, S. Crouch-Baker, P. Jayaweera, A. Sanjurjo, and F. Tanzella (SRI International)

14:45 **2254** A 12 V / Kilo-Farad Range Lead-Carbon Hybrid Ultracapacitor and Their Envisaged Applications – A. K. Shukla, A. Banerjee, A. Jalajakshi, and M. K. Ravikumar (Indian Institute of Science)

15:00 **2255** *In Situ* Monitoring of Phosphate Inhibitor Surface Deposition in the Cathodic Region during Corrosion of a Zinc Magnesium Aluminium Alloy Using Time-Lapse Microscopy and Energy Dispersive X-ray Spectroscopy – S. Mehraban, J. H. Sullivan, and J. Elvins (Swansea University)

15:15 **2256** An Investigation into the Individual and Synergistic effects of Organically Coated Steel Systems Using the Scanning Vibrating Electrode Technique (SVET) – A. W. Littlehales (University of Wales Swansea), J. H. Sullivan, D. A. Worsley, and J. Elvins (Swansea University)

15:30 **2257** Inhibition of Corrosion-Driven Organic Coating Delamination on Hot Dip Galvanized Steel by Phenyl Phosphonic Acid – C. F. Glover and G. Williams (Swansea University)

15:45 Intermission (15 Minutes)

Electrochemistry – 16:00 – 19:00
Co-Chairs: M. Urquidi-Macdonald and T.-K. Yeh

16:00 **2258** Self-organized Anodic Structures – P. Schmuki (University of Erlangen-Nuremberg)

16:15 **2259** Development of Zn-Mn Alloy Based Sacrificial Coatings – S. Ganesan, P. Ganesan, and B. N. Popov (University of South Carolina)

16:30 **2260** Study of the Inhibition of Mild Steel Corrosion by Molybdate and Nitrite Anions – A. Al-Refaie (Saudi Basic Industries Corporation)

16:45 **2261** Oxygen Sensors for Accelerator Driven System (ADS) Reactors – A. Verdaguer, S. Colominas (Universitat Ramon Llull), and J. Abellà (IQS Universitat Ramon Llull)

17:00 **2262** Prussian Blue Films in Ammonium Aqueous Solution – J. Agrisuelas, C. Delgado, J. García-Jareño, and F. Vicente (University of Valencia)

17:15 **2263** Towards Tritium Electrochemical Sensors: Synthesis and Characterization of Proton Conducting Ceramic Elements – L. Llivina, S. Colominas, and J. Abellà (Institut Quimic de Sarria – Universitat Ramon Llull)

17:30 **2264** *In Situ* Coupling Current Studies in AA5083 and AA2024 – K. Williams (The Pennsylvania State University), R. Bayles (Naval Research Laboratory), and D. D. Macdonald (The Pennsylvania State University)

17:45 **2265** On the Corrosion of Iron in Physically-Constrained Locations – D. D. Macdonald (The Pennsylvania State University) and G. R. Engelhardt (OLI Systems, Inc.)

18:00 **2266** Mechanisms of Depassivation – D. D. Macdonald (The Pennsylvania State University)

18:15 **2267** Two Manifestations of the Passivity of the Metal in Aqueous Solution – H. Hua (China Aerospace Engineering Consultation Center) and H. Hua (Chinese Academy of Science)

18:30 **2268** Could this Fuel Replace Gasoline – J. O. Bockris (Gainesville)

D4 High Resolution Characterization of Corrosion Processes 3

Corrosion
Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

D4 – Poster Session – 18:00 – 20:00
Co-Chair: K. Zavadil

- **2269** Kelvin Probe Force Microscopic Study on Galvanic Action between MnS Inclusions and Stainless Steel Matrix – Y. Sugawara, I. Muto, and N. Hara (Tohoku University)
- **2270** Analysis of Pit Corrosion Using Temporal Series of Micrographs Coupled with Electrochemical Methods to Estimate the Three-Dimensional Evolution of Pits – A. M. Zimer, E. Rios, M. A. De Carra, L. H. Mascaro (Universidade Federal de São Carlos), and E. C. Pereira (Universidade Federal de Sao Carlos)

D5 High Temperature Corrosion Materials Chemistry 10

High Temperature Materials / Corrosion
318A, Level 3, Hawaii Convention Center

Thermodynamic/Kinetic Modeling and Experiment – 08:20 – 12:00
Co-Chairs: J. Fergus and E. Opila

08:20 **2325** Thermodynamic Modeling of Chromate Salt Mixtures in High-Temperature Corrosion of Superheater Materials – D. K. Lindberg, J. Lehmusto, and M. Hupa (Åbo Akademi University)

08:40 **2326** Investigation of the effect the Polarisability of Dipoles on the Local Microstructures of Molten Slags Using Density Functional Theory Molecular Dynamics – A. A. Gray-Weale (University of Melbourne), J. Krahl, A. Jacob (TU Freiberg), and P. J. Masset (ATZ Entwicklungszentrum)

09:00 **2327** Thermodynamic Modeling for Liquid Phase Sintering and Joining of Silicon Carbide – H. J. Seifert (Karlsruhe Institute of Technology)

09:40 Intermission (20 Minutes)

10:00 **2328** Multiscale Analysis on Gas Phase and Surface Chemistry of SiC-CVD Process – Y. Fukushima (The University of Tokyo), K. Hotozuka (IHI Corporation), Y. Funato, N. Sato, T. Momose, and Y. Shimogaki (The University of Tokyo)

10:20 **2329** Study of $La_2Zr_2O_7$ and $La_2Hf_2O_7$ Melting by Thermal Analysis and X-ray Diffraction – S. V. Ushakov, P. Saradhi, A. Navrotsky (University of California at Davis), R. J. Weber, and C. J. Benmore (Argonne National Laboratory)

10:40 **2330** *In Situ* Investigation of a High Temperature Phase Transformation Using Laser Heating and Synchrotron Diffraction – P. Saradhi, S. V. Ushakov, A. Navrotsky (University of California at Davis), R. J. Weber, and C. J. Benmore (Argonne National Laboratory)

11:00 **2331** Hydration and Dehydration Behavior of Amorphous Tantalum Oxide with Various Oxygen Contents – T. Ozato, T. Tsuchiya, S. Miyoshi, and S. Yamaguchi (The University of Tokyo)

11:20 **2332** Determination of Vapor Pressures of Fe-Oxides in Humid Atmospheres – T. Markus, W. Quadakkers, and L. Singheiser (Forschungszentrum Jülich GmbH)

11:40 **2333** Reaction Syntheses with Carbon Materials Chemistry: Intragranular Nanocomposites and 'Carbon Copies' – D. W. Lipke (Air Force Research Laboratory) and K. H. Sandhage (Georgia Institute of Technology)

High Temperature Coatings – 14:00 – 17:40
Co-Chairs: T. Markus and E. Wuchina

14:00 **2334** Thermochemical Interactions of Rare Earth Based TBCs with Molten CMAS Deposits – E. M. Zaleski, C. Ensslen, and C. G. Levi (University of California, Santa Barbara)

14:20 **2335** Ceramic Dusting Corrosion of Yttria Stabilized Zirconia in Ultra-High Temperature Reverse-Flow Pyrolysis Reactors – C. Chun, S. Desai (ExxonMobil Corporate Strategic Research), and T. A. Ramanarayanan (Princeton University)

14:40 **2336** Chemical Densification of Oxide Based Coatings for High Temperature Wear and Corrosion Resistance – P. J. Masset, M. Faulstich (ATZ Entwicklungszentrum), K. Fehr (Ludwig-Maximilians-Universität München), C. Weih, G. Wolf (ATZ Entwicklungszentrum), and Y. Ye (Ludwig-Maximilians-Universität München)

15:00 **2337** Relationship between Electrical Properties and Stress Field in Solid Electrolyte Thin Films – F. Iguchi, Y. Osawa, and H. Yugami (Tohoku University)

15:20 **2338** Oxygen Gas Sealing between YSZ and Fe-Cr Alloy by Liquid-Phase-Oxidation Joining via ZrO_2-Dispersed Al Interlayer – Y. Hashimoto and T. Akashi (Hosei University)

15:40 Intermission (20 Minutes)

16:00 **2339** Microstructures and Phase Evolution in NiAl-Based Overlay Coatings – M. L. Weaver and J. P. Alfano (The University of Alabama)

16:20 **2340** Transition Metal Spinel Oxide Coatings for Solid Oxide Fuel Cell Interconnects – J. W. Fergus, C. Dileep Kumar, Y. Liu, W. Tilson, A. Dekich, and H. Wang (Auburn University)

16:40 **2341** Microstructural Investigation of Co- and RE-Nanocoatings on FeCr Steels – S. Canovic, J. Froitzheim, R. Sachitanand, M. Nikumaa, L. Johansson, and J. Svensson (Chalmers University of Technology)

17:00 **2342** Protection of Ferritic Steels by Nano-Structured Coatings: Supercritical Steam Turbines Applications – M. Mato, M. Hierro, S. Castañeda, G. Alcalá, I. Lasanta, M. Tejero (Universidad Complutense de Madrid), J. Sánchez (CSIC), M. Brizuela (TECNALIA-Inasmet), and F. J. Pérez (Universidad Complutense de Madrid)

17:20 **2343** Improvement of the Resistance of Titanium Aluminides to Environmental Embrittlement – P. J. Masset (ATZ Entwicklungszentrum), F. Bleicher (TU Wien), L. Bortolotto (Dechema Forschungsinstitut), G. Geiger (TU Wien), A. Kolitsch (Helmholtz-Zentrum Dresden-Rossendorf), C. Langlade (TU Belfort-Montbéliard), J. Paul (Helmholtz-Zentrum-Geestacht), B. Pelic (TU Freiberg), F. Pyczak (Helmholtz-Zentrum-Geestacht), D. Rafaja (TU Freiberg), P. Schumacher (Österreichisches Gießerei-Institut), M. Schütze (Dechema Forschungsinstitut), G. Wolf (ATZ Entwicklungszentrum), and R. Yankov (Helmholtz-Zentrum Dresden-Rossendorf)

D6 Light Alloys 4
Corrosion
319A, Level 3, Hawaii Convention Center

Co-Chairs: B. Shaw and R. Buchheit

08:20 **2344** High Resolution SEM Investigation of Intercrystalline Corrosion on 6000-Series Aluminum Alloy with Low Copper Content – K. Shimizu (Keio University) and K. Nisancioglu (Norwegian University of Science and Technology)

08:40 **2345** Effect of Additive Elements on Corrosion Behavior for Aluminum in Weak Alkaline Solution at High Temperature – Y. Honkawa, T. Yaegashi, and Y. Kojima (Furukawa-Sky Aluminum Corp.)

09:00 **2346** Combined Role of Trace Elements Pb and Sn in Low Temperature Activation of Aluminum – K. Kurt, J. C. Walmsley (Norwegian University of Science and Technology), S. Diplas (SINTEF), and K. Nisancioglu (Norwegian University of Science and Technology)

09:20 **2347** Interactions of Sulfide with Aluminum Alloys – J. S. Lee, R. Ray, and B. Little (Naval Research Laboratory)

09:40 **2348** The Role of Environmental Aspects and Atmospheric Contaminants on the Corrosion of 2024, 6061 and 7075 Aluminum Alloys – Y. Yoon and D. C. Hansen (University of Dayton Research Institute)

Co-Chairs: S. Virtanen and S. Fujimoto

10:20 **2349** Pitting Corrosion of Aluminum Alloy in Chloride Environment – Y. Oya and Y. Kojima (Furukawa-Sky Aluminum Corp.)

10:40 **2350** Effect of Surface Topography, Cleaning, and Conversion Coatings in the Adhesion Strength of Organic Polymers to AA2024-T3 using the Blister Test – B. C. Rincon Troconis and G. Frankel (The Ohio State University)

11:00 **2351** Self-Healing Nature of Molybdate Conversion Coatings for Aluminum Alloys – D. Rodriguez, R. Misra, and D. Chidambaram (University of Nevada Reno)

11:20 **2352** Organic-Inorganic Sol-Gel Coatings Modified with TiO_2 Nanoparticles for Corrosion Protection of a Powder Metallurgical Aluminum Alloy – A. Jiménez-Morales, F. García-Galván, D. Carbonell, D. Montoya (Universidad Carlos III de Madrid), and J. C. Galván (Centro Nacional de Investigaciones Metalúrgicas)

11:40 **2353** The Role of Environmental and Atmospheric Conditions on the Corrosion of AA 2024-T3 with Various Pre-Treatments and Coating Systems – L. Petry (University of Dayton Reearch Institute) and D. C. Hansen (University of Dayton Research Institute)

Co-Chairs: K. Nisancioglu and Y. Kojima

14:00 **2354** Corrosion Control Studies of Aluminum-Composite Interfaces in Diverse Micro-Climates – R. Srinivasan and L. H. Hihara (University of Hawaii)

14:20 **2355** Metal Dissolution and Repassivation Behavior of Ti6Al4V Alloy during Rapid Straining in Simulated Body Fluid – K. Doi, S. Miyabe, and S. Fujimoto (Osaka University)

14:40 **2356** Investigation of the Corrosion of Magnesium and Titanium in Simulated Body Fluids – R. Feser, M. Ceylan (University of Applied Sciences South Westfalia), and S. Virtanen (University of Erlangen)

15:00 **2357** Magnesium and Mg Alloys "Biocorrosion" in Protein Containing Body Fluids – P. Schmutz (EMPA Swiss Federal Laboratories for Materials Science and Technology), N. Ott, R. Grisch (EMPA), and P. Uggowitzer (ETHZ, Swiss Federal Institute of Technology)

15:20 **2358** Influence of Chemistry, Microstructure and Texture on the Durability of Mg-Alloys: An overview – K. Gusieva, C. H. Davis, and N. Birbilis (Monash University)

Co-Chairs: D. Hansen and N. Birbilis

16:00 **2359** A Cumulative Approach to Tracking the Corrosion of Mg Alloys on the Microscale – R. M. Asmussen, P. Jakupi, and D. W. Shoesmith (University of Western Ontario)

16:20 **2360** Local, Time-Resolved and Element-Specific Investigations of Corrosion Processes for the Development of Biodegradable Mg Alloys – N. Ott (EMPA), P. Schmutz (EMPA Swiss Federal Laboratories for Materials Science and Technology), C. Ludwig, and A. Ulrich (EMPA)

16:40 **2361** Improvement in Corrosion Characteristics of AZ31 Mg Alloy by Square Pulse Anodizing between Transpassive and Active Regions – Y. Choi, S. Salman, K. Kuroda, and M. Okido (Nagoya University)

17:00 **2362** The Development of Ionic Liquid Generated Conversion Coatings for Magnesium Alloys – P. Howlett (Deakin University), J. Latham, D. MacFarlane (Monash University), and M. Forsyth (Deakin University)

17:20 **2363** Corrosion Inhibition of Mg Alloys by Inorganic and Organic Inhibitors – J. Hu, D. Huang (Huazhong University of Science and Technology), G. Song (GM Global R&D), and X. Guo (Huazhong University of Science and Technology)

17:40 **2364** Biocompatible Coatings for Mg Alloys for Tailored Degradation Behavior – S. Virtanen (University of Erlangen)

D7 Pits and Pores 5: A Symposium in Honor of David Lockwood

Corrosion / Luminescence and Display Materials

323B, Level 3, Hawaii Convention Center

Membranes & Sensing – 08:00 – 10:00
Co-Chairs: I. Balberg and K. Rumpf

08:00 **2405** Solid-State Nanopores: Electronic Tools for Single-Molecule Analysis – V. Tabard-Cossa (University of Ottawa)

08:30 **2406** Transport in Surface Passivated Porous Silicon Membranes – A. Kovacs, W. Kronast, A. Filbert, and U. Mescheder (Furtwangen University)

08:50 **2407** New Cheap Composite Membranes Using Nanoporous Anodic Aluminum Oxide Films – M. Kim, T. N. Nguyen, J. Ahn (Korea Electrotechnology Research Institute), J. Kaewsuk (Korean Electrotechnology Research Institute), J. Kim, and D. Jeong (Korea Electrotechnology Research Institute)

09:10 **2408** Importance of Pore Morphology for Super-Liquid Repellency of Solid Surfaces – H. Habazaki, T. Fujii, and E. Tsuji (Hokkaido University)

09:40 Intermission (20 Minutes)

Oxide Formation & Ordered Nanostructures – 10:00 – 12:20
Co-Chairs: S. Ono and T. Djenizian

10:00 **2409** Morphological Instability Leading to Formation of Porous Anodic Oxide Films – K. R. Hebert and A. Macrostie (Iowa State University)

10:20 **2410** A Continuum Model of Anodic Pore Growth in Alumina – S. J. DeWitt (University of Michigan – Ann Arbor) and K. Thornton (University of Michigan)

10:40 **2411** Controlled Fabrication of Ordered 3D Porous Alumina Nanostructures with Designed Cell Ratios by Stepwise Anodization – S. Chu, Y. Hitoshi (Iwate University), K. Wada, S. Inoue, and H. Segawa (National Institute for Materials Science)

11:00 **2412** Self-Ordered Sub-10 nm Nanoporous Anodic Alumina Membranes: A New Tool for Nanotechnology – E. Moyen, L. Assaud, K. Pitzschel, L. Masson, M. Hanbücken, and L. Santinacci (CNRS – Aix-Marseille University)

11:20 **2413** Electrochemical Formation of Ordered Pore Arrays on Metallic Substrates – H. Tsuchiya (Osaka University), M. Kim, Y. Terada (Division of Materials and Manufacturing Science, Graduate School of Engineering, Osaka University), and S. Fujimoto (Osaka University)

11:40 **2414** New Cheap Anodic Aluminum Oxide Composite Membranes by Lithography Technique – J. Kaewsuk (Korean Electrotechnology Research Institute), J. Kim, M. Kim, T. N. Nguyen, J. Ahn, and D. Jeong (Korea Electrotechnology Research Institute)

12:00 **2415** Dependence of the Reactivity of Silicon Dioxide Layers on the Porous Structure – F. N. Dultsev (Institute of Semiconductor Physics SB RAS)

Device Applications – 14:00 – 16:00
Co-Chairs: V. Tabard-Cossa and C. Lévy-Clément

14:00 **2416** Nanostructure Modified Porous Interfaces for Enhanced Sensing and Directed Microcatalysis – J. Gole and W. Laminack (Georgia Institute of Technology)

14:30 **2417** Miniaturization of Hydrogen Gas Sensors by Using Anodization Processes of Titanium – Y. Kimura, S. Kimura, R. Kojima, and M. Niwano (Tohoku University)

14:50 **2418** Photoelectric-conversion Devices Based on InP Porous Structure – T. Sato, R. Jinbo, and Z. Yatabe (Hokkaido University)

15:10 **2419** Multi-Functionality of Nanosilicon and Its Device Applications – N. Koshida (Tokyo University of Agriculture and Technology)

15:40 Intermission (20 Minutes)

Pore Formation and Characterization – 16:00 – 17:40
Co-Chairs: L. Santinacci and K. Kolasinski

16:00 **2420** The Effect of Temperature and Electrolyte Concentration on Porous Layers Formed on InP in KOH – N. Quill, R. Lynch, C. O'Dwyer (University of Limerick), and D. Buckley (Materials & Surface Science Institute, University of Limerick)

16:20 **2421** Current-Line Oriented Pore Formation in n-InP Anodized in KOH – N. Quill, R. Lynch, C. O'Dwyer (University of Limerick), and D. Buckley (Materials & Surface Science Institute, University of Limerick)

16:40 **2422** Fabrication of a Single-Crystalline Porous InP Membrane by Electrochemical and Photoelectrochemical Etching – M. Gerngross, J. Carstensen, and H. Föll (Christian-Albrechts-University of Kiel)

17:00 **2423** SVET Analysis of Tinplate Flow Melted Using Resistance Heating and Induction Vs Novel Near Infrared Heat Treatment – I. Mabbett, D. J. Warren, S. Geary, J. H. Sullivan, D. Penney, T. M. Watson, and D. A. Worsley (Swansea University)

17:20 **2424** Imaging Metastable Pits on Austenitic Stainless Steel *In Situ* at the Open-Circuit Corrosion Potential Using Scanning Electrochemical Microscopy – R. M. Souto, J. Izquierdo, and S. González (University of La Laguna)

E1 Solid State Topics General Session

Dielectric Science and Technology / Electronics and Photonics / Energy Technology
310, Level 3, Hawaii Convention Center

Solid State Topics Afternoon Session – 14:00 – 17:20
Co-Chairs: R. Todi and O. M. Leonte

14:00 **2438** Characteristics of Zinc Oxide Films Grown on Sapphire Substrates Using High-Energy H_2O Generated by a Catalytic Reaction on Platinum Nanoparticles – K. Yasui, H. Miura, S. Satomoto, and T. Kato (Nagaoka University of Technology)

14:20 **2439** Dielectric Constant Studies of BCN Thin Films – K. B. Sundaram and V. Todi (University of Central Florida)

14:40 **2440** Effect of Wet Surface Treatments on Amorphous Silicon Anneal and Gate Breakdown – C. S. Tiwari, T. Guo, C. Breyfogle, J. Zhang, H. Mitro, L. Olmer, V. Kumar, D. Pohlman, and M. Rutte (Micron Technology Inc.)

15:00 **2441** Ultrasonic Spray-Assisted Vapor-Deposition Method as a Cost-Effective and Environmental-Friendly Technology for Semiconductor and Dielectric Materials for Devices – S. Fujita, S. Katori, J. Piao, T. Ikenoue, and K. Kaneko (Kyoto University)

15:20 **2442** UV-Visible Faraday Rotators Based on Rare-Earth Fluoride Single Crystals: $LiREF_4$ (RE=Tb, Dy, Ho, Er and Yb), PrF_3 and CeF_3 – V. Vasyliev, E. G. Villora (National Institute for Materials Science), Y. Sugahara (Waseda University), and K. Shimamura (National Institute for Materials Science)

15:40 Intermission (20 Minutes)

16:00 **2443** The Characterization Study of Polycrystalline Silicon Grain Growth with Electron Backscatter Diffraction Patterns and Crystallinity – S. Yang, J. Chang, J. Lim, J. Shin, Y. Yoo, J. Kim, B. Chung, H. Choi, K. Hwang, and H. Kang (Samsung Electronics Co., Ltd.)

16:20 **2444** Electrical Breakdown of Anodic Aluminum Oxide Films for Electrowetting Systems – M. Mibus, E. Nein, A. Sapkota, C. Knospe, M. Reed, and G. Zangari (University of Virginia)

16:40 **2445** Ultrafast Carrier Dynamics in Green-Sensitive Organic Photodiodes – S. Sul, K. Lee, D. Leem, K. Kim, and H. Han (Samsung Advanced Institute of Technology)

17:00 **2446** Single Chamber HFCVD Process for Growth of Diamond, Graphene and CNTs – S. Albin (Norfolk State University), R. Vispute, and A. Seiser (Blue Wave Semiconductors, Inc.)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

E1 – Poster Session – 18:00 – 20:00
Co-Chairs: R. Todi and O. M. Leonte

- **2447** The Systematic Study and Simulation Modeling on Dislocation Edge Stress Effects for Si N-MOSFETs – M. Liao, C. Chen, L. Chang, C. Yang (National Taiwan University), C. Hsieh (Industrial Technology Research Institute), and M. Lee (National Taiwan Normal University)
- **2448** The Investigation on the Relaxation of Intrinsic Compressive Stress in CMOS Transistors by Additional N IMP Treatment and AFM-Raman Stress Extraction – M. Liao, C. Chen, L. Chang, C. Yang (National Taiwan University), C. Hsieh (Industrial Technology Research Institute), and M. Lee (National Taiwan Normal University)
- **2449** Plasmonic Color Filters for OLED by Laser Interference Lithography – J. Park (Korea University), Y. Do (KAIST), B. Hwang (Korea University), K. Choi (KAIST), and B. Ju (Korea University)
- **2450** Hot Carrier effects by Gate Induced Drain Leakage Current – K. Kim (Samsung Electronics Co.), C. Han, J. Lee, D. Kim, H. Kim (Sungkyunkwan University), H. Lee (Samsung Electronics Co.), and B. Choi (Sungkyunkwan University)
- **2451** Development of Visual Inspection System for Metal Surface with Multivariate Pattern Analysis – K. Shigyo, T. Matsumoto, K. Sakiyama (Mitsubishi Electric Corporation), and H. Kobayashi (Mitsubishi Electric METECS)
- **2452** Effects of Tungsten Composition Ratio on the Properties of W-In-Zn-O Films Deposited by RF Magnetron Sputtering – G. Heo (Korea Institute of Industrial Technology), B. Oh (LINKLINE INC), J. Park (Korea Institute of Industrial Technology), Y. Lee, Y. Lee, and D. Shin (Chosun University)
- **2453** Fabrication of n-type Semiconductive Polycrystalline Diamond by Incorporating Phosphorous Atoms – A. Nakahara, H. Naragino, K. Yoshinaga, S. Tanaka, and K. Honda (Yamaguchi University)
- **2454** Carrier Transport Mechanism at Metal/Amorphous Gallium Indium Zinc Oxide Interfaces – S. Kim, C. Choi, and H. Kim (Chonbuk National University)
- **2455** Glowth of AlN Single Crystals by Sublimation Method – Y. Oshima, M. Nakamura (National institute for materials science), Y. Masa (Sumitomo Metal Mining Co., Ltd.), E. G. Villora, K. Shimamura (National Institute for Materials Science), and N. Ichinose (Waseda University)

E3 Chemical Mechanical Polishing 12

Dielectric Science and Technology
317B, Level 3, Hawaii Convention Center

CMP Symposium (E3) Day 1 – 08:00 – 15:40
Co-Chairs: Robert Rhoades and Gautam Banerjee

08:00		Introductory Comments (30 Minutes)
08:30	**2485**	Corrosion Inhibition Effect of Organic Additive on Ru Film in Colloidal Silica Based Slurry with Sodium Periodate – H. Cui, J. Lim, J. Cho, H. Hwang, J. Park, and J. Park (Hanyang University)
09:10	**2486**	Electrochemical Characterizations on Chemical Mechanical Polishing Compositions of Polishing Ruthenium Films in CMP Processes – T. X. Shi, J. Henry, and J. Schlueter (DA NanoMaterials)
09:30	**2487**	Brush Scrubbing Scratches Reduction Methods in Post CMP Cleaning – H. Soondrum (Globalfoundries)
09:50		Intermission (20 Minutes)
10:10	**2488**	Studies on Slurry Design Fundamentals for Advanced CMP Applications – G. Basim, A. Karagoz (Ozyegin University), L. Chen, and I. Vakarelski (King Abdullah University of Science and Technology)
10:30	**2489**	Managing Corrosion during the Chemical Mechanical Polishing (CMP) of Metal Films – J. Schlueter, J. Henry, and T. X. Shi (DA NanoMaterials)
10:50	**2490**	Microstructure and Pattern Size Dependence of Copper Corrosion in Submicron-Scale Features – U. Lee, J. Choi, J. Won (Samsung Electronics), H. Lee (Dong-A University), H. Sohn, and T. Kang (Seoul National University)
11:10	**2491**	Scratching of Patterned Composite Surfaces by Pad Asperities in Chemical-Mechanical Polishing – S. Kim, N. Saka, and J. Chun (Massachusetts Institute of Technology)
11:30	**2492**	Effect of Chelating Agent on Chemical Mechanical Polishing Performance for Polycrystalline $Ge_2Sb_2Te_5$ Film – J. Cho, J. Lim, S. Woo (Hanyang University), E. Hwang (Hynix Semiconductor Inc.), and J. Park (Hanyang University)
11:50		Lunch Break (70 Minutes)
13:00	**2493**	Metal Oxide Nano Film Characterization for CMP Optimization – G. Basim, A. Karagoz, and Z. Ozdemir (Ozyegin University)
13:40	**2494**	Novel Ru CMP Slurry Using TiO_2 Nano Particle as Abrasive and H_2O_2 as Oxidizer – J. Park, H. Cui, J. Lim, J. Jo, H. Hwang, and J. Park (Hanyang University)
14:00	**2495**	Metal Clearing Process Control in Metal CMP – K. Xu, I. Carlsson, T. Liu, S. Shen, B. Swedek, Y. Wang, X. Xia, D. Bennett, W. Tu, and L. Karuppiah (Applied Materials Inc.)
14:20		Intermission (20 Minutes)
14:40	**2496**	Post-CMP Cleaning of Copper Interconnects at Sub-32nm Technology Node – T. Dnyanesh, M. Rao (Air Products & Chemicals), and G. Banerjee (Air Products and Chemicals)

15:00 **2497** Effect of Iron(III) Nitrate Concentration on Tungsten Chemical-Mechanical-Polishing Performance – J. Lim, J. Cho, H. Hwang, H. Cui, J. Park, and J. Park (Hanyang University)

15:20 **2498** Effect of slurry on Vapor Deposition Polymerization (VDP)Chemical Mechanical Planarization (CMP) in Through-Silicon Via (TSV) Applications – I. Ali, B. Sapp, R. Quon, S. Kruger (SEMATECH), K. Maekawa, K. Sugita, H. Hashimoto (TEL), M. Stender, J. Dysard (Cabotmicroelectronics), and S. Arkalgud (SEMATECH)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

E3 – Poster Session – 18:00 – 20:00
Co-Chairs: Robert Rhoades and Gautam Banerjee

- **2499** Effects of Polishing Parameters on the Evolution of 3-D Wafer Pattern during CMP – L. Wu (Lanzhou University of Technology)
- **2500** The Step Height Reduction in STI-CMP by Controlling the Adhesion Force between Abrasive and Polishing Pad – J. Seo, J. Moon, K. Kim, W. Sigmund, and U. Paik (Hanyang University)
- **2501** Controls of Interactions among Polishing Pad, Abrasive, and Oxide Film by Modification of Polyethyleneimine(PEI) on Under 30nm Ceria Abrasive CMP Slurry – J. Moon, J. Bae, K. Park, K. Kim, H. Park, and U. Paik (Hanyang University)
- **2502** Bottom Electrode Surface Treatment effect on MTJ in MRAM Device – C. Kim, J. Jung, I. Yoon, B. Yoon, J. Park, and S. Jung (Samsung Electronics Co. Ltd.)
- **2503** Improved Removal Rate in Organic Additive Assisted Ceria Chemical Mechanical Planarization – J. Bae, J. Seo, K. Park, J. Moon, H. Park, and U. Paik (Hanyang University)
- **2504** A Modeling Study on the Layout Impact of With-In-Die Thickness Range for STI CMP – S. Kincal (Middle East Technical University) and G. Basim (Ozyegin University)

E4 Gallium Nitride and Silicon Carbide Power Technologies 2

Electronics and Photonics / Dielectric Science and Technology
316C, Level 3, Hawaii Convention Center

SiC MOS Devices – 08:00 – 10:00
Co-Chairs: Mietek Bakowski and Stan Atcitty

08:00 **2545** Band Diagrams and Trap Distributions in Metal-SiO_2-SiC(3C) Structures with Different Metal Gates – H. M. Przewlocki, T. Gutt, K. Piskorski (Institute of Electron Technology), and M. Bakowski (Acreo AB)

08:20 **2546** Angle-Resolved XPS Studies on Transition Layers at SiO_2/SiC Interfaces – H. Okada, A. Komatsu, M. Watanabe (Tokyo City University), Y. Izumi, T. Muro (Japan Synchrotron Radiation Research Institute), and H. Nohira (Tokyo City University)

08:40 **2547** Effect of Stress and Measurement Conditions in Determining the Reliability of SiC Power MOSFETs – A. Lelis, R. Green, M. El, and D. Habersat (U.S. Army Research Laboratory)

09:00 **2548** $POCl_3$ Annealing as a New Method for Improving 4H-SiC MOS Device Performance – H. Yano, T. Hatayama, and T. Fuyuki (Nara Institute of Science and Technology)

09:20 **2549** Passivation in High-Power Si Devices – An Overview – U. Grossner, A. Mihaila, U. Vemulapati (ABB Corporate Research), and C. Corvasce (ABB Switzerland Ltd., Semiconductors)

09:40 Intermission (20 Minutes)

High-Frequency Power Transistors – 10:00 – 12:00
Co-Chairs: Mike Spencer and Joachim Wurfl

10:00 **2550** Broadband GaN Power Amplifiers – S. Leong (PolyFET RF Devices) and K. Shenai (University of Toledo)

10:20 **2551** A Promising New n^{++}-GaN/InAlN/GaN HEMT Concept for High-Frequency Applications – V. Palankovski and J. Kuzmik (TU Wien)

10:40 **2552** Achieving Low Doped ($<10^{16}$) GaN with Large Breakdown Voltages (~1000 V) – K. A. Jones, R. P. Tompkins, M. A. Derenge, K. W. Kirchner, S. Zhou (Army Research Lab.), R. Metzger, J. Leach (Kyma Technologies), P. Suvana, M. Tungare, and F. Shahedipou-Sandvik (SUNY-Albany)

11:00 **2553** GaN Technology for Millimeter Wave Power Amplifiers – A. K. Oki, M. Wojtowicz, B. Heying, I. Smorchkova, B. Luo, and M. Siddiqui (Northrop Grumman Aerospace Systems)

11:20 **2554** A Simple and Accurate Physics-Based Circuit Simulation Model for Depletion-Mode GaN Power Transistors – K. Shenai (University of Toledo) and S. Leong (PolyFET RF Devices)

11:40 **2555** Current Status and Future Prospects of GaN HEMTs for High Power and High Frequency Applications – T. Kikkawa, M. Kanamura, T. Ohki, K. Imanishi, K. Watanabe, and K. Joshin (Fujitsu Laboratories Ltd.)

12:00 **2556** S-Band 300 W Output SiC MESFET – S. Cai, L. Li, J. Li, J. Mo, B. Liu, and Z. Feng (Science and Technology on ASIC Lab.)

GaN Power Transistors and Converters – 14:00 – 16:00
Co-Chairs: Reenu Garg and Ken Jones

14:00 **2557** Low Dynamic ON-Resistance in AlGaN/GaN Power HEMTs Obtained by AlN Thin Film Passivation – K. Chen, S. Huang, and Q. Jiang (Hong Kong University of Science and Technology)

14:20 **2558** Thickness Dependent Electrical Characteristics of AlGaN/GaN MOSHEMT with La_2O_3 Gate Dielectrics – J. Chen, K. Tsuneishi, K. Kakushima, P. Ahmet, Y. Kataoka, A. Nishiyama, N. Sugii, K. Tsutsui, K. Natori, T. Hattori, and H. Iwai (Tokyo Institute of Technology)

14:40 **2559** Field Control Energy-Band (FCE) Technology for GaN-Based Heterostructure Power Devices – W. Chen, Z. Wang, X. Deng, and B. Zhang (University of Electronics Science and Technology of China)

15:00 **2560** Electro-Thermal Circuit Modeling of Power Inductors – K. Shenai (University of Toledo), J. Wu, and H. Cui (University of Tennessee)

15:20 **2561** eGaN FETs in Low Power Wireless Energy Converters – M. A. De Rooij and J. T. Strydom (Efficient Power Conversion Corp.)

15:40 Intermission (20 Minutes)

SiC Bipolar Power Diodes – 16:00 – 18:00
Co-Chairs: Mike Dudley and Aivars Lelis

16:00 **2562** Ion Implanted 4H-SiC p-i-n Diodes: Comparison between 1600-1650°C and 1950°C Post Implantation Annealing – R. Nipoti (CNR-IMM of Bologna)

16:20 **2563** Thermal Behavior of SiC Power Diodes – J. Millán (IMB-CNM-CSIC), P. Godignon, and V. Banu (CNM-CSIC)

16:40 **2564** Multilayer Epitaxial Growth and Fabrication of 4H-SiC BJT with Double Base Epilayers – Y. Zhang, L. Yuan, Y. Zhang, X. Tang, Q. Song, X. Zhang, and Q. Zhang (Xidian University)

17:00 **2565** Merits of Buried Grid Technology for SiC JBS Diodes – M. Bakowski (Acreo AB), J. Lim, and W. Kaplan (Acreo)

17:20 **2566** Towards Very High Voltage SiC Power Devices – D. Planson, P. Brosselard, D. Tournier (Université de Lyon, INSA de Lyon, CNRS UMR 5005 Ampere Lab), and C. Brykinski (Université de Lyon, Université Lyon1, CNRS UMR 5615 Laboratoire des Multimatériaux et Interfaces)

Panel #3: Switch vs. Reverse Conducting Diode in a Power Module – 18:00 – 20:00
Co-Chairs: Krishna Shenai and Durga Misra

18:00 Introduction of Panelists (15 Minutes)

18:15 Stan Atcitty (10 Minutes)

18:25 M. Bakowski (10 Minutes)

18:35 T. Funaki (10 Minutes)

18:45 S. Sato (10 Minutes)

18:55 R. Ranstad (10 Minutes)

19:05 K. Hobart (10 Minutes)

19:15 Q&A (45 Minutes)

E5 Dielectric Materials and Metals for Nanoelectronics and Photonics 10

Dielectric Science and Technology / Electronics and Photonics
313A, Level 3, Hawaii Convention Center

Strain Characterization – 09:00 – 09:40
Co-Chair: Samares Kar

09:00 **2610** Development of Ultrathin Gold Film Tensile Testing by Floating Specimen on Water Surface – J. Kim, A. Nizami (KAIST), H. Lee, S. Hyun (Korea Institute of Machinery and Materials), and T. Kim (KAIST)

09:20 **2611** Characterization of Stress Transfer from Process Induced Stressor Layer to Substrate in MOSFETs – R. THOMAS, D. Benoit, A. Pofelski, L. Clement, P. Morin (STMicroelectronics), D. Cooper (CEA LETI), and F. Bertin (CEA-LETI)

Nano-Wire Technology – 10:00 – 11:20
Co-Chairs: Hemanth Jagannathan and Kajuhiko Endo

10:00 **2612** Si Nanowire Technology – H. Iwai (Tokyo Institute of Technology)

10:30 **2613** Fabrication of High-Quality GOI and SGOI Structures by Rapid Melt Growth Method – Novel Platform for High-Mobility Transistors and Photonic Devices – - H. Watanabe, Y. Suzuki, S. Ogiwara, N. Kataoka, T. Hashimoto, T. Hosoi, and T. Shimura (Osaka University)

11:00 **2614** A Study of Metal Gates on HfO_2 using Si Nanowire Field Effect Transistors as Platform – Q. Li (George Mason University), H. Zhu, H. Yuan, O. Kirillov (NIST), D. Ioannou (George Mason University), J. Suehle, and C. A. Richter (NIST)

EOT Scaling – 11:20 – 12:20
Co-Chairs: Shinichi Takagi and Sven Van Elshocht

11:20 **2615** Aggressive SiGe Channel Gate Stack Scaling by Remote Oxygen Scavenging: pFET Performance and Reliability – M. M. Frank, E. A. Cartier, T. Ando, S. W. Bedell, J. Bruley, Y. Zhu, and V. Narayanan (IBM T.J. Watson Research Center)

11:40 **2616** Interface Properties La-Silicate MOS Capacitors with Tungsten Carbide Gate Electrode for Scaled EOT – T. Kamale (Tokyo Institute of Technology), R. Tan (Ningbo University), K. Kakushima, P. Ahmet, Y. Kataoka, A. Nishiyama, N. Sugii, K. Tsutsui, K. Natori, T. Hattori, and H. Iwai (Tokyo Institute of Technology)

12:00 **2617** Remote Scavenging Technology using Ti/TiN Capping Layer Interposed in a Metal/High-k Gate Stack – X. Ma, X. Wang, K. Han, W. Wang, and T. Ye (Chinese Academy of Sciences)

Interface Related Studies – 14:00 – 15:10
Co-Chairs: Andrew Kummel and Koji Kita

14:00 **2618** Band Lineup Issues Related with High-k/SiO_2/Si Stack – J. Xiang, X. Wang (Chinese Academy of Sciences), T. Li (Institute of Microelectronics of Chinese Academy of Sciences), C. Zhao, W. Wang (Chinese Academy of Sciences), Q. Liang, J. Li (Institute of Microelectronics of Chinese Academy of Sciences), D. Chen, and T. Ye (Chinese Academy of Sciences)

14:20 **2619** Schottky Barrier Height at TiN/HfO_2 Interface of TiN/HfO_2/SiO_2/Si Structure – K. Han, X. Wang, W. Wang (Chinese Academy of Sciences), J. Zhang (North China University of Technology), J. Xiang, H. Yang, C. Zhao, D. Chen, and T. Ye (Chinese Academy of Sciences)

14:40 **2620** SiC MOS Interface States: Similarity and Dissimilarity from Silicon – T. Umeda, Y. Satoh (University of Tsukuba), R. Kosugi, Y. Sakuma, M. Okamoto, S. Harada (National Institute of Advanced Industrial Science and Technology), and T. Ohshima (Japan Atomic Energy Agency)

Device Manufacturing – 15:20 – 16:20
Co-Chair: Samares Kar

15:20 **2621** Controlled Lateral Etching of Titanium Nitride in a CMOS Gate Structure using DSP+ – J. C. Foster (Intermolecular inc), S. Metzger, and P. Besser (Globalfoundries)

15:40 **2622** The Electrochemical Kinetics of Selectively Corroding Poly-Silicon in Generating Lonely Crater-Defects – L. Sheng and E. Glines (ON Semiconductor)

16:00 **2623** Local-Loading Effects for Pure-Boron-Layer Chemical-Vapor Deposition – V. Mohammadi (Delft University of Technology), W. De Boer (TUDelft), T. Scholtes (Delft University of Technology), and L. K. Nanver (TUDelft)

E6 High Purity Silicon 12

Electronics and Photonics
320, Level 3, Hawaii Convention Center

Materials Issues in ULSI Processing – 08:30 – 09:40
Co-Chair: C. Claeys

08:30 **2653** Introduction of New Materials into CMOS Devices – H. Iwai (Tokyo Institute of Technology)

09:10 **2654** Cu Contamination Assessment and Control in 3-D Integration – M. Koyanagi, K. Lee, J. Bea, T. Fukushima, and T. Tanaka (Tohoku University)

09:40 Intermission (20 Minutes)

Gettering and Defects in Circuits and Devices – 10:00 – 12:10
Co-Chairs: M. Koyanagi and E. Simoen

10:00 **2655** Modeling of Boron and Phosphorus Diffusion Gettering of Iron in Silicon – A. Haarahiltunen, V. Vähänissi, H. Talvitie, M. Yli-Koski, and H. Savin (Aalto University)

10:30 **2656** Defect Generation in Device Processing and Impact on the Electrical Performances – M. Polignano, I. Mica, G. Carnevale, A. Mauri (Micron Semiconductor Italia S.r.l.), E. Bonera (Universita' degli studi di Milano-Bicocca), and S. Speranza (Cabot Microelectronic)

11:00 **2657** Segregation Behavior of Copper and Tantalum in Oxide Film and Si Substrate after Device Heat-treatment – I. Lee, S. Baek, G. Lee, U. Paik, and J. Park (Hanyang University)

11:20 **2658** The Characteristics of Gettering Ability in Advanced Multi-Chip Packaging Thinned Wafer – J. An (SK Hynix), J. Kim, J. Kim, K. Lee, H. Kang (LG Siltron), S. Lee, B. Moon, Y. Shin, S. Hwang, and H. Park (SK Hynix)

11:40 **2659** Effects of Slow Diffusivity Metallic Contaminant on Electrical Characteristic Degradation for Silicon C-MOS Image Sensor – G. Lee, I. Lee, S. Baek, I. Kim, and J. Park (Hanyang University)

12:00 Concluding Remarks (10 Minutes)

E7 Low-Dimensional Nanoscale Electronic and Photonic Devices 5

Electronics and Photonics / Dielectric Science and Technology / Sensor
304A, Level 3, Hawaii Convention Center

Low-Dimensional Materials for Functional Devices II – 08:20 – 09:40
Co-Chairs: Hiroyuki Sugimura and Zhiyong Fan

08:20 **2697** Transparent Conductive CNT/PMMA Nanocomposite Via Electrostatic Adsorption Technique – H. Muto, N. Hakiri, G. Kawamura, and A. Matsuda (Toyohashi University of Technology)

08:45 **2698** Transfer Printing of Compound Semiconductor Nanostructures on Heterogeneous Substrates – H. Ko (Ulsan National Institute of Science and Technology)

09:10 **2699** Electrochemical Growth of Vertically Standing Ni Nanorod Arrays on Si Substrate and the Low-Dimensional Effect on Their Enhanced Cold Field Electron Emission Properties – A. N. Banerjee and S. Joo (Yeungnam University)

09:25 **2700** Formation of Ge-Nanodots Capped with SiC Layer by Gas-Source MBE Using MMGe and MMSi – K. Yasui (Nagaoka University of Technology), Y. Anezaki, K. Sato, A. Kato (Nagaoka Universityof Technology), T. Kato (Nagaoka University of Technology), M. Suemitsu (Tohoku University), Y. Narita (Yamagata University), and H. Nakazawa (Hirosaki University)

Low-Dimensional Materials for Functional Devices III – 10:00 – 11:55
Co-Chairs: Xudong Wang and Hyunhyub Ko

10:00 **2701** Extremely Stretchable Electrodes beyond Intrinsic Limit Originated from Three Dimensional Nanonetworks – J. Park, C. Ahn, K. Hyun, and S. Jeon (KAIST)

10:25 **2702** Synthesis and Characterizations of InGaAs Nanowire Parallel Arrays for High Performance Electronic Devices – J. Hou, N. Han, F. Wang, S. Yip, F. Xiu, T. Hung, and J. C. Ho (City University of Hong Kong)

10:50 **2703** Self-Assembly of Gold Nanoparticale Arrays Covalently Bonded to Silicon Surface – H. Sugimura (Kyoto University)

11:15 **2704** Carbon Nanotube Field Emitters: Fundamental Properties and Applications – Y. Saito (Nagoya University)

11:40 **2705** Optically Pumped Lasing in Gallium Nitride Nanorods Structure – Y. Hsu, S. Chang, K. Sou, M. Shih, H. Kuo, K. Hsu, and C. Chang (National Chiao Tung University)

Low-Dimensional Materials for Functional Devices IV – 14:00 – 15:45
Co-Chairs: Seokwoo Jeon and Johnny Ho

14:00 **2706** Three-Dimensional Nanowire Architectures for Highly-Efficiency Photoelectrochemical Electrodes – X. Wang (University of Wisconsin-Madison)

14:25 **2707** Piezoelectronics of Obliquely-Aligned InN Nanorod Array – C. Liu and N. Ku (National Cheng Kung University)

14:50 **2708** Self-organized 3-D Nanostructures for Photon Management and Cost-effective Photovoltaics – S. Leung, M. Yu, Q. Lin (Hong Kong University of Science and Technology), K. Kwon (Korea Advanced Institute of Science and Technology), K. Ching, K. Yu, and Z. Fan (Hong Kong University of Science and Technology)

15:15 **2709** Optical and Surface Recombination Properties of Compound Surface Textures for Heterojunction Solar Cells – H. Wang (National Taipei University of Technology), C. Lin (Advanced Technology Department AU Optronic Corporation), and J. He (National Taiwan University)

15:30 **2710** Gold Nanoparticle 2D-Arrays Chemically Immobilized as Large-Area Near-Field Light Source – K. Miki (National Institute for Materials Science), K. Isozaki, T. Ochiai, T. Taguchi, and K. Nittoh (National Institute for Materials Science (NIMS) 1-1 Namiki, Tsukuba 305-0044, Japan)

Low-Dimensional Materials for Energy Converison – 16:00 – 17:20
Co-Chairs: Sang-Woo Kim and Chuan-Pu Liu

16:00 **2711** Light- and Energy-Harvesting Scheme Employing the Nanoscale Photon Management in the Solar Cells and the Photodetectors – J. He (National Taiwan University)

16:25 **2712** Self-Powered Flexible Strain Sensor – J. Zhou (Huazhong University of Science and Technology)

16:50 **2713** Thermal Properties of In_2O_3 Nanowires – C. Hsu, C. Hung, and L. Chou (National Tsing Hua University)

17:05 **2714** Optical Characterization of Si Quantum Dots – S. Hu, T. Lin, D. Tsai (National Taiwan Normal University), and R. Liu (National Taiwan University)

E8 Processing Materials of 3D Interconnects, Damascene and Electronics Packaging 4

Dielectric Science and Technology / Electrodeposition / Electronics and Photonics
310, Level 3, Hawaii Convention Center

Plasma Processes for Barriers and Dielectrics – 08:00 – 09:40
Co-Chairs: G. Mathad and R. Akolkar

08:00 **2750** Stability of Glassy Ta-Rh Diffusion Barriers for Cu Metallization – N. Dalili, Q. Liu, and D. Ivey (University of Alberta)

08:20 **2751** Investigation of Tetrahedral Amorphous Carbon (ta-C) as Diffusion Barrier for Advanced Cu Metallization Technology – X. Ma, H. Yin, Z. Fu (Institute of Microelectronics of Chinese Academy of Sciences), X. Zhang (Key Laboratory of Beam Technology and Material Modification of Ministry of Education, Beijing Normal University), K. Du (Shenyang National Laboratory for Materials Science, Institute of Metal Research of Chinese Academy of Sciences), J. Yan (Institute of Microelectronics of Chinese Academy of Sciences), C. Zhao, D. Chen, and T. Ye (Chinese Academy of Sciences)

08:40 **2752** Positive-Tone, Aqueous-Developable, Polynorbornene Dielectric – B. K. Mueller, A. Grillo (Georgia Institute of Technology), E. Elce (Promerus LLC), and P. Kohl (Georgia Institute of Technology)

09:00 **2753** Ladder-like Polymethylsilsesquioxane (PMSQ) for Interlayer Dielectric (ILD) Application – H. Lee, S. Hwang, and K. Baek (Korea Institute of Science and Technology (KIST))

09:20 **2754** Effect of Thermal Treatment on Physical, Electrical Properties and Reliability of Porogen-Containing and Porogen-Free Ultralow-k Dielectrics – Y. Cheng, W. Chang, Y. Chang, and J. Leu (National Chi-Nan University)

Novel Systems Approaches – 10:00 – 11:40
Co-Chairs: M. Koyanagi and M. Hayase

10:00 **2755** System-in-Package concept for a Carbon Nanotube resonator – R. Gueye (Sensors Actuators and Microsystems Laboratory (SAMLAB) EPFL), S. Lee (Micro and Nanosysems Laboratory, ETHZ), T. Akiyama (The Sensors Actuators and Microsystems Laboratory (SAMLAB), Ecole Polytechnique Fédérale de Lausanne (EPFL)), D. Briand (EPFL Lausanne), M. Muoh, C. Roman, C. Hierold (Micro and Nanosysems Laboratory, ETHZ), and N. De Rooij (EPFL Lausanne)

10:20 **2756** Concept of Spatially Divided Deep Reactive Ion Etching of Si using Oxide Atomic Layer Deposition in the Passivation Cycle – F. Roozeboom (Eindhoven University of Technology), B. Kniknie, R. Knaapen, M. Smets, A. Illiberi, P. Poodt (TNO, Eindhoven, Netherlands), G. Dingemans, W. Keuning, and W. Kessels (Eindhoven University of Technology)

10:40 **2757** Adhesion Reliability Enhancement of Silicon/Epoxy/Polyimide Interfaces for Flexible Electronics – S. Kim and T. Kim (KAIST)

11:00 **2758** The Effects of Levelers on Copper Via Filling in 3D SiP – M. Jung, K. Kim, and J. LEE (Hongik University)

11:20 **2759** Direct Measurement and Enhancement of Adhesion Energy of Bi-Te Thermoelectric Thin Films – C. Kim (KAIST), S. Jeon, H. Lee (Sungkyunkwan University), S. Hyun (Korea Institute of Machinery and Materials), and T. Kim (KAIST)

E11 Nonvolatile Memories

Dielectric Science and Technology / Electronics and Photonics
313C, Level 3, Hawaii Convention Center

ReRAM-Bipolar Devices – 08:00 – 09:40
Co-Chairs: S. Shingubara and H. Akinaga

08:00 **2803** Scalable Non-volatile Memory and Switch Device for High-Density Bipolar ReRAM Applications – D. Lee, M. Lee, and U. Chung (Samsung Advanced Institute of Technology)

08:40 **2804** A Two Terminal Vertical Selector Device for Bipolar RRAM – S. Chopra (Applied Materials), P. Bafna, P. Karkare, S. Srinivasan, S. Lashkare, P. Kumbhare (IIT Bombay), Y. Kim, S. Srinivasan, S. Kuppurao (Applied Materials), S. Lodha, and U. Ganguly (IIT Bombay)

09:00 **2805** Forming-less Interfacial Resistive Switching Mechanism of Ultra-Thin HfO_2 Films – J. Kim, I. Mok, K. Lee, Y. Kim, and H. Sohn (Yonsei University)

09:20 **2806** Hf Cap Thickness Dependence in Bipolar-Switching TiN\HfO_2\Hf\TiN RRAM Device – Y. Chen, G. Pourtois, S. Clima, B. Govoreanu, L. Goux, A. Fantini, R. Degreave, G. Groeseneken, D. Wouters, and M. Jurczak (imec)

PCRAM and FeRAM – 10:00 – 12:00
Co-Chairs: N. Takaura and H. Akinaga

10:00 **2807** Material Engineering of GexSbyTez and GaxSby Phase Change Materials for High Performance Phase Change Memory – H. Cheng (Macronix International Co., Ltd.), S. Raoux (IBM T. J. Watson Research Center), T. Hsu, C. Wu (Macronix International Co., Ltd.), M. BrightSky (IBM T. J. Watson Research Center), H. Lung (Macronix International Co., Ltd.), and C. Lam (IBM T. J. Watson Research Center)

10:30 **2808** Advances in ALD GST Process and Equipment for sub-20nm PCRAM Devices : Precursor delivery, GST Gapfill and Electrical Characterization – Z. Karim (Aixtron Inc), L. Yang (Aixtron SE), J. Mack, M. Liu (Aixtron Inc), U. Weber, P. Baumann (Aixtron SE), S. Ramanathan, B. Lu (Aixtron Inc), W. Czubatyj, S. Hudgens, and T. Lowrey (Ovonyx Inc)

11:00 **2809** Characterisation of GeTe Phase Change Material Deposited by Plasma Assisted MOCVD – L. Dussault (CNRS), C. Vallée, M. Aoukar (LTM/CNRS), D. Jourde, and P. Michallon (CEA/LETI)

11:20 **2810** Supercritical Fluid Deposition of Bismuth Titanate for Embedded FeRAM Applications – Y. Zhao, K. Jung, T. Momose, and Y. Shimogaki (The University of Tokyo)

11:40 **2811** Deposition Mechanism of Metal Oxide for FeRAM Electrode using Flow Type Supercritical Fluid Deposition Reactor – K. JUNG (The univ. Tokyo), T. Momose, and Y. Shimogaki (The University of Tokyo)

STT-MRAM and Other Memories – 14:00 – 16:00
Co-Chairs: Y. Suzuki and N. Takaura

14:00 **2812** Progresses on High Density MRAMs with perpendicular MTJs and Challenges to Realize Normally-Off systems – H. Yoda (Toshiba Electronics Korea Corporation)

14:30 **2813** Racetrack Memory 2.0 – S. Parkin (IBM Almaden Research Center)

15:00 **2814** STT-MRAM Development and Its Integration with BEOL Process for Embedded Applications – T. Sugii, Y. Iba, M. Aoki, H. Noshiro, K. Tsunoda, A. Hatada, M. Nakabayashi, Y. Yamazaki, A. Takahashi, and C. Yoshida (LEAP)

15:20 **2815** Ohmic and Non-Ohmic ON States in Pt/Ta_2O_5/Cu Memristive Switches – P. R. Shrestha (National Institute of Standards and Technology), A. Ochia (National Institute of Satndards and Technology), K. Cheung, J. Campbell (National Institute of Standards and Technology), H. Baumgart (Old Dominion University), and G. Harris (Howard University)

15:40 **2816** Resistive Switching Characteristics of N-doped ZnO Films Using Atomic Layer Depsition – T. Huang (Photonics and Optoelectronics), W. Chang (National Taiwan University), J. Chien (Materials Science and Engineering), C. Kang, P. Yang (National Taiwan University), M. Chen (Materials Science and Engineering), and J. He (National Taiwan University)

Flash Memories – 16:20 – 18:00
Co-Chairs: K. Kobayashi and Z. Karim

16:20 **2817** Current Status of NAND Memories and its Future Prospect with 3D NAND Technology – T. Endoh (Tohoku University)

16:50 **2818** Analysis of the Scaling Effect on NAND FLASH Memory Cell Operation – R. Shirota and H. Watanabe (National Chao Tung University)

17:20 **2819** The Development of the Novel High Speed Erase Scheme for 3D Stacked NAND Flash Memory – W. Lin (National Chiao Tung University), R. Shirota (National Chao Tung University), T. Kuo, N. Mitiukhina, F. Li, and C. Chang (National Chiao Tung University)

17:40 **2820** Temperature Effects on Performance of nc-MoO_x Embedded ZrHfO High-k Nonvolatile Memories – C. Lin and Y. Kuo (Texas A&M University)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

E11 – Poster Session – Nonvolatile Memoreis – 18:00 – 20:00
Co-Chairs: S. Shingubara and Suzuki

- **2821** Characteristics of Nano-Crystalline $Ge_2Sb_2Te_5$ Material for Phase Change Memory – T. Ohyanagi and N. Takaura (Low-power Electronics Association & Project)
- **2822** Oxygen Ion based Resistive Switching in Ta_2O_{5-x}/TiO_{2-x} Bi-Layer Frameworks for the Nonvolatile Memory Applications – J. Hong, Y. Bae, and A. Lee (Hanyang University)
- **2823** Effect of Post-Annealing on the Resistance Switching Characteristic of Oxygen Modulated HfO_x Films – K. Lee, J. Kim, S. Park, and H. Sohn (Yonsei University)
- **2824** Perpendicular Magnetic Dipolar Interaction of Co/Pt Nanodot Arrays on Carbon Nanopost Stamps – S. Yoon (Gwangju Institute of Science and Technology), S. Lee (Gwagnju Institute of Science and Technology), and B. Cho (Gwagnju Institite of Science and Technology)
- **2825** Low-Temperature Annealed Sol-Gel Derived SONOS-Type Flash Memory – C. Wu and Y. Yu (Graduate Institute of Biomedical Materials and Tissue Engineering)

- **2826** Large Resistive Switching Phenomenon Induced by Magnetic Field in Nano Conduction Path – T. Kato, T. Shimizu, S. Otuka, T. Kyomi, and S. Shingubara (Kansai University)
- **2827** Electrical Properties of Sol-Gel Derived $PbLaZrTiO_x$ Capacitors with Nonnoble Metal Oxide Top Electrodes – Y. Takada, T. Tsuji, N. Okamoto, T. Saito, K. Kondo, T. Yoshimura, N. Fujimura (Osaka Prefecture University), K. Higuchi, A. Kitajima, and A. Oshima (Osaka University)
- **2828** Converse Magnetoelectric effect in a Room Temperature Multiferroic $Pb(Zr_{0.53}\ Ti_{0.47})_{1-x}(Fe_{0.5}Ta_{0.5})_xO_3$ Ceramic System – D. A. Sanchez, R. Martinez, A. Kumar, N. Ortega (University of Puerto Rico), G. Srinivasan (Oakland University), R. Katiyar, and J. Scott (University of Puerto Rico)
- **2829** Electric Conduction Mechanism of Resistive Switching Memory using Anodic Porous Alumina – S. Otsuka, T. Shimizu, S. Shingubara (Kansai University), N. Iwata, T. Watanabe, Y. Takano, and K. Takase (Nihon University)
- **2830** Pulse Switching Property of Reset Process in Resistive Random Access Memory (ReRAM) Consisting of Binary-Transition-Metal-Oxides – T. Moriyama, K. Kinoshita, R. Koishi, and S. Kishida (Tottori University)
- **2831** Physical Properties Elucidation of Filaments in HfO_2-Conducting-Bridge Random Access Memory – S. Haswgawa, K. Kinoshita, S. Turuta, T. Fukuhara, and S. Kishida (Tottori University)
- **2832** Switching Phenomena in Iron-Oxide Thin Films Deposited through Chemical Vapor Deposition – S. Lee, Y. You, H. Yang, J. Hwang (Hongik University), T. Chung, C. Kim (Korea Research Institute of Chemical Technology), S. Lee (Korea Research Institute of Chemistry Technology), and K. An (Korea Research Institute of Chemical Technology)
- **2833** Physical Picture of Filaments in Reset Process of Resistive Random Access Memory Consisting of Pt/NiO/Pt Structure – M. Yoshihara, K. Kinoshita, R. Ogata, and S. Kishida (Tottori University)

E12 Photovoltaics for the 21st Century 8

Dielectric Science and Technology / Electrodeposition / Electronics and Photonics / Energy Technology / Industrial Electrochemistry and Electrochemical Engineering

314, Level 3, Hawaii Convention Center

CIGS – 08:20 – 12:00
Co-Chairs: Park, Claeys, and Deligianni

08:20 **2902** Size-dependent Photoelectrochemical Properties of Semiconducting Cu_2ZnSnS_4 Nanoparticles – T. Torimoto, T. Osaki, T. Nagano, T. Kameyama, S. Suzuki (Nagoya University), and S. Kuwabata (Osaka University)

08:40 **2903** A New Approach to Fabricate Selenide-based Absorber Layer Uusing Stoichiometric Single Target – T. Kim, J. Park (Korea Institute of Industrial Technology), S. Lee, and J. Kim (Chonnam National University)

09:00 **2904** Smooth and Dense $CuInSe_2$ Film Growth by Selenization of Sputtered Metallic Precursors – J. Suh (Electronics and Telecommunications Research Institute)

09:20 **2905** CIGS Electrodeposition from Improved Electrolytes: Electrochemical Characterization and Transport Effects – M. A. Saeed, O. Gonzalez, and U. Landau (Case Western Reserve University)

09:40 Intermission (20 Minutes)

10:00 **2906** Use of Surface Chemistry Control and Low Temperature Growth Methods for Overcoming Perceived Limitations in III-Nitride Epitaxy – W. Doolittle, M. Moseley, B. Gunning (Georgia Institute of Technology), and G. Namkoong (Old Dominion University)

10:20 **2907** Controlled Synthesis of Chalcogenide Nanocrystal Inks for High-Performance Photodetectors and Solar Energy Conversion – J. Hu (Institute of Chemistry), Y. Guo (Chinese Academy of Sciences), and L. Wan (Institute of Chemistry)

10:40 **2908** $CuInS_2$- and Cu_2ZnSnS_4-based Thin Film Solar Cells Prepared from Electrodeposited Metal Stacks – S. Ikeda, Y. Otsuka, A. Kyoraiseki, W. Septina, T. Harada, and M. Matsumura (Osaka University)

11:00 **2909** Electrodeposition of In-S based Buffer Layers for High Efficiency $Cu(In,Ga)Se_2$ based Solar Cells – E. Chassaing, N. Naghavi, S. Galanti, G. Renou, M. Soro (IRDEP), M. Bouttemy (Institut Lavoisier de Versailles), A. Etcheberry (CNRS-UVSQ), and D. Lincot (IRDEP)

11:20 **2910** Overview of Electrodeposition Based Copper Indium Gallium Selenide (CIGS) Solar Cell Fabrication – S. Aksu (SoloPower Inc.), S. Pethe, A. Kleiman-Shwarsctein, S. Kundu, and M. Pinarbasi (SoloPower, Inc.)

11:40 **2911** Electrodepsion of $Cu_2ZnSn(S,Se)_4$ (CZTSSe) Thin Films for the Thin film Solar Cell Application – K. Lee, S. Seo, and J. Kim (Korea Institute of Science and Technology)

Novel Photovoltaics – 14:00 – 17:40
Co-Chairs: Sunkara, Park, and Tao

14:00 **2912** Synthesis of Phase Pure Pyrite Nanowires/ Nanotubes for Solar Energy Applications – D. R. Cummins, H. B. Russell, J. Jasinski, and M. K. Sunkara (University of Louisville)

14:20 **2913** Electrodeposition of Tin (II) Sulfide from 1-Butyl-3-methylimidazolium Dicyanamide at High Temperature for Thin Film Solar Cells – M. Steichen, R. Djemour, D. Regesch, L. Gütay, S. Siebentritt, and P. Dale (University of Luxembourg)

14:40 **2914** Multilayer Hybrid Solar Cell using Anodic TiO_2 Nanotubes – T. Ma, R. Kojima, D. Tadaki, J. Zhang, Y. Kimura, and M. Niwano (Tohoku University)

15:00 **2915** Optical Property of Random Inverted-Pyramid Textures on Si Surface by Etching with N-Fluoropyridinium Salts – M. Otani, J. Uchikoshi, K. Tsukamoto, T. Hirano (Osaka University), T. Nagai, K. Adachi (Daikin Industries, Ltd.), K. Kawai, K. Arima, and M. Morita (Osaka University)

15:20 **2916** Enhancement of Thermal and Chemical Stabilities of Gold Nanorods Embedded in Titanium Oxide Film – Y. Takahashi, N. Miyahara, and S. Yamada (Kyushu University)

15:40 Intermission (20 Minutes)

16:00 **2917** Development of Organic-Inorganic Hybrid Photovoltaic Cells with Metallocene Molecular Complexes – A. Ishii and T. Miyasaka (Toin University of Yokohama)

16:20 **2918** Effect of Ag Nano-crystals on Power-conversion-efficiency Enhancement for Polymer Photovoltaic Cells – J. Kim, D. Kim, Y. Hwang, J. Shin, J. Park, and J. Park (Hanyang University)

16:40 **2919** An Analysis on Electrorefining for Solar-Grade Silicon – M. Tao (Arizona State University)

17:00 **2920** Dislocation Analysis for a New Mushroom-Shaped Growth of Large-Size Monocrystalline Silicon by Seed Casting Technique – B. Gao (Research Institute for Applied Mechanics), H. Harada, Y. Miyamura (National Institute for Materials Science), S. Nakano, and K. Kakimoto (Research Institute for Applied Mechanics)

17:20 **2921** Effects of Metal Contamination on Power-conversion-efficiency Degradation for p-type Silicon Solar Cell – S. Baek, I. Lee, H. Yoon, M. Choi, G. Lee, and J. Park (Hanyang University)

E13 Plasma Processing 19

Dielectric Science and Technology / Electronics and Photonics

324, Level 3, Hawaii Convention Center

Thin Film Etching Processes and Technologies – 08:40 – 12:00
Co-Chairs: G. S. Mathad and O. Leonte

08:40 **2922** Direct SiGe BFFT Patterning by Dry Plasma Etching – A. Milenin, L. Witters, B. Deweerdt, C. Vrancken, and M. Demand (IMEC)

09:00 **2923** Hydrogen Plasma-Based Etching of Copper – F. Wu (Globalfoundaries), G. Levitin, T. Choi, and D. Hess (Georgia Institute of Technology)

09:40 Intermission (20 Minutes)

10:00 **2924** Inductively Coupled Plasma Etching of InP with $Cl_2/H_2/Ar$ Plasma – E. Douglas, J. Stevens, R. Shul (Sandia National Laboratories), and S. Pearton (University of Florida)

10:20 **2925** Extreme Nano Etching – D. L. Olynick, Z. Liu, S. Dhuey, C. Peroz, B. Harteneck, and S. Cabrini (Molecular Foundry, Lawrence Berkeley National Lab)

11:00 **2926** Investigation of Synchronized Pulsed Plasma for High Selective Etching of Silicon Nitride Spacers – R. Blanc, O. Joubert, T. David (LTM), F. Leverd, and C. Vérove (STMicroelectronics)

11:20 **2927** Systematic Approach to TDM Process Development – C. W. Johnson, D. Pays-Volard, L. Martinez, and J. Plumhoff (Plasma-Therm)

11:40 **2928** Advanced Dual Hard Mask Patterning Scheme to Enable High Resolution Lithography for sub 30 nm Technology Nodes – J. Paul, M. Rudolph, S. Riedel (Fraunhofer-Center Nanoelectronic Technologies), S. Wege (Plasma-Consulting), C. Hohle, and V. Beyer (Fraunhofer-Center Nanoelectronic Technologies)

Thin Film Etching Processes and Technologies – 14:00 – 16:00
Co-Chairs: D. W. Hess and G. S. Mathad

14:00 **2929** Towards New Plasma Technologies for 22 nm Gate Etch Processes and Beyond – O. Joubert (LTM)

14:40 **2930** Precision, Damage-Free Etching and Cleaning by Electron-Enhanced Reactions: Results and Simulations. – H. P. Gillis, S. Anz (Systine Inc.), S. Han, J. Su (Caltech), and W. Goddard III (California Institute of Technology)

15:20 **2931** Simulations of Industrial Plasma Processes: SF6 Etching – S. Lopez-Lopez (Quantemol Ltd), A. Williams (University College London), D. Brown (Quantemol Ltd), and J. Tennyson (University College London)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

E13 – Poster Session – 18:00 – 20:00
Co-Chairs: O. Leonte and D. W. Hess

- **2932** Quantum Chemical Molecular Dynamics Simulation of GaN Etching Processes by Cl Radical – K. Yanagiya, H. Ito, T. Kuwahara, T. Ishikawa, Y. Higuchi, N. Ozawa, T. Shimazaki, and M. Kubo (Tohoku University)
- **2933** Dry Etching Characteristics of Palladium Thin Films Using Inductive Coupled Plasma – J. Kim, D. Lee, J. Kwak (Sunchon National University), S. Lee (Korea Polytechnic University), J. Yoon, J. Yang (Korea Basic Science Institute), and J. Lee (Sunchon National University)
- **2934** Improvement in Electric Property of ITO Films at Low Temperature – H. Lee, Y. Han, M. Lee, J. Hur, H. Kim, and H. Lee (Korea Institute of Industrial Technology)
- **2935** Feature Profile 2D and 3D Simulation with Etching, Deposition and Implantation Processes – P. Moroz (Tokyo Electron US Holdings)
- **2936** Preparation of Zinc Oxide Films by Coplanar Plasma Discharge Technique – M. Okuya, T. Hanai, M. Iyoda, and K. Nabeta (Shizuoka University)
- **2937** Preparation of Polymer Particles Coated with a Diamond-like Carbon Film by a Polygonal Barrel-Plasma Chemical Vapor Deposition Method – Y. Honda, S. Akamaru, M. Inoue, and T. Abe (University of Toyama)
- **2938** Enhanced Optical and Electrical Property of ITO by Hydrogen Plasma and Post-Wet Treatment – D. Lee, S. Yang, J. Kim, and J. Lee (Sunchon National University)
- **2939** Low Temperature TiC Coating Process by Plasma Enhanced Chemical Vapor Deposition – H. Masaoka, S. Matsumoto, N. Okamoto, T. Saito, K. Kondo (Osaka Prefecture University), and T. Kan (ULTEX)

- **2940** Observation of Vacancy-Induced Resistance Change in AlGaN/GaN HEMT – C. Cheng, T. Chang, S. Liao, W. Ho, Y. Shiau, T. Chang, and J. Sen (Chung-Shan Institute of Science & Technology)
- **2941** Preparation of IZO Transparent Conductive Thin Film by Microwave Heating Technique – S. Muto, Y. Kawabata, and M. Okuya (Shizuoka University)
- **2942** Effect of Inductively Coupled Plasma on the Electrical and Optical Properties of Indium Tin Oxide Films Deposited by Ionized Physical Vapor Deposition – C. Hong (Electronics and Telecommunication Reaseach Institute), J. Shin, N. Park, K. Kim (Electronics and Telecommunications Research Institute), B. Kim (Electronics and Telecommunication Reaseach Institute), B. Ju (Korea University), and W. Cheong (Electronics and Telecommunications Research Institute)

E14 Semiconductor Wafer Bonding 12: Science, Technology, and Applications

Electronics and Photonics
312, Level 3, Hawaii Convention Center

Plasma Activation – 08:00 – 09:40

08:00 **2988** Plasma Activation as a Pretreatment Tool for Low-Temperature Direct Wafer Bonding Materials in Microsystems Technology – M. Eichler, P. Hennecke, K. Nagel (Fraunhofer Institute for Surface Engineering and Thin Films IST), M. Gabriel (SUSS MicroTec Lithography GmbH), and C. Klages (Fraunhofer Institute for Surface Engineering and Thin Films IST)

08:40 **2989** Mechanisms for Ultra-Low Temperature Plasma Activated Direct Wafer Bonding – T. Plach (Johannes Kepler University), K. Hingerl (Center of Surface- and Nanoanalytics, Johannes Kepler University), V. Dragoi (EV Group E. Thallner GmbH), and M. Wimplinger (EV Group)

09:00 **2990** Treatments of Deposited SiO_2 Surfaces Enabling Low Temperature Direct Bonding – C. Rauer, H. Moriceau, F. Fournel (CEA, LETI), A. Charvet (CEA-LETI), C. Morales (CEA, LETI), N. Rochat, L. Vandroux (CEA-LETI), F. Rieutord (CEA, INAC), T. McCormick, and I. Radu (Soitec)

09:20 **2991** Room Temperature Bonding of Polymer to Glass Wafers using Surface Activated Bonding (SAB) Method – T. Matsumae (University of Tokyo), M. Nakano, Y. Matsumoto (Lantechnical Service Co., Ltd., Takasaki-shi, Gunma 370-3523, Japan), R. Kondo (School of Engineering, The University of Tokyo, Bunkyo-ku, Tokyo 113-8656, Japan), and T. Suga (University of Tokyo)

Layer Transfer Technologies – 10:20 – 12:00

10:20 **2992** Cost-effective layer transfer by Controlled Spalling Technology – S. W. Bedell (IBM T.J. Watson Research Center), D. Shahrjerdi (IBM T J Watson Research Center), K. Fogel, P. Lauro, B. Hekmatshoar, N. Li (IBM T.J. Watson Research Center), J. Ott (IIBM T.J. Watson Research Center), and D. Sadana (IBM T.J. Watson Research Center)

11:00 **2993** Development of Porous InP for Subsequent Epitaxial Layer Transfer onto Flexible Substrates – X. Kou and M. Goorsky (University of California, Los Angeles)

11:20 **2994** Effect of Two-step Oxidation in Ge Condensation on Surface Roughness Property of Relaxed SiGe layer-on-insulator Substrates – T. Shim, T. Kim, D. LEE (Hanyang University), R. Okuyama (SUMCO Corporation), and J. Park (Hanyang University)

11:40 **2995** Advanced Characterization of a Direct Wafer Bonding-compatible Germanium Exfoliation Process – I. P. Ferain (Tyndall National Institute-UCC), X. Kou, C. Moulet-Ventosa, M. Goorsky (University of California, Los Angeles), and C. Colinge (Tyndall National Institute-UCC)

Bonding for Photonics – 14:00 – 16:00

14:00 **2996** Low-Temperature Bonding Technologies for Photonics Applications – E. Higurashi (The University of Tokyo)

14:40 **2997** Adhesive Wafer Bonding Applied for Fabrication of True-Chip-Size Packages for SAW Devices – T. Heuser, C. Bauer (EPCOS AG), V. Dragoi (EV Group E. Thallner GmbH), and G. Mittendorfer (EV Group)

15:00 **2998** Distortion Free Wafer Bonding Technology for Backside Illumination Image Sensors – M. Broekaart, A. Castex, K. Landry, R. Fontaniere, and C. Lagahe-Blanchard (Soitec)

15:20 **2999** Monitoring Inner Pressure of MEMS Devices Sealed by Wafer Bonding – R. Knechtel, S. Hering, and S. Dempwolf (X-FAB Semiconductor Foundries AG)

15:40 **3000** Chemical-Mechanical Polishing YAG For Wafer Bonding – J. Mc Kay (University of California – Los Angeles), C. Moulet-Ventosa, and M. Goorsky (University of California, Los Angeles)

E15 State-of-the-Art Program on Compound Semiconductors 54 (SOTAPOCS 54)

Electronics and Photonics / Luminescence and Display Materials
328, Level 3, Hawaii Convention Center

Advances in Compound Semiconductor – 08:00 – 12:00

08:00 **3034** VCSELs for Atomic Clocks – D. K. Serkland, K. Geib, and G. Peake (Sandia National Labs)

08:30 **3035** Oxide-Semiconductor-Based TFTs for Displays and Flexible Electronics – C. Wu (National Taiwan University)

09:00 **3036** Direct Observation of Conducting Nano filaments in BMO Resistive Switching Memory – C. Kang (National Taiwan University), W. Kuo, C. Huang (National Chiao Tung University), W. Chang (National Taiwan University), W. Wu, Y. Chu (National Chiao Tung University), and J. He (National Taiwan University)

09:15 **3037** Bloch Oscillations in Two-Dimensional Antidot Arrays – W. Pan (Sandia National Laboratory)

09:45 Intermission (15 Minutes)

10:00 **3038** Single Donor Devices for Quantum Computing – M. Carroll, E. Bielejec, N. Bishop, J. Dominguez, and M. Lilly (Sandia National Laboratories)

10:30 **3039** Sulfide Quantum Dots as a Sensitizer for Titanium Dioxide Photoanodes of Solar Cells – T. Li, C. Lin, and H. Teng (National Cheng Kung University)

11:00 **3040** Multi-Shelled Metal Oxide Hollow Microsphere: Design, Preparation and Property – Z. Dong (Institute of Process Engineering, Chinese Academy of Sciences), R. Yu (University of Science & Technology Beijing), and D. Wang (Institute of Process Engineering, Chinese Academy of Sciences)

11:30 **3041** Fully Transparent Non-Volatile Memory Using Multi-Layer Graphene Electrode – P. Yang (National Taiwan University), S. Jen (National Tsing Hua University), W. Chang (National Taiwan University), P. Chiu (National Tsing Hua University), and J. He (National Taiwan University)

11:45 **3042** Hybrid Silicon Solar Cells with Hierarchical Structure for Energy Harvesting – W. Wei, C. Ho, S. Tai, H. Wang, A. Li, R. Chung (National Taipei University of Technology), and J. He (National Taiwan University)

E16 Thin Film Transistors 11 (TFT 11)

Electronics and Photonics

327, Level 3, Hawaii Convention Center

TFT Structures and Materials – 08:00 – 10:10
Co-Chairs: J. Jang and M. Furuta

08:00 **3087** Channel Width and Channel Length Dependencies in Amorphous-Oxide-Semiconductor Thin-Film Transistors: From a Device Structure Perspective – M. Mativenga, J. Um (Kyung Hee University), R. Mruthyunjaya, J. Chang, G. Heiler, T. Tredwell (Carestream Health, Inc.), and J. Jang (Kyung Hee Univ.)

08:40 **3088** Ambipolar SnO Thin-Film Transistors and Inverters – L. Liang and H. Cao (Chinese Academy of Sciences)

09:00 **3089** Structure and Material Considerations for Thin Film Transistor Applications beyond LCD Driving – Y. Kuo (Texas A&M University)

09:40 Intermission (30 Minutes)

Advanced Applications – 10:10 – 12:00
Co-Chairs: M. Furuta and J. Jang

10:10 **3090** Issues of Backplane Technologies for AMOLED – S. Lee, J. Lee, and M. Han (Seoul National University)

10:50 **3091** A Novel LTPS TFT Pixel Circuit for Compensating IR Drop of Large Area AMOLED Display – S. Lee, S. Kuk, S. Song, M. Song, and M. Han (Seoul National University)

11:10 **3092** Memory Thin Film Transistor with Monolayered Nanoparticles through Chemical and Biological Bindings – H. Lee, H. Jung, M. Kim, Y. Kim, S. Oh, and T. Yoon (Myongji University)

11:30 **3093** High Mobility Oxide TFT – S. K. Park, M. Ryu, H. Oh, C. Hwang, S. Yang (Electronics and Telecommunications Research Institute), and S. Lim (Heesung Metal LTD.)

Advanced Applications Continued – 14:00 – 15:50
Co-Chairs: H. Hamada and P.-T. Liu

14:00 **3094** Nanocrystal Floating Gate Memory with Indium-Gallium-Zinc-Oxide Channel and Pt-Fe_2O_3 Core-Shell Nanocrystals – S. Lee, Q. Hu, J. Lee, Y. Baek, H. Lee, and T. Yoon (Myongji University)

14:20 **3095** Transparent Amorphous Oxide Semiconductors for System on Panel Applications – P. Liu, L. Chu, L. Teng, Y. Fan, and C. Fuh (National Chiao Tung University)

15:00 **3096** Thin-Film Transistors on Germanium-on-Glass Substrate – R. G. Manley and T. Chuang (Corning Incorporated)

15:20 Intermission (30 Minutes)

Novel Materials and Processes – 15:50 – 17:30
Co-Chairs: P.-T. Liu and H. Hamada

15:50 **3097** Dual In-Plane-Gate Thin-Film Transistors Gated by Chitosan on Paper Substrates – Q. Wan (Chinese Academy of Sciences) and W. Dou (Ningbo Institute of Material Technology and Engineering, Chinese Academy of Sciences,)

16:10 **3098** Highly Stable IGZO TFT with Electro-Less Ni Plated Cu Electrodes – S. Nam, T. Moon, K. Lee, K. Lee, S. Yoo, W. Shin (LG Display), and S. Im (Yonsei University)

16:30 **3099** Laser Patterned Junctionless In-Plane-Gate Oxide Thin-Film Transistors Arrays – L. Zhu and Q. Wan (Chinese Academy of Sciences)

17:00 **3100** The Stability and Reliability of Mixed Oxide-Based Thin Film Transistors Under Gamma Irradiation – T. L. Alford, A. Indluru, and K. E. Holbert (Arizona State University)

17:20 Intermission (10 Minutes)

E17 SiGe, Ge, and Related Compounds: Materials, Processing, and Devices 5

Electronics and Photonics

316A, Level 3, Hawaii Convention Center

GeSn Session 1: GeSn Photonics – 08:00 – 09:20
Co-Chairs: Benjamin Vincent and Gianlorenzo Masini

08:00 **3175** GeSn Photodetection and Electroluminescence Devices on Si – M. Oehme, E. Kasper, and J. Schulze (University of Stuttgart)

08:30 **3176** $Ge_{1-x-y}Si_xSn_y$ Photodiodes with 1 eV Pptical Gaps Grown on Si(100) and Ge(100) Platforms – R. Beeler, J. Menendez, and J. Kouvetakis (Arizona State University)

08:50 **3177** MBE Growth of GeSn and SiGeSn Heterojunctions for Photonic Devices – J. S. Harris, R. Chen, H. Lin, Y. Huo, E. Fei, and T. Kamins (Stanford University)

316B, Level 3, Hawaii Convention Center

Epitaxy Session 2: New Materials – 08:00 – 09:50
Co-Chairs: Yihwan Kim and Masao Sakuraba

08:00 **3178** Beyond Graphene: Silicene and Germanene Novel Two-Dimensional Electronic Materials – G. Le Lay (Aix-Marseille University), A. Resta (CNRS-CINaM), B. Ealet (Aix-Marseille University), P. De Padova (CNR-ISM), T. Bruhn, and P. Vogt (TU-Berlin)

08:30 **3179** Epitaxial Growth of Low Defect SiGe Buffer Layers for Integration of New Materials on 300 mm Silicon Wafers – G. Kozlowski, T. Schroeder (IHP), and P. Storck (Siltronic AG)

09:00 **3180** Synthesis of Monocrystalline Silicon-like (III-V)-Si Semiconductors: Structural and Optical Properties – A. Chizmeshya, J. Kouvetakis, T. Watkins, R. Beeler, and J. Menendez (Arizona State University)

09:20 **3181** Strained Ge Core/Si(Ge) Shell Nanowires: Stability and Surface Defect Passivation – P. C. McIntyre (Stanford University)

316A, Level 3, Hawaii Convention Center

Emerging Applications Session 1: Quantum Effects / Spintronics – 10:05 – 11:55
Co-Chairs: Tejas Krishnamohan

10:05 **3182** Spin Coherence in Si and Applications to Quantum Information Processing – S. Lyon, A. M. Tyryshkin, J. He, and R. M. Jock (Princeton University)

10:35 **3183** Single-Shot Readout of Singlet-Triplet Qubit States in a Si/SiGe Double Quantum Dot – J. Prance, Z. Shi, C. Simmons, D. Savage, M. Lagally (University of Wisconsin-Madison), L. Schreiber, L. Vandersypen (Kavli Institute of Nanoscience, TU Delft), M. Friesen, R. Joynt, S. Coppersmith, and M. Eriksson (University of Wisconsin-Madison)

11:05 **3184** A Design Scheme for Topological Insulators based Bonds, Bands, Symmetry and Spin Orbit Coupling – C. Felser, L. Müchler, C. Stanislav (Max Planck Institute Chemical Physics of Solids), H. Zhang, and S. Zhang (Stanford University)

11:25 **3185** Measurement and Control of Individual Electron Spins in Silicon MOS-based Quantum Dots – H. Jiang (UCLA)

316B, Level 3, Hawaii Convention Center

Surfaces and Interfaces Session 2: Nanowires and New Materials – 10:05 – 12:05
Co-Chairs: Seiichi Miyazaki and Paul McIntyre

10:05 **3186** Non Planar Non Si CMOS – Challenges and Opportunities – C. Hobbs, K. Ang, R. Hill, I. Ok, B. Min (SEMATECH), D. Franca (Research Foundation of SUNY), H. Stamper, S. Vivekanand, M. Rodgers, S. Gausepohl (CNSE), P. Kirsch, and R. Jammy (SEMATECH)

10:35 **3187** Phonon Dispersion in <100> Si Nanowire Covered with SiO_2 Film Calculated by Molecular Dynamics Simulation – T. Watanabe, T. Zushi, M. Tomita, R. Kuriyama, N. Aoki, and T. Kamioka (Waseda University)

10:55 **3188** Electron Transport and Strain Mapping in Ge-Si_xGe_{1-x} Core-Shell Nanowire Heterostructres – E. Tutuc (The University of Texas at Austin)

11:25 **3189** Liquid-Phase Deposition of Thin Si and Ge Films Based on Ballistic Electro-reduction – T. Ohta, R. Mentek (Tokyo Univ. of A & T), B. Gelloz (Nagoya University), N. Mori (Osaka Univ.), and N. Koshida (Tokyo University of Agriculture and Technology)

11:45 **3190** Evidence of Layer-by-Layer Oxidation of Ge Surfaces by Plasma Oxidation Through Al_2O_3 – R. Zhang, P. Huang, J. Lin, M. Takenaka, and S. Takagi (The University of Tokyo)

316A, Level 3, Hawaii Convention Center

Processing Session 2: Germanium and Nanoscaled Devices – 13:40 – 16:00
Co-Chairs: Harold W. Kennel and J. Murota

13:40 **3191** GOI substrates -Fabrication and Characterization- – A. Sakai, S. Yamasaka, J. Kikkawa, Y. Nakamura (Osaka University), Y. Moriyama, T. Tezuka (GNC, AIST), S. Takeuchi, and K. Izunome (Covalent Silicon Corp.)

14:10 **3192** Strained Nanoscaled Devices – D. Gruetzmacher, S. Mantl (Forschungszentrum Jülich), Q. Zhao, S. Richter, L. Knoll, J. Moers, J. Gerharz, G. Mussler, D. Buca, and R. Minamisawa (Forschungszentrum Juelich)

14:40 **3193** Effect of Two-step Oxidation in Ge Condensation on Surface Roughness Property of Relaxed SiGe layer-on-insulator Substrates – T. Shim, T. Kim, D. LEE (Hanyang University), R. Okuyama (SUMCO Corporation), and J. Park (Hanyang University)

15:00 **3194** Simple Fabrication of Suspended Germanium Structures and Their Electrical Properties from High Quality Ge on Si(001) Layers – V. A. Shah, M. Myronov, C. Wongwanitwatana, R. Morris, M. Prest, J. S. Richardson-Bullock, E. H. Parker, T. E. Whall, and D. R. Leadley (University of Warwick)

15:20 **3195** Formation of Graded SiGe on Insulator by Segregation-Controlled Rapid-Melting-Growth – R. Matsumura, Y. Tojo, H. Yokoyama, M. Kurosawa, T. Sadoh, and M. Miyao (Kyushu University)

15:40 **3196** Modeling Two Dimensional Solid Phase Epitaxial Growth for Patterned Ge Substrates – B. L. Darby, B. R. Yates, A. Kumar (University of Florida), A. Kontos (Applied Materials), R. Elliman (Australian National University), and K. S. Jones (University of Florida)

316B, Level 3, Hawaii Convention Center

Optoelectronics Session 3: Receivers, Emitters, and Interconnects – 13:40 – 15:50
Co-Chair: Gianlorenzo Masini

13:40 **3197** Germanium/Silicon Heterostructures for Terahertz Emission – R. W. Kelsall, V. Dinh, P. Ivanov, A. Valavanis, L. Lever, Z. Ikonic (University of Leeds), P. Velha, D. Dumas, K. F. Gallacher, D. J. Paul (University of Glasgow), J. Halpin, M. Myrnov, and D. R. Leadley (University of Warwick)

14:10 **3198** Ge Photodiodes for CMOS Photonics Optical Engines and Interconnects – S. Sahni and G. Masini (Luxtera)

14:40 **3199** Long Wavelength ≥1.9 μm Germanium for Optoelectronics Using Process Induced Strain – P. Velha, D. J. Paul (University of Glasgow), M. Myronov, and D. R. Leadley (University of Warwick)

15:00 **3200** Single Photon Emitters on Si substrate – S. Bietti (Universita' degli Studi di Milano-Bicocca), L. Cavigli, M. Abbarchi (Universita' di Firenze), G. Isella, J. Frigerio (Politecnico di Milano), C. Frigeri (CNR-IMEM Parma), A. Vinattieri, M. Gurioli (Universita' di Firenze), and S. Sanguinetti (Universita' degli Studi di Milano-Bicocca)

15:20 **3201** Advanced GE-ON-SI Telecommunication Receivers – C. R. Doerr (Acacia Communications)

316A, Level 3, Hawaii Convention Center

Strain Session 1: Channels, Source/Drain, and GaN – 16:15 – 17:45
Co-Chair: Ken Uchida

16:15 **3202** Heteroepitaxial Lattice Mismatch Stress Relaxation in Nonpolar and Semipolar GaN by Dislocation Glide – J. S. Speck (University of California Santa Barbara)

16:45 **3203** Channel Strain Evolution of Recessed Source/Drain $Si_{1-x}C_x$ Structures by Modifying Scaling Factors – S. Kim, D. Byeon, M. Jung, I. Lee, D. Ko (Yonsei University), Y. Kim (Applied Materials), and H. Lee (Sungkyunkwan University)

17:05 **3204** High Ge Content SiGe Selective Processes for Manufacturing Source/Drain in the Next Generations of pMOS Transistors – A. Hikavyy, W. Vanherle, L. Witters, B. Vincent, J. Dekoster, and R. Loo (imec)

17:25 **3205** Formation of Uniaxially Strained Si/Ge Channels on SiGe Buffers Strain-Controlled with Selective Ion Implantation – K. Sawano, Y. Hoshi, S. Nagakura (Tokyo City University), K. Arimoto, K. Nakagawa (University of Yamanashi), N. Usami (Tohoku University), and Y. Shiraki (Tokyo City University)

316B, Level 3, Hawaii Convention Center

Emerging Applications Session 2: Quantum Effects / Spintronics – 16:15 – 17:55
Co-Chair: Tejas Krishnamohan

16:15 **3206** Coherent Manipulation of a Si/SiGe-based Singlet-Triplet Qubit – M. G. Borselli (HRL Laboratories LLC)

16:45 **3207** Spin Generation and Relaxation in Ge/SiGe Quantum Wells – G. Isella, F. Bottegoni, S. Cecchi, A. Ferrari, F. Ciccacci (Politecnico di Milano), F. Pezzoli, A. Giorgioni, E. Gatti, E. Grilli, M. Guzzi (Università di Milano Bicocca), C. Lange, N. Koester, R. Woscholski, S. Chatterjee (Philipps-Universitt Marburg), D. Trivedi, P. Li, Y. Song, and H. Dery (University of Rochester)

17:15 **3208** Enhancement-Mode Buried Strained Silicon Channel Double Quantum Dot with Integrated Electrometer – M. Carroll, N. Bishop (Sandia National Laboratories), T. Lu, T. Pluym, and P. Kotula (Sandia National Labs)

17:35 **3209** Local Quantity Analysis of Nanosize Electronics and Spintronics Material – M. Senami and A. Tachibana (Kyoto University)

316A, Level 3, Hawaii Convention Center

Reception and Workshop on Next Generatin Devices – 19:00 – 21:30
Co-Chair: David Harame

19:00 Reception (30 Minutes)

19:30 **3210** (Panel Discussion) How Far Can We Push Si CMOS and What are the Alternatives for Future ULSI – D. Harame (IBM Systems and Technology Group)

21:00 Tak Ning (IBM, USA) (5 Minutes)

21:05 Shinichi Takaga (University of Tokyo, Japan) (5 Minutes)

21:10 Witek Maszara (Global Foundries, USA) (5 Minutes)

21:15 Cor Claeys (imec, Belgium) (5 Minutes)

21:20 Ken Uchida (Keio University, Japan) (5 Minutes)

21:25 Paolo Gargini (Intel, USA) (5 Minutes)

F4 Emerging Materials and Processes for Energy Conversion and Storage

Electrodeposition / Battery / Energy Technology
313B, Level 3, Hawaii Convention Center

Session I: Advanced Battery Materials and Concepts – 08:00 – 12:20
Co-Chairs: Y. Fukunaka and L. Deligianni

08:00 **3340** (Invited) The Battery of the Future: Using Computational Modeling to Understand the Limits of Intercalation Systems Across a Wide Range of Chemistries – G. Ceder (Massachusetts Institute of Technology)

08:40 **3341** Single-Step and Low-Temperature Synthesis of Layered $LiCoO_2$ Thin Film Electrodes: An Electrochemical-Hydrothermal Route – H. Porthault, F. Le Cras (CEA), and S. Franger (CNRS)

09:00 **3342** (Invited) Fabrication of Rechargeable Micro Lithium-Ion Battery with 3D Anode and 3D Cathode – K. Kanamura, K. Yoshima, and H. Munakata (Tokyo Metropolitan University)

09:40 Intermission (20 Minutes)

10:00 **3343** Energy Harvesting Device – Y. Garsany (EXCET/NRL) and K. Swider-Lyons (U.S. Naval Research Laboratory)

10:20 **3344** Fundamental Study of Li Dendrite Growth in Ionic Liquid – T. Nishida (Stellachemifa corporation), K. Nishikawa (NIMS), T. Homma, Y. Fukunaka (Waseda University), and M. Rosso (Ecole Polytechnique)

10:40 **3345** Effect of Dissolved Gas in an Ionic Liquid Electrolyte for Lithium and Lithium/Sodium Metal Anode – J. K. Stark and P. Kohl (Georgia Institute of Technology)

11:00 **3346** Two-dimensionally Patterned Electrodeposition of Sn Film from Aqueous Acid Bath – S. Yagi, E. Takeda, T. Okada (Osaka Prefecture University), D. Mu (Beijing Institute of Technology), N. Okamoto, T. Saito, and K. Kondo (Osaka Prefecture University)

11:20 **3347** Porous Li_2MnO_3 as a High Capacity and High Rate Capability Cathode Material – M. Nookala, T. Penki, and S. Duraisamy (Indian Institute of Science)

11:40 **3348** Synthesis and Electrochemical Properties of Cation Doped Spinel $LiM_xMn_{2-x}O_4$ (M=Ni, Al; $0 \leq x \leq 0.5$) Cathode Materials for Li-Ion Battery – M. A. Kebede, N. Kunjuzwa, K. I. Ozoemena, and M. K. Mathe (Council for Scientific and Industrial Research)

12:00 **3349** Improved Lithium Storage and Cyclability in Graphene/Graphene Oxide Wired Mesoporous SnO_2 – K. Shiva and A. J. Bhattacharyya (Indian Institute of Science)

Session II: Emerging Materials, Processes and Devices for Solar Cells – 14:00 – 18:00
Co-Chair: J. Talbot and K. Kanamura

14:00 **3350** (Electrodeposition Division Research Award Presentation) Electrodeposition for the Synthesis of Thin Film Solar Cells – L. Deligianni (IBM, Thomas J. Watson Research Center)

14:40 **3351** (Invited) New Paradigms for Cost-Effective III-V Photovoltaic Technology – D. Shahrjerdi (IBM T J Watson Research Center), S. W. Bedell, B. Hekmatshoar (IBM T.J. Watson Research Center), C. Bayram (IBM T J Watson Research Center), N. Li, K. Fogel, P. Lauro (IBM T.J. Watson Research Center), J. Ott (IIBM T.J. Watson Research Center), M. Hopstaken (IBM T J Watson Research Center), and D. Sadana (IBM Research)

15:20 **3352** Silicon Bonding State in Films Electrodeposited from $SiCl_4$ in Ionic Liquid – J. Komadina, T. Akiyoshi, Y. Ishibashi (Waseda University), X. Wang (SLAC), Y. Fukunaka (Waseda University), P. Pianetta (SLAC), and T. Homma (Waseda University)

15:40 **3353** Novel Front Side MetallizationPprocesses for Silicon based Solar Cells – A. Bund (Technische Universität Ilmenau), M. Fritz, U. Schmidt (Technische Universitaet Ilmenau), O. Luehn, and H. Kuehnlein (RENA Solar Technology Center Freiburg)

16:00 Intermission (20 Minutes)

16:20 **3354** (Invited) CIGS-Based Solar Cells Prepared from Electrodeposited Precursor Films – R. N. Bhattacharya (National Renewable Energy Laboratory) and Y. Kim (Dasstech Co., Ltd.,)

17:00 **3355** One-Step Electrochemical Deposition of Cu-In-Ga Mixed Oxide Thin Films for Low-Cost CIGS Solar Cells – E. Chassaing, A. Duchatelet, T. Sidali, G. Savidand, and D. Lincot (IRDEP)

17:20 **3356** Electrophoretic Deposition: A Bottom-up Approach to Functional Nanocomposite Films – M. A. Worsley, A. Pascall, K. Sullivan, T. Olson, C. Orme, J. Satcher, and J. Kuntz (Lawrence Livermore National Laboratory)

17:40 **3357** Electrodeposition of Elements for Thin Film, Photovoltaic Applications: Citrate Complexation and Partial Current Densities – S. S. Zahmi and E. Podlaha (Northeastern University)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

F4 – Poster Session – 18:00 – 20:00
Co-Chairs: L. Deligianni and E. Podlaha

- **3358** Wet Clean Efficiency Monitor by SP3 SM – Y. Chang Chien, M. Yeh, C. Yang, S. Ku (Taiwan Semiconductor Manufacturing Company), C. Wan (National Tsing-Hua University), C. Hu (National Tsing Hua University), E. Chen, J. Yan, E. Khuan, K. Joyce (KLA-Tencor), and C. Hu (National Tsing Hua University)
- **3359** Tuning of Mesopore Size in WO_3-based Photoaodes for Enhanced Visible Light Driven Water Oxidation – D. Chandra and M. Yagi (Niigata University)
- **3360** CIS Thin Film Solar Cells from Electrodeposited Cu/In Stacked Precursors – Y. Kim, S. Chae, S. Yoon, M. Jeon (Dasstech Co., Ltd.), and R. N. Bhattacharya (National Renewable Energy Laboratory)
- **3361** Various Metal Oxides based Dye-Sensitized Solar Cells – S. Kang (Chonnam National University)
- **3362** Fabrication Mediated by Self-Assembly of Block Copolymer and Photoelectrochemical Properties of Mesoporous WO_3 Films – D. Chandra, K. Ouchi, and M. Yagi (Niigata University)
- **3363** Preparation and Photoanodic Properties of a Chromium-Electrodeposited TiO_2 Electrode – R. Tsuriya, M. Kajita, N. Abe, A. Shoji, and M. Yagi (Niigata University)
- **3364** Energy Storage Devices from Biomass Conversion Byproducts, Lignin – J. Yang (The University of Wisconsin-Madison), S. Gunasekaran (University of Wisconsin-Madison), and S. Gunasekaran (The University of Wisconsin-Madison)
- **3365** Pore-Filling Anion-Exchange Membranes for Non-Aqueous Redox Flow Batteries (RFBs) – M. Kang (Sangmyung University), M. Lee (Samsung Advanced Institute of Technology), J. Kim, H. Cha, and J. Park (Sangmyung University)
- **3366** Novel Graphene – Polyethylene Oxide Composite Electrolyte for Highly Efficient Solid State Dye Sensitized Solar – M. Akhtar, Z. Li, J. Jang, and O. Yang (Chonbuk National University)

F5 Magnetic Materials and Devices 12
Electrodeposition
323C, Level 3, Hawaii Convention Center

Electrodeposition in Spintronics – 08:20 – 12:00
Co-Chairs: W. Schwarzacher and Y. Kitamoto

08:20 **3422** Aligning Superparamagnetic Nanoparticles at Temperatures Much Higher than the Blocking Temperature – W. Schwarzacher, J. Eloi, M. Okuda, and S. Ward Jones (University of Bristol)

09:00 **3423** Giant Magnetoelectric Effect in Thin Film Composites – E. Lage, A. Piorra, C. Kirchhof, E. Yarar, D. Meyners, and E. Quandt (University of Kiel)

09:40 Intermission (20 Minutes)

10:00 **3424** SiGe Spintronics with Single-Crystalline Ferromagnetic Schottky-Tunnel Contacts – K. Hamaya, S. Yamada, and M. Miyao (Kyushu University)

10:40 **3425** Generation and Detection of a Pure Spin Current Using Co-based Heusler-alloy Spin Injector and Detector: Comparison of Co_2FeSi and Co_2MnSi – S. Oki, M. Kawano, K. Tanikawa, H. Aoki, S. Yamada, M. Miyao, and K. Hamaya (Kyushu University)

11:00 **3426** Electrochemical Synthesis of Ferromagnetic Metal-Metal Oxide Nanocontacts for Magnetic Field Sensor Application – J. George, R. Sharma (University of Houston), S. Elhalawaty, R. Carpenter (Arizona State University), D. Litvinov, and S. Brankovic (University of Houston)

11:40 **3427** Giantmagnetoimpedance Effect of $La_{0.6}Bi_{0.1}Sr_{0.3}MnO_3$ at Room Temperature – S. K. Barik, R. Katiyar (University of Puerto Rico), and R. Mahendiran (National Univerity of Singapore)

Magnetic Materials for Biomedical Applications – 15:00 – 17:40
Co-Chairs: T. Osaka and C. Bonhote

15:00 **3428** Lipid-based Magnetic Nanomedicines for Cancer – Y. Namiki (The Jikei University), T. Fuchigami (Tokyo Institute of Technology), M. Nakagawa (Tohoku University), and Y. Kitamoto (Tokyo Institute of Technology)

15:40 **3429** FePt Magnetic Hollow Spheres Designed for Nano-Scale Drug Delivery System Targeted to Cancer Tumor – T. Fuchigami (Tokyo Institute of Technology), M. Nakagawa (Tohoku University), Y. Namiki (The Jikei University), and Y. Kitamoto (Tokyo Institute of Technology)

16:00 **3430** Fabrication of Magnetic Nanoparticle-Assembly with Biodegradable Polymer Core – C. Oka (Tokyo Institute of Technology), N. Horiishi (Bengala Techno Lab), and Y. Kitamoto (Tokyo Institute of Technology)

16:20 Intermission (20 Minutes)

16:40 **3431** Development of Specific Delivery of Magnetic Nanoparticles in Cancer Tissue for Hyperthermia and Their Establishment of System for Safety Assessment – H. Zhang, T. Nakanishi, and T. Osaka (Waseda University)

17:20 **3432** Separation of Magnetic Nano Beads by Using Soft Magnetic Flux Concentrators – M. Kaiser, J. Chen, P. Taptimthong, and L. Rissing (Leibniz Universitaet Hannover)

G2 Synthesis and Engineering General Session
Industrial Electrochemistry and Electrochemical Engineering
304B, Level 3, Hawaii Convention Center

Water Electrolysis – 08:00 – 09:20
Co-Chairs: M. Sudoh and V. Ramani

08:00 **3433** Electroplated Ni-W-S Alloy Cathode for Alkaline Water Electrolysis – D. Suzuki, K. Someya, T. Suzuki, A. Horie (Vantec Co., Ltd.), R. Miyamoto (Utsunomiya University), Y. Ishikawa (Nippon Platec Co., Ltd.), and S. Yoshihara (Utsunomiya University)

08:20 **3434** Size Control of Hydrogen Nanobubble by Pt-nanoparticle/Ru Electrode – K. Kikuchi and T. Okamoto (The Univerity of Shiga Prefecture)

08:40 **3435** Degradation of Nickel Anode for Alkaline Water Electrolysis under Potential Cycling – H. Ichikawa, K. Matsuzawa (Yokohama National University), I. Nagashima (Kawasaki Heavy Industries, Ltd.), A. Manabe (Chlorine Engineers Corp., Ltd.), Y. Nishiki (Permelec Electrode Ltd.), and S. Mitsushima (Yokohama National University)

09:00 **3436** Water Electrolysis to Produce the Dry Oxygen for the Human Activies under the Closed Environment – Y. Sone, S. Masato (Japan Aerospace Exploration Agency), Y. Tetsuya (Daiki Ataka Engineering Co. Ltd.), and S. Naoki (Japan Aerospace Exploration Agency)

Electrolyzer – 09:20 – 10:40
Co-Chairs: M. Sudoh and V. Ramani

09:20 **3437** Low Voltage Electrochemical Process for Manufacturing Sodium Hydroxide and Halogenated Hydrocarbons – B. K. Boggs, S. Gorer, M. Kostowskyj, R. King, J. Miller, and R. Gilliam (Calera Corporation)

09:40 Intermission (20 Minutes)

10:00 **3438** Theoretical Study on Pressurized Operation of Solid Oxide Electrolysis Cells – M. Henke, C. Willich, C. Westner, F. Leucht, W. Bessler, J. Kallo, and K. Friedrich (German Aerospace Center (DLR))

10:20 **3439** Electrolytic Conversion of Sodium Salts in a Kraft Mill – J. Cloutier (Hydro-Québec)

Soda Electrolysis – 10:40 – 12:00
Co-Chairs: M. Sudoh and V. Ramani

10:40 **3440** Scale-up of Low Energy Process for Generation of Alkalinity – R. L. King, D. Martinez, J. Miller, S. Gorer, M. Kostowskyj, B. K. Boggs, and R. Gilliam (Calera Corporation)

11:00 **3441** Design of Rechargeable Air Diffusion Cathode of Metal-Air Battery in Alkaline Solution – Y. Takeshita, S. Fujimoto, and M. Sudoh (Shizuoka University)

11:20 **3442** Development of a High Performance Salt Electrolysis Cell Using Soft-Zero-Gap Method – H. Matsui, H. Tanaka, and H. Okido (Tokuyama Corporation)

11:40 **3443** Electrochemical Processes in Waste Water Treatment: Process Development at Pilot Plant Scale – D. Woisetschlaeger (Graz University of Technology), M. Koncar (VTU Engineering), and M. Siebenhofer (Graz University of Technology)

Water Treatment – 14:00 – 15:00
Co-Chairs: M. Sudoh and V. Ramani

14:00 **3444** Recycling Electrochemical Machining Electrolyte for Metal Recovery and Elimination of Waste – E. J. Taylor, B. Skinn, H. Garich, and M. Inman (Faraday Technology Inc.)

14:20 **3445** Anodic Reactivity of Ferrous Sulfide Particles Generated in Wastewater Treatment – E. Mejia Likosova (The University of Queensland), Y. Poussade (Veolia Water Australia), J. Keller, and S. Freguia (Advanced Water Management Centre at The University of Queensland)

14:40 **3446** Enhanced Electrochemical Oxidation of Rhodamine B by TiO_2-Coated Granular Activated Carbon – X. Li, C. Wang, L. Zhang, Y. Qian, and Y. Wang (Tsinghua University)

Anode – 15:00 – 16:00
Co-Chairs: M. Sudoh and V. Ramani

15:00 **3447** A Novel Chlorine Evolution Anode for Electrowinning of Non-ferrous Metals – M. Matsuda and M. Morimitsu (Doshisha University)

15:20 **3448** Preparation of Shape-Controlled Pt Nanoparticles by Galvanostatic Electrolysis – T. Nishimura, T. Nakade, T. Morikawa (Technology Research Institute of Osaka Prefecture), and H. Inoue (Osaka Prefecture University)

15:40 Intermission (20 Minutes)

Electrochemical Engineering – 16:00 – 17:40
Co-Chairs: M. Sudoh and V. Ramani

16:00 **3449** Development of an Electrolysis-Reversible Hydrogen Electrode (E-RHE) – N. Kamiya (KM Laboratory CO., LTD)

16:20 **3450** Effect of Pt Dissolution on H_2O_2 Formation by Using RRDE Method – K. Ono (Shizuoka University), N. Takeuchi, K. Sekizawa, T. Yoshida (Toyota Motor Corporation), and M. Sudoh (Shizuoka University)

16:40 **3451** Characterization and Performance of Non-Iridium Oxide Based Oxygen Evolution Anodes – T. Zhang and M. Morimitsu (Doshisha University)

17:00 **3452** Mathematical Modeling of Ammonia Electro-Oxidation in a Rotating Disk Electrode (RDE) System – L. A. Diaz Aldana, M. Muthuvel, and G. G. Botte (Ohio University)

17:20 **3453** Electrocatalytic Synthesis of Hydrogen Peroxide on Non-Precious Catalysts – F. Hasché (Technische Universität Berlin), T. Fellinger (Max Planck Institute of Colloids and Interfaces), M. Oezaslan, P. Strasser (Technische Universität Berlin), and M. Antonietti (Max Planck Institute of Colloids and Interfaces)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

G2 – Poster Session – 18:00 – 20:00
Co-Chairs: V. Ramani and M. Sudoh

- **3454** Cathodic Characteristic and Structural Analyses of a New Catalyst for Chlorate Electrolysis – K. Terada (Doshisha University), S. Hatano, K. Hara, A. Kimura (Daiso engineering Co. Ltd), M. Saito, H. Daimon, M. Inaba, and A. Tasaka (Doshisha University)
- **3455** TIZO/Ag/TIZO Multilayer Films for the Application of a Very Low Resistance Transparent Electrode – G. Heo (Korea Institute of Industrial Technology), Y. Lee (Chosun University), J. Park (Korea Institute of Industrial Technology), J. Oh (Chonnam National University), D. Shin (Chosun University), and T. Kim (Korea Institute of Industrial Technology)
- **3456** Synthesis and Properties of Pentacenes Having Alkyl- chains at 2, 3, 9, 10-Positions – S. Katsuta (Nara Institute of Science and Technology), C. Ohashi, K. Nakayama (Yamagata University), and H. Yamada (Nara Institute of Science and Technology)
- **3457** Preparation and Characterization of Cathode Active Materials from Spent Lithium Ion Batteries – J. Moon, J. Ahn, S. Son, H. Lee, H. Kim, and H. Kim (Korea Institute of Industrial Technology)
- **3458** Enhancement of Electrical Conductivity and Electrochemical Activity of Hydrogenated Amorphous Carbon by Incorporating Boron Atoms – H. Naragino, K. Yoshinaga, A. Nakahara, S. Tanaka, and K. Honda (Yamaguchi University)
- **3459** Direct Preparation of Highly Fluorescent Pyrene-Dyes from Non-Fluorescent Precursors Upon Photoirradiation – T. Aotake, D. Kuzuhara, and H. Yamada (Nara Institute of Science and Technology)

H1 Carbon Nanotubes and Graphene: From Fundamental Properties and Processes to Applications and Devices

Fullerenes, Nanotubes, and Carbon Nanostructures / Dielectric Science and Technology / Energy Technology /Sensor
317A, Level 3, Hawaii Convention Center

Session III – 08:00 – 12:20
Co-Chairs: R. Weisman, Z. Liu, and H. Klauk

08:00 **3515** Effect of Boric Acid on the Nucleation and Growth of Ni Nanoparticles for CNT Growth – J. Vanpaemel, M. Van der Veen, C. Huyghebaert, S. De Gendt, and P. Vereecken (imec)

08:20 **3516** The Effect of Carbon-Nanotubes on the Electrochemical Impedance Behavior of Glass and Carbon fibers with AA2024 and AA7075 – Y. Yoon, K. Lafdi, and M. Bouchard (University of Dayton Research Institute)

08:40 **3517** Carbon Nanotube Enhanced Functional Carbon Fibers from Renewable Resources – O. Rios, W. E. Tenhaeff, M. McGuire, P. Menchhofer, A. Johs, K. L. More (Oak Ridge National Laboratory), and D. White (Maryville College-ORAU)

09:00 **3518** Highly Conductive, Super Stiff Carbon Nanotube-based Macroassemblies and Their Composites – M. A. Worsley, M. Merrill, S. Kucheyev, J. Kuntz, T. Han, J. Satcher, M. Stadermann, A. Hamza, J. Biener, and T. Baumann (Lawrence Livermore National Laboratory)

09:20 **3519** Vertically Aligned Carbon Nanofiber Based Electrode for Biosensor Applications – D. Suazo, J. Rivera (University of Puerto Rico), J. Koehne, M. Meyyappan (NASA Ames Research Center), and C. Cabrera (University Of Puerto Rico)

09:40 `Intermission (20 Minutes)

10:00 **3520** Indene-C_{60}/C_{70} Bisadduct as Acceptor in Polymer Solar Cells – Y. Li (Institute of Chemistry, Chinese Academy of Sciences)

10:20 **3521** Synthesis and Separation Strategies for New Fullerenes Created in Oxidizing Atmospheres – S. Stevenson (Indiana-Purdue University)

10:40 **3522** Design of Robust Functional Structures on Carbon Substrates Using Sylil-Protected Aryldiazonium Electroreduction – Y. Leroux (Universite de Rennes – CNRS) and P. Hapiot (Universite de Rennes 1)

11:00 **3523** Preparation of Hydrophilic Nano-Carbon Particles by Electrolysis and Their Environmental Applications – S. Ikeda, S. Kawasaki, Y. Hayashi (Nagoya Institute of Technology), S. Kita, A. Nobumoto, H. Ono, and S. Ono (Shion co., ltd.,)

11:20 **3524** Synthesis and Functions of Hybrid Assemblies Composed of Metalloporphyrin and Heteropolyoxometallates – T. Kojima (University of Tsukuba), A. Yokoyama (Ewha Womans University), T. Ishizuka (University of Tsukuba), K. Ohkubo (Osaka University), and S. Fukuzumi (Osaka Prefecture University)

11:40 **3525** Synthesis and Properties of Acenes Photochemically Prepared from Diketone Precursors – H. Yamada, T. Aotake, S. Katsuta, Y. Kaneshige (Nara Institute of Science and Technology), C. Ohashi, and K. Nakayama (Yamagata University)

12:00 **3526** Stability Computations for La@C_{76} – Z. Slanina (University of Tsukuba), F. Uhlik (Charles University), T. Akasaka (University of Tsukuba), and S. Nagase (Institute for Molecular Science, NINS)

I3 Molten Salts and Ionic Liquids 18

Physical and Analytical Electrochemistry / Electrodeposition / Energy Technology

301A, Level 3, Hawaii Convention Center

Power – 08:00 – 14:40
Co-Chairs: M. Mizuhata and B. Zhu

08:00 **3671** A Design for a Membrane-less Al/Cl2 Ionic Liquid Flow Battery – M. Zhang (University of Tennessee, Knoxville), T. A. Zawodzinski Jr. (The University of Tennessee), P. Trulove (US Naval Academy), J. Watson, and R. Counce (University of Tennessee, Knoxville)

08:20 **3672** Electrochemical Behavior of Lithium Metal Electrodes in Ionic Liquid Based Electrolytes – A. I. Bhatt (CSIRO Energy Technology)

08:40 **3673** Ionic Liquid Based Electrolytes for Zn-Air and Mg-Air Batteries – P. Howlett, A. A. Torriero (Deakin University), T. Khoo (Monash University), T. Simons (Deakin University), D. MacFarlane (Monash University), and M. Forsyth (Deakin University)

09:00 **3674** The Solid Oxide-molten Salts Ion Conductors and Multifunctional Nanocomposites for Advanced Fuel Cells – B. Zhu (KTH)

09:40 Intermission (20 Minutes)

10:00 **3675** The Kinetics of Electrochemical Alloying in Liquid Mg-Sb – J. M. Newhouse, H. Kim, and D. R. Sadoway (Massachusetts Institute of Technology)

10:20 **3676** Spectroscopic Analysis of Ceria Based Oxide-Carbonate Nanocomposite Electrolyte for Low Temperature Solid Oxide Fuel Cells – M. Mizuhata, K. Takeda (Kobe University), R. Raza, and B. Zhu (KTH)

10:40 **3677** Measurement of the Diffusion Coefficient of Calcium in the Calcium-Bismuth Liquid Alloy System – S. A. Barriga, H. Kim, D. Boysen, and D. R. Sadoway (Massachusetts Institute of Technology)

11:00 **3678** Electrochemical Properties of Ca-Sb Alloys in Molten Salt Electrolytes – T. Ouchi, H. Kim, and D. R. Sadoway (Massachusetts Institute of Technology)

11:20 **3679** Oxygen Reduction Reaction at $LaNiO_3$ Supported by Au Ring in Li/Na Eutectic Carbonate with La_2O_3 – K. Matsuzawa, Y. Esaki, K. Watanabe, K. Ota, and S. Mitsushima (Yokohama National University)

11:40 **3680** $EMIHSO_4$-based Polymer Electrolytes and Their Applications in Solid Electrochemical Capacitors – S. Ketabi, X. Liu, Z. Le, and K. Lian (University of Toronto)

12:00 Lunch Break (120 Minutes)

14:00 **3681** Charge and Discharge Properties at Room to Intermediate Temperature of Sodium Secondary Batteries Using Molten NaFSA-MPPyrFSA for the Green Base Transceiver Station (G-BTS) – E. Itani, S. Sakai, K. Nitta, S. Inazawa (Sumitomo Electric Industries, Ltd.), K. Takeno, and T. Seki (NTT Docomo)

14:20 **3682** Versatility of Molten Salt Synthesis for the Preparation of Cathode and Anode Electrode Materials for Lithium-Ion Batteries – M. Reddy and B. Chowdari (National University of Singapore)

Separations and Purification – 14:40 – 17:20
Co-Chairs: P. Trulove and R. Mantz

14:40 **3683** Exploiting the Versatility of Ionic Liquids and Polymeric Ionic Liquids in Chromatographic Separations and Microextractions – J. Anderson (The University of Toledo)

15:20 Intermission (20 Minutes)

15:40 **3684** Separation of Flue Gas Components by Ionic Liquids – Fundamental Chemistry and Industrial Application – R. Fehrmann, A. Kunov-Kruse, S. L. Mossin, S. Kegnæs, H. Kolding, and A. Riisager (Technical University of Denmark)

16:20 **3685** Reactive Separation of H2S from Fuel Process Streams Using Ionic Liquids – K. Jayne, D. Carr, B. Slote, and M. C. Kimble (Reactive Innovations, LLC)

16:40 **3686** Decomposition of CO_2 Gas in $CaCl_2$-CaO and LiCl-Li_2O Molten Salts – R. O. Suzuki, K. Otake, T. Uchiyama (Eco-Processing), H. Kinoshita (Fukushima College of Technology), and T. Kikuchi (Hokkaido University)

17:00 **3687** The Use of Ionic Liquids for the Purification of Heavy Metals from Coal Ash – T. E. Sutto (Naval Research Laboratory)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

I3 – Poster Session 2 – 18:00 – 20:00
Co-Chairs: L. Haverhals and W. M. Reichert

- **3688** Ionic Liquids Technology for Aluminum Deposition – T. Naguy, E. Berman (AFRL), N. Voevodin (AFRL/UDRI), P. Brezovec, and M. Miller (CTC)
- **3689** Electrode Reactions of Platinum Bromide Complexes in an Amide-Type Ionic Liquid – T. Endo, Y. Katayama, and T. Miura (Keio University)
- **3690** Electronic State Analyses of Redox-Active Molecule Tethered at Ionic Liquid / Electrode Interface by Photoelectron Spectroscopy – Y. Kanai, Y. Mino, A. Imanishi, Y. Yokota, and K. Fukui (Osaka University)
- **3691** Electrochemical Deposition of Cobalt onto the Surface of Copper Using a Choline Chloride-Based Ionic Liquid – B. Damiano, A. I. Wixtrom, and T. M. Abdel-Fattah (Christopher Newport University)
- **3692** Electrochemical Polishing Applications and EIS of a Novel Choline Chloride-based Ionic Liquid – A. I. Wixtrom, J. Buhler (Christopher Newport University), C. E. Reece (Thomas Jefferson National Accelerator Facility), and T. M. Abdel-Fattah (Christopher Newport University)
- **3693** Investigation of Oxidation State of the Electrodeposited Neodymium Metal Related with the Water Contents of Phosphonium Ionic Liquids – H. Kondo, M. Matsumiya (Yokohama National University), K. Tsunashima (Wakayama National College of Technology), and S. Kodama (Nippon Chemical Industrial Co. Ltd.)
- **3694** Electrochemical Formation of Tb-Ni Alloys in a Molten LiCl-KCl-$TbCl_3$ System – H. Konishi, K. Mizuma, H. Ono, E. Takeuchi (Osaka University), T. Nohira (Kyoto University), and T. Oishi (National Institute of Advanced Industrial Science and Technology)
- **3695** Application of Electrochemical Transient Techniques for Studying Niobium Speciation in Chloride Melts – G. Fofanov, I. B. Polovov, M. Chernyshov, V. A. Volkovich, O. Rebrin (Ural Federal University), and T. Griffiths (Redston Trevor Consulting, Ltd.)
- **3696** Complex Formation and Micropassivation at Electrodeposition of Niobium Coatings in Alkali Chloride-Fluoride Melts With Different Cationic Composition – E. Marenkova (Institute of Chemistry, Kola Science Centre RAS) and S. Kuznetsov (KSC RAS)
- **3697** Influence of the Second Coordination Sphere on the Diffusion Coefficients of Niobium Fluoride Complexes in Chloride and Fluoride Melts – A. Popova, V. Kremenetsky (Institute of Chemistry, Kola Science Centre RAS), and S. Kuznetsov (KSC RAS)
- **3698** Electrochemical Behavior and Electrorefining of Vanadium in Melts Containing Titanium Salts – O. Kazakova (Institute of Chemistry, Kola Science Centre RAS) and S. Kuznetsov (KSC RAS)
- **3699** Activity Coefficients and Solubility of Lanthanum and Praseodymium in Gallium-Indium Eutectic Alloy – A. Dedyukhin, V. Ivanov, S. Mel'chakov, A. Shchetinskii, V. A. Volkovich, L. Yamshchikov (Ural Federal University), A. Osipenko (State Scientific Centre Research Institute of Atomic Reactors), S. Raspopin (Ural Federal University), and M. Kormilitsyn (State Scientific Centre Research Institute of Atomic Reactors)
- **3700** Uranium Activity and Solubility in Liquid Ga-In Eutectic Alloy: An Electrochemistry Study – V. A. Volkovich, D. Maltsev, L. Yamshchikov (Ural Federal University), A. Osipenko (State Scientific Centre Research Institute of Atomic Reactors), S. Raspopin (Ural Federal University), and M. Kormilitsyn (State Scientific Centre Research Institute of Atomic Reactors)
- **3701** Precipitation of Rare Earth Phosphates in NaCl-2CsCl Eutectic Based Melts – V. A. Volkovich, A. Ivanov, S. Yakimov, I. B. Polovov, B. Vasin (Ural Federal University), T. Griffiths (Redston Trevor Consulting, Ltd.), A. Chukin, and A. Shtolts (Ural Federal University)
- **3702** Development of Recycling Process for Rare Earth Magnets by Electrodeposition Using Ionic Liquids Media – M. Ishii, M. Matsumiya (Yokohama National University), and S. Kawakami (Dowa Eco-System Co. Ltd.)
- **3703** Electrochemical Behavior and Solvation Analysis of Rare Earth Complexes in Ionic Liquids Media Investigated by SECM and Raman Spectroscopy – N. Tsuda, M. Matsumiya (Yokohama National University), K. Tsunashima (Wakayama National College of Technology), and S. Kodama (Nippon Chemical Industrial Co. Ltd.)
- **3704** Investigation on the Hydration State of Ionic Liquids toward the Application as a Protein Solvent – Y. Nikawa, K. Fujita, and H. Ohno (Tokyo University of Agriculture and Technology)
- **3705** Dissolution and Stabilization of Proteins in a Hydrophobic Ionic Liquid with Hydrated Zwitterions – Y. Ito, Y. Kohno, and H. Ohno (Tokyo University of Agriculture and Technology)

- **3706** Effect of Carboxylate Anions on Polarity and Water Miscibility of Hydrophobic Ionic Liquids Toward the Matrix for Cellulose Hydrolysis – T. Nakano, Y. Fukaya, and H. Ohno (Tokyo University of Agriculture and Technology)
- **3707** Evaluation of Glucose Oxidase Activity in Ionic Liquids in the Presence of Small Amount of Water – K. Nagata, M. Abe, Y. Fukaya, and H. Ohno (Tokyo University of Agriculture and Technology)
- **3708** HPLC Analysis of Cellulose Dissolved in Ionic Liquids – K. Kuroda, Y. Fukaya, and H. Ohno (Tokyo University of Agriculture and Technology)
- **3709** Ionic Liquid Facilitated Introduction of Functional Materials into Biopolymer Polymer Substrates – L. M. Haverhals, E. E. Christman (United States Naval Academy), M. P. Foley (U.S. Naval Academy), E. K. Brown (United States Naval Academy), H. De Long (AFRL/AFOSR), and P. Trulove (US Naval Academy)
- **3710** Direct Dissolution of Wet and Saliferous Microalgae with Ionic Liquids and Isolation of Poly(3-Hydroxybutyrate) – D. Kobayashi, K. Fujita, N. Nakamura, and H. Ohno (Tokyo University of Agriculture and Technology)
- **3711** Preparation of Ionic Liquids Composed of Benzoic Acid Derivatives and Their Phase Behavior with Water – T. Ando, Y. Kohno, and H. Ohno (Tokyo University of Agriculture and Technology)
- **3712** High Temperature Stability of Carbon-Carbonate Mixture in Solid Oxide Electrolyte DCFC – B. Chu, K. Kang, K. Kang (Korea Institute of Industrial Technology), and J. Hwang (KITECH)
- **3713** Task-Specific Room Temperature Ionic Liquids (RT-ILs) for Biological Liquid/Liquid Extraction – A. J. McIntosh, S. A. Goodchild (Dstl Porton Down), and T. Welton (Imperial College, London)

I4 Electrocatalysis 6

Physical and Analytical Electrochemistry / Energy Technology / Industrial Electrochemistry and Electrochemical Engineering

315, Level 3, Hawaii Convention Center

Electrocatalysis VI – General Session – 08:00 – 12:00
Co-Chairs: N. Hoshi and V. Ramani

08:00 **3784** Electrocatalytic Oxidation of Phenol within the Interlayer Space of Surfactant/MnO_2 Multilayer Films – M. Nakayama, S. Mito, M. Shamoto, and K. Tomono (Yamaguchi University)

08:20 **3785** Electrochemical Studies of Ternary And Quaternary Pt Based Catalysts for Glycerol Oxidation – C. Caliman and J. Ribeiro (Universidade Federal do Espírito Santo)

08:40 **3786** Highly Active Pd-based Metallic Glass Nanowires for Alcohol Oxidation in Alkaline Media – R. C. Sekol, M. Carmo, G. Kumar, F. Gittleson (Yale University), K. Sun (University of Michigan), J. Schroers, and A. D. Taylor (Yale University)

09:00 **3787** Influence of Peroxodisulfate Electro-Generation on the Electrochemical Oxidation of Formic Acid on Boron Doped Diamond Electrodes – Y. Honda, S. Fierro (Keio University), C. Comninellis (Swiss Federal Institute of Technology (EPFL)), and Y. Einaga (Keio University)

09:20 **3788** Effect of pH on Electrooxidation of Formic Acid/Formate on Platinum – J. Joo, T. Uchida (Hokkaido University), A. Cuesta (Instituto de Química Física "Rocasolano" CSIC), M. T. Koper (Leiden University), and M. Osawa (Hokkaido University)

09:40 Intermission (20 Minutes)

10:00 **3789** Investigation on MEA-performances of Highly Durable Silica-coated Pd/C Electrocatalysts – Y. Sato (JX Nippon Oil & Energy Corp), K. Fujii (JX Nippon Oil & Energy Corporation), M. Ito (JX Nippon Oil & Energy Corp), S. Takenaka, and M. Kishida (Kyushu University)

10:20 **3790** Durable Oxide-Based Catalysts for Application as Cathode Materials in Polymer Electrolyte Membrane Fuel Cells (PEFCs) – E. Fabbri, A. Rabis, A. Foelske-Schmitz (Paul Scherrer Institute), D. Kramer (University of Southampton), R. Kötz, and T. J. Schmidt (Paul Scherrer Institute)

10:40 **3791** NO Conversion in Porous Cell Stacks – R. M. Werchmeister, K. B. Andersen, and K. Kammer Hansen (Technical University of Denmark)

11:00 **3792** Photoelectrochemistry Applied to Organic Dye Oxidation and Concomitant Hydrogen Generation – M. B. Zanoni (Chemistry Institute) and T. Guaraldo (UNESP)

11:20 **3793** Preparation of Photocatalytic TiO_2/WO_3 Hollow Fiber Using Polysulfone as Template – K. I. Liu, P. Chen, Y. Hsueh, H. Chen, and T. Perng (National Tsing Hua University)

11:40 **3794** Composite Thin Film $Ir_{1-x}Nb_xO_2$ Electrocatalysts for the Oxygen Evolution Electrode – A. Zlotorowicz, F. Seland, and S. Sunde (Norwegian University of Science and Technology)

Electrocatalysis VI – General Session – 14:00 – 17:20
Co-Chairs: G. Brisard and P. K Shen

14:00 **3795** A Comparative Study of Nickel and Cobalt based Nanoparticles as Electrocatalyst for Alkaline Water Electrolysis – A. Patru, F. Favier (Institut Charles Gerhardt Montpellier), and N. Jerez (Bulane SAS)

14:20 **3796** Chemical Amplitude: A Quantitative Descriptor for the Surface Reactivity of Metals – L. Zhuang, B. Huang, L. Xiao, and J. Lu (Wuhan University)

14:40 **3797** Nanostructured and Hybrid Carbon Films for Electrocatalytic Reaction with Bbiomolecules – O. Niwa, T. Kamata, D. Kato (National Institute of Advanced Industrial Science and Technology), A. Ueda (Tokyo Institute of Technology), K. Yoshioka (National Institute of Advanced Industrial Science and Technology), S. Umemura (Chiba Institute of Technology), and S. Hirono (National Institute of Advanced Industrial Science and Technology, MES Afty)

15:00 **3798** Electrochemical Characterization of Cup-Stacked Carbon Nanofiber-Modified Electrodes and its Application to Biosensing – K. Komori, S. Ko, S. Komatsu, T. Tatsuma, A. Sakoda, and Y. Sakai (University of Tokyo)

15:20 Intermission (20 Minutes)

15:40 **3799** Large-Scale Self-Assembly of the Nitrogen-Doped Graphene with High Electrocatalytic Activity for Oxygen Reduction – C. He and P. Shen (Sun Yat-Sen University)

16:00 **3800** Plasmonic Application of Pt-Group Metal Nanostructures – K. Ikeda, S. Uchiyama, and K. Murakoshi (Hokkaido University)

16:20 **3801** Pit Falls in the Use of Point Electrodes – K. Kammer Hansen (Technical University of Denmark)

16:40 **3802** Recent Development on Electroanalytical Application of Boron-Doped Diamond Electrodes – Y. Einaga (Keio University)

17:00 **3803** Redox Properties and Catalytic Activity for Oxygen Reduction Reaction of Electropolymerized Aromatic Diamines – S. Kishioka (Gunma University)

I5 Electrochemical Atomic Layer Epitaxy and Quantum Confinement

Physical and Analytical Electrochemistry / Electrodeposition

318B, Level 3, Hawaii Convention Center

Semiconductor Deposition I – 08:00 – 09:40
Co-Chairs: John Stickney and Stephen Maldonado

08:00 **3804** Electrochemical Liquid-Liquid Solid Deposition of Crystalline Semiconductor Materials – J. Gu, E. Fahrenkrug, S. Collins, and S. Maldonado (University of Michigan)

08:20 **3805** Kesterite Group Materials Thin Films by Elettrodeposition for Photovoltaic Applications – M. Innocenti, I. Bencistà, F. Di Benedetto, S. Cinotti, A. De Luca, S. Bellandi (University of Florence), A. Lavacchi (ICCOM_CNR), M. Muniz Miranda (University of Florence), F. Vizza (ICCOM_CNR), and M. Foresti (University of Florence)

08:40 **3806** New Route for Low Cost Fabrication of Semiconducting Materials for Photovoltaic Applications – R. Salazar, S. Sanchez, D. Rouchon (CEA-Leti), C. Levy-Clement (CNRS), and V. Ivanova (CEA-Leti)

09:00 **3807** Electrochemical Atomic Layer Deposition of PV Materials – B. Perdue, V. Stickney, J. Stickney (The University of Georgia), and D. Banga (Sandia National Laboratories)

09:20 **3808** Characterization of Electrochemical ALD Processes on Bipolar Electrodes Using Confocal Raman Microscopy – S. Ndzesse and C. Shannon (Auburn University)

Semiconductor Deposition II – 10:00 – 11:40
Co-Chairs: John Stickney and Erik Menke

10:00 **3809** Cadmium Telluride Nanowire Electrodeposition for Advanced Photovoltaics – E. Menke, L. Reed, and J. Hujdic (University of California)

10:20 **3810** Ultra-long Hollow Chalcogen and Chalcogenide Nanofibers by Galvanic Displacement Reaction – H. Park, M. Zhang (University of California, Riverside), C. Chang, H. Jung (University of California-Riverside), J. Lim (Korea Institutte of Materials Science), Y. Choa (Hanyang University), and N. Myung (University of California – Riverside)

10:40 **3811** Pulsed Electrodeposition of Bi_2Te_3/Sb_2Te_3 Superlattices in Flow Cells vs. Single Baths – D. Banga, J. Sugar, D. Medlin, V. Stavila, D. B. Robinson, and P. Sharma (Sandia National Laboratories)

11:00 **3812** Bismuth Thin Films: Growth, Structure and Properties – M. Saini, S. Zheng (York University), S. Huang (The John Hopkins University), W. Wang (The John Hopkins Univeristy), C. Chien (The John Hopkins University), and S. Morin (York University)

11:20 **3813** Electrochemical Routes to the Reduction of Resistance in Single-Walled Carbon Nanotube Networks – D. Asheghali, N. Bhatt, P. Vichchulada, and M. D. Lay (University of Georgia)

Surface Limited Redox Replacement – 14:00 – 18:00
Co-Chairs: Nikolay Dimitrov and Natasa Vasiljevic

14:00 **3814** Thermodynamics and Kinetics Aspects of Metal Deposition via Surface Limited Redox Replacement Reaction – S. Brankovic (University of Houston)

14:20 **3815** Deposition of Ultra Thin Pt Films via Surface Limited Redox Replacement of UPD Layers on Au – N. Vasiljevic, J. Nutariya (University of Bristol), M. Fayette (SUNY at Binghamton), B. Rawlings (University of Bristol), and N. Dimitrov (SUNY at Binghamton)

14:40 **3816** The Electrochemical Atomic Layer Deposition of Pt and Pd Nanoparticles on Ni Foam for the Electro-Oxidation of Alcohols – R. M. Modibedi, E. Louw (CSIR), K. I. Ozoemena, and M. K. Mathe (Council for Scientific and Industrial Research)

15:00 **3817** Electrodeposition of Metals in Catalysts Syntheses: Platinum Monolayer Electrocatalysts for the Oxygen Reduction Reaction – M. Vukmirovic, S. Bliznakov, K. Sasaki, J. Wang, and R. R. Adzic (Brookhaven National Laboratory)

15:20 **3818** Highly-Active Pt Coated NPG Catalyst for HCOOH Oxidation: Synthesis, SLRR Coating, Activity and Durability – N. Dimitrov (SUNY at Binghamton), M. Kamundi, L. Bromberg, D. McCurry (Chemistry, SUNY Binghamton), M. Fayette (SUNY at Binghamton), and E. Fey (Chemistry, SUNY Binghamton)

15:40 **3819** Epitaxial Ag(111) Overlayers on Noble Metals – K. Soliman and L. A. Kibler (University of Ulm)

16:00 **3820** Electrodeposition of Pt Thin Films by Pulsed Potential – Y. Liu, D. Gokcen, U. Bertocci, and T. Moffat (National Institute of Standards and Technology)

16:20 **3821** NEAR-Surface Equilibrium Phases in Electrochemically Fabricated Low-dimensional Multi-Component Catalysts – F. M. Alamgir, R. Rettew, and A. Vitale (Georgia Institute of Technology)

16:40 **3822** Self-Limiting Electroless Deposition of Nanoscale Ruthenium Oxide: Catalyst, Electron/Proton Conductor, Broadband Transparent Oxide – D. R. Rolison, C. N. Chervin, J. W. Long, M. Osofsky, J. Melinger, J. Owrusky, F. Rachford, J. Pietron, and M. Pomfret (U.S. Naval Research Laboratory)

17:00 **3823** *In Situ* Stress Measurement During Pt Deposition Using Surface Limited Redox Replacement – G. Stafford, M. C. Lafouresse (NIST), Y. Liu (National Institute of Standards and Technology), J. Shin, and U. Bertocci (NIST)

17:20 **3824** First Principles Studies of Trends in Metal Electrodeposition and Reactivity – J. Greeley (Argonne National Laboratory)

17:40 **3825** Reduction of Nitrate Mediated By Metal UPD on Pd-Modified Au Electrodes In Aqueous Electrolytes – A. J. Jebaraj and D. J. Scherson (Case Western Reserve University)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

I5 – Poster Session – 18:00 – 20:00
Co-Chairs: Nikolay Dimitrov and John Stickney

• **3826** Preparation of Size-quantized Lead Sulfide Thin Layer on Silver Nanocubes via Electrochemical Atomic Layer Deposition – M. Nakano, K. Okazaki, and T. Torimoto (Nagoya University)

J1 Chemical Sensors 10 – Chemical and Biological Sensors and Analytical Systems

Sensor
319B, Level 3, Hawaii Convention Center

J1-5 – Gas and Liquid Phase Chemical Sensors – 08:00 – 11:20
Co-Chairs: M. Sailor and S. Uchiyama

08:00 **3887** CO Sensing Properties of Electrochemical Gas Sensors using an Anion-Conducting Polymer as an Electrolyte – T. Goto, T. Hyodo (Nagasaki University), K. Kaneyasu (Figaro Engineering Inc.), H. Yanagi (Tokuyama Corp.), and Y. Shimizu (Nagasaki University)

08:20 **3888** Investigation of ZnO-Nanowire-Based Extended-Gate Field-Effect-Transistor pH Sensors – C. Li, S. Chang, T. Yang, and S. Chang (National Cheng Kung University)

08:40 **3889** NO_2 Sensing Properties of Porous In_2O_3-based Powders Preapred by Utilizing Ultrasonic-Spray Pyrolysis Employing PMMA Microsphere Templates: Effects of the Size of the PMMA Microspheres on Their Gas-Sensing Properties – E. Fujii, T. Hyodo, K. Matsuo, and Y. Shimizu (Nagasaki University)

09:00 **3890** Biosensors for Health Monitoring – S. Anastasova and P. Vadgama (Queen Mary University of London)

09:20 **3891** Redox-Active Alkali Insertion Materials as Inner Contact Layer in All-Solid-State Ion-Selective Electrodes – S. Komaba, C. Suzuki, N. Yabuuchi, S. Kanazawa, T. Hasegawa, and T. Akatsuka (Tokyo University of Science)

09:40 **3892** Sensing Characteristics of a Fiber Bragg Grating Hydrogen Gas Sensor using Sol-Gel Derived Pt/WO_3 Film – S. Okazaki (Yokohama National University), Y. Maru, and T. Mizutani (Japan Aerospace Exploration Agency)

10:00 **3893** Zirconia-based Electrochemical Oxygen Sensor for Accurately Determining Water Vapor Concentration – R. E. Soltis (Ford Motor Company)

10:20 **3894** Fabrication of Surface Enhanced Raman Scattering (SERS)-active substrates by using Dip-Pen Nanolithography – K. Chao and K. K. Ou (Taipei Medical University)

10:40 **3895** Application of Commercial Manufacturing Methods to Mixed-Potential NOx Sensors – C. R. Kreller (Los Alamos National Laboratory), P. Sekhar (Washington State University Vancouver), W. Li, P. Palanisamy (ESL ElectroScience), E. L. Brosha, R. Mukundan, and F. H. Garzon (Los Alamos National Laboratory)

11:00 **3896** Research on Filter Materials for LP Gas Sensors – M. Sai, K. Shinnishi, K. Kaneyasu (Figaro Engineering Inc.), T. Suzuki, and M. Takeuchi (Osaka Prefecture University)

J2 Luminescence and Display Materials: Fundamentals and Applications

Luminescence and Display Materials
323A, Level 3, Hawaii Convention Center

Luminescence from Inorganic Materials – 08:00 – 12:00
Co-Chairs: Charles Hunt and David Lockwood

08:00 **3926** Optoelectronic and Persistent Luminescence Properties in Ce^{3+}-Doped Garnet Ceramics – J. Ueda, K. Aishima, and S. Tanabe (Graduate School of Human and Environmental Studies, Kyoto University)

08:40 **3927** Ce^{3+}-Tb^{3+} Energy Transfer in Aluminate Garnets – A. Setlur and J. Shiang (GE Global Research)

09:00 **3928** Systematic Studies of Structural and Optical Properties of Pure and Doped Pyrochlore Crystals – A. Srivastava (GE Global Research) and M. G. Brik (University of Tartu)

09:20 **3929** Experimental and Crystal Field Studies of Spectroscopic Properties of Mn^{2+} Ions in Fluoride Crystals in UV-VUV – M. G. Brik, M. Kirm (University of Tartu), M. True (Carl Zeiss EyeTec GmbH), and G. Zimmerer (HASYLAB at DESY)

09:40 **3930** Improvement of Luminescence Properties of $KSrPO_4$:Eu by a Polymerizable Complex Method Employing a Water Soluble Phosphorus Oligomer – M. Kim, M. Kobayashi, H. Kato, and M. Kakihana (Tohoku University)

10:00 Intermission (20 Minutes)

10:20 **3931** Relationship between Emission Properties and Host Structure for Eu^{2+}-doped Phosphate Investigated by Quantitative Structure Relationship and First Principles Calculation – H. Takaba (Tohoku University), R. Miura, A. Suzuki, N. Hatakeyama, and A. Miyamoto (Tohoku Iniversity)

10:40 **3932** Transparent Inorganic Downconverters for Luminescent Solar Concentrators – L. Shea-Rohwer, J. Martin, and M. Nyman (Sandia National Laboratories)

11:00 **3933** Spectroscopy of Pr-doped CaTiO3 Nano-particles under Excitation into the Charge Transfer State – J. Collins, Y. Tsehay (Wheaton College), P. Boutinaud, G. Chadeyron, and R. Boosin (Clermont Université)

11:20 **3934** Development of $YVO_4:Bi^{3+},Eu^{3+}$ Nanophosphor and Its Application as a Spectral Down-Shifter for Solar Cells – S. Takeshita and T. Isobe (Keio University)

11:40 **3935** Liquid Phase Synthesis and Characterization of $LaPO_4:Yb^{3+}/GdPO_4$ Nanoparticles with NIR Emission under NIR Excitation – T. Isobe, T. Shimizu, K. Hara, and S. Takeshita (Keio University)

Luminescent Semiconductor Materials – 14:00 – 17:00

Co-Chairs: Lauren Shea-Rohwer and Anant Setlur

14:00 **3936** Photoluminescence of single InAsP quantum dots in InP nanowires – P. Poole, D. Dalacu, J. Lapointe, and K. Mnaymneh (National Research Council Canada)

14:40 **3937** Fast Luminescence in Silicon-Germanium Nanostructures – D. J. Lockwood, X. Wu, J. Baribeau (National Research Council), N. Modi, and L. Tsybeskov (New Jersey Institute of Technology)

15:00 Intermission (20 Minutes)

15:20 **3938** XANES and XEOL Studies of Luminescent Silicon Carbonitride (SiCN) Thin Films – Z. Khatami, P. Wilson, J. Wojcik, and P. Mascher (McMaster University)

15:40 **3939** Design Rule of Ti/Al Ohmic contacts on N-face n-GaN : Solution for Thermal Degradation – B. Kim, Y. Song (Pohang University of Science and Technology), J. Son (University of California at Berkeley), C. Yoo, and J. Lee (Pohang University of Science and Technology)

16:00 **3940** Colloidal Synthesis of $(CuAg)_xIn_{2x}Zn_{2(1-2x)}S_2$ Solid Solution Nanocrystals with Tunable Band Gap – M. Dai, K. Okazaki (Nagoya University), A. Kudo (Tokyo University of Science), S. Kuwabata (Osaka University), and T. Torimoto (Nagoya University)

16:20 **3941** Core/Shell structured Nanoparticles and Hybrid Electrode Materials for Electrically Tunable Photonic Crystal Display – H. Shim, M. Han (Samsung Advanced Institute of Technology), J. Lim (Seoul National University), C. Heo, H. Jin, C. Shin, S. Jeon, J. Kim (Samsung Advanced Institute of Technology), J. Lee (Seoul National University), and S. Lee (Samsung Advanced Institute of Technology)

16:40 **3942** Enhanced Electrochemiluminescence Light-Emitting Device Driven by Application of AC Voltage and Its Emission Mechanism – T. Nobeshima, K. Nakamura, and N. Kobayashi (Chiba University)

J4 Microfabricated and Nanofabricated Systems for MEMS/NEMS 10

Sensor / Dielectric Science and Technology / Electronics and Photonics / Physical and Analytical Electrochemistry

311, Level 3, Hawaii Convention Center

Micro/Nanofabrication – 08:00 – 12:00
Co-Chairs: Peter Hesketh and Gary Hunter

08:00 Introductory Remarks (5 Minutes)

08:05 **3985** Micro-systems and Nanotechnologies in ELISA and Droplet Generation Applications – C. Yeh and Y. Lin (National Cheng Kung University)

08:50 **3986** A Novel Microdevice for the Treatment of Hydrocephalus – J. Oh (Harvard University), F. Kralick, and H. Noh (Drexel University)

09:25 **3987** Wafer Scale Processing of Plasmonic Nanopore Arrays in 200mm CMOS Fab Environment – K. Malachowski, R. Verbeeck, T. Dupont, C. Chen, S. Musa, Y. Li, T. Stakenborg, D. Sabuncuoglu, and P. Van Dorpe (IMEC Belgium)

09:45 Intermission (15 Minutes)

10:00 **3988** Tunable Young's Modulus in Carbon MEMS using Graphene-based Stiffeners – C. M. Washburn (Sandia National Laboratories), T. Lambert, J. Blecke, D. Davis, P. Finnegan, B. Hance, and J. Strong (Sandia National Labs)

10:20 **3989** Residue-Free Dry Etching of Polymer Sacrificial Layer for Microelectromechanical-System Device Fabrication – K. Takagahara, K. Ono, K. Kuwabara, T. Sakata (NTT Microsystem Integration Laboratories), H. Ishii (Toyohashi University of technology), Y. Sato, and Y. Jin (NTT Microsystem Integration Laboratories)

10:40 **3990** Low Cost UV Laser Direct Write Photolithography System for Rapid Prototyping of Microsystems – J. Waynelovich, A. Sepehri (Black Box Inc), B. Mehta (Black Box Inc.), S. Kassegne (MEMS Lab, San Diego State University), and A. Khosla (Simon Fraser University)

11:00 **3991** The Carbonized SU-8 Elctrospun Nano-Fiber for an Electrode in the Energy Storage Device – H. Kim, J. Woo, Y. Joo, Y. Chun, and C. Kim (Chung-Ang University)

11:20 **3992** Hydrodynamic Cell Enrichment in Double Spiral Microfluidic Channels – J. SUN, M. Li (National Center for Nanoscience and Technology), C. Liu (Institute of Mechanics, Chinese Academy of Sciences), G. Hu (Institute of Mechanics, CAS), and X. Jiang (National Center for Nanoscience and Technology)

11:40 **3993** Nanostructured Columnar Thin Films for Biological and Chemical Sensing Applications – P. Shah (Universty of Dayton), H. Knachel, A. Sarangan, and K. Hansen (University of Dayton)

Cantilevers and Microdevices – 13:30 – 18:00
Co-Chairs: Yu Cheng Lin and Hongseok Noh

13:30 **3994** Thermal Conductivity Engineering via Nano Patterning – B. Kim, I. El-Kady, and R. Olsson (Sandia National Laboratories)

14:00 **3995** Photothermal Cantilever Deflection Spectroscopy – T. Thundat, M. Bagheri, S. Kim, D. Lee (University of Alberta), and S. Jeon (POSTECH, S. Korea)

14:20 **3996** Development of Insulated Conductive AFM Probes for Molecular Electronics – Y. Wu, T. Akiyama (The Sensors Actuators and Microsystems Laboratory (SAMLAB), Ecole Polytechnique Fédérale de Lausanne (EPFL)), P. D. Van der Wal (EPFL), S. Gautsch (The Sensors Actuators and Microsystems Laboratory (SAMLAB), Ecole Polytechnique Fédérale de Lausanne (EPFL)), and N. De Rooij (EPFL Lausanne)

14:40 **3997** All Thin Film Micromachined Cantilever Using PZT/Terfenol-D Multilayer for High Sensitive Magnetoelectric Sensors – D. Lee (Kwangwoon University), S. Kim, Y. Yoo (Korea Institute of Science and Technology), J. Han (Chungnam National University), W. Jo (Cantis Co), and J. Lee (Kwangwoon University)

15:00 **3998** Characterization and Response of Metal Organic Frameworks Based Microcantilever Sensors for the Detection of Volatile Organic Compounds – I. Ellern (Georgia Institute of Technology)

15:20 **3999** Manipulation of Micro Condensed Matter by Direct Peeling Method by using Atomic Force Microscope Tip – A. Kawai (Nagaoka University of Technology)

15:40 Intermission (20 Minutes)

16:00 **4000** A MEMS-based Platform for Multi-physics Characterization of Ultra-thin Freestanding Films – A. Haque (Penn State University)

16:20 **4001** Effects of Adsorbate Surface Diffusion in Focused Electron-Beam-Induced-Deposition – A. Szkudlarek, M. Gabureac, and I. Utke (Empa Swiss Federal Laboratories for Materials Science and Technology)

16:40 **4002** Electroplating of Microstructured Nickel Phase Gratings for X-Ray Phase Contrast Tomography – M. Amberger, K. Bade, J. Meiser, D. Kunka, and J. Mohr (Karlsruhe Institute of Technology (KIT))

17:00 **4003** The Defect and Transport Properties of TlBr – S. R. Bishop (Kyushu University), G. Ciampi (Radiation Monitoring Devices), M. Kuhn, H. L. Tuller (Massachusetts Institute of Technology), W. Higgins, and K. Shah (Radiation Monitoring Devices)

17:20 **4004** Microfabricated Systems to Measure Marine Variables – S. Aravamudhan (North Carolina A&T State University)

17:40 **4005** Nanoporous Alumina as a Platform for 3-D Ceramic Microdevices – D. Routkevitch (InRedox LLC)

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

J4 – MEMS/NEMS Poster Session – 18:00 – 20:00
Co-Chairs: Peter Hesketh and Kalpathy Sundaram

- **4006** Radiophotoluminescence in Ag^{+}-Doped Phosphate Glass Dosimeter – T. Ohno, Y. Miyamoto (Kanazawa Institute of Technology), T. Kurobori (Kanazawa University), Y. Takei, K. Hirasawa (Kanazawa Institute of Technology), T. Yamamoto (Chiyoda Technol Co. Ltd.), and H. Nanto (Kanazawa Institute of Technology)
- **4007** Characterization and Process Optimization of UV Patternable Electrically Conducting SU-8 Silver Nanocomposite Polymer – A. Khatri, S. Kassegne (MEMS Lab, San Diego State University), and A. Khosla (Simon Fraser University)
- **4008** Effects of Added Uranium on the Triboluminescent Properties of EuD_4TEA – R. Fontenot (Alabama A&M University), W. Hollerman (University of Louisiana at Lafayette), K. Bhat, and M. Aggarwal (Alabama A&M University)
- **4009** Micropatternable, Electrically Conducting Polyaniline Photoresist Blends for MEMS Applications – C. Patel, S. Kassegne (MEMS Lab, San Diego State University), and A. Khosla (Simon Fraser University)
- **4010** Micro-Structures for Electrophoretic Display: Case Studies of the Response Speed/Time and Contrast Ratio Depending on Micro-Structures – J. Kim, C. Kim, and K. Suh (Electronics and Telecommunications Research Institute)

Thursday, October 11

08:00h..... ECS Electrochemical Energy Summit (E2S): "Grand Challenges for Energy Conversion and Large Scale Energy Storage"

09:30h..... Technical Session Coffee Break

18:30h..... Luau on the Lagoon (ticket required)

B1 Batteries and Energy Technology
Joint General Session – In Honor of James McBreen

Battery / Energy Technology

Coral 1, Mid-Pacific Conference Center, Hilton Hawaiian Village

Solid Oxide Fuel Cells II – 08:00 – 12:00
Co-Chairs: T. M. Gur and J. W. Stevenson

08:00	**462**	The Development of MT-HF-SOFCs Using New Fabrication Techniques – N. Droushiotis and G. H. Kelsall (Imperial College London)
08:20	**463**	Performance Enhancement of Solid Oxide Storage Battery – X. Zhao, N. Xu, X. Li, Y. Gong, and K. Huang (University of South Carolina)
08:40	**464**	Research and Development Activities of SOFC in Pohang, Korea – N. M. Sammes (POSTECH) and J. Chung (Pohang University of Science and Technology)
09:00	**465**	A Novel High Temperature Metal – Air Battery – W. W. Drenckhahn, M. Kuehne, T. Soller (Siemens AG), K. Litzinger, J. Shull, A. Iyengar (Siemens Energy Inc.), H. Greiner, H. Landes, A. Leonide, and C. Schuh (Siemens Corporate Technology)
09:20		Intermission (20 Minutes)
09:40	**466**	Preparation of Ashless Coal and Its Oxidation in a Coin Type Direct Carbon Fuel Cell – C. Lee and W. Kim (Hanbat National University)
10:00	**467**	Oxide Solid/Melt Composites as Ion Transport Membranes for Oxygen Separation from Air – V. V. Belousov (Russian Academy of Sciences)
10:20	**468**	Synthesis and Characterization of Functional Ceramic Nanopowders by Thermal Oxidation of Metal-Alginate Gels – Z. Wang, G. Kale, and M. Ghadiri (University of Leeds)
10:40	**469**	A Novel $BaCo_{0.4}Fe_{0.4}Zr_{0.2}O_{3-\delta}$ Cathode for Intermediate Temperature Proton-Conducting SOFC – M. Shang, J. Tong, and R. O'Hayre (Colorado School of Mines)
11:00	**470**	A Study of Anode -Supported Solid Oxide Fuel Cell with YSZ/GDC Bilayer Electrolyte Using Dry Press Process – H. Choi and S. Cha (Seoul National University)
11:20	**471**	Dynamic Response Analysis of a Molten Carbonate Fuel cell Using a Sinusoidal Impedance Approach – M. Yousef Ramandi, P. Berg, and I. Dincer (University of Ontario Institute of Technology)
11:40	**472**	In-Operando X-ray Diffraction of LSCF Cathodes on Anode-Supported Solid Oxide Fuel Cells – J. S. Hardy, J. W. Templeton, and J. W. Stevenson (Pacific Northwest National Laboratory)

Coral 2, Mid-Pacific Conference Center, Hilton Hawaiian Village

Modeling – 08:00 – 12:40
Co-Chairs: B. Liaw and V. Subramanian

08:00	**473**	3D Coupled Thermofluid-Thermomechanical Modelling and Experimental Validation of a Whole Solid Oxide Fuel Cell System – M. Peksen, A. Al-MASRI, L. Blum (Forschungszentrum Jülich), and D. Stolten (Forschungszentrum Jülich GmbH)
08:20	**474**	Reverse Breakdown in Bipolar Membranes – N. Craig (UC Berkeley) and J. Newman (University of California, Berkeley)
08:40	**475**	Electrochemical and Mechanical Reliability of Three Dimensionally Reconstructed Electrode Microstructures – D. Chung, D. Ely (Purdue University), P. Shearing (University College London), N. Brandon (Imperial College), S. Harris (General Motors), and E. García (Purdue University)
09:00	**476**	Application of the Molecular Interaction Volume Model (MIVM) to Ca-Based Liquid Alloys – S. Poizeau and D. R. Sadoway (Massachusetts Institute of Technology)
09:20	**477**	Electrochemical-Thermal Coupled Simulation of Lithium-Ion Secondary Batteries Using New Lumped Model – N. Baba, H. Yoshida, M. Nagaoka, C. Okuda, and S. Kawauchi (Toyota Central R&D Labs., Inc.)
09:40	**478**	Lattice Boltzmann Modeling of Advection-Diffusion Transport with Electrochemical Reactions in a Porous SOFC Anode Structure – H. Paradis and B. Sundén (Lund University)
10:00	**479**	Synthesize Battery Degradation Modes via a Diagnostic Model – M. Dubarry, C. Truchot, and B. Liaw (University of Hawaii at Manoa)
10:20	**480**	Modeling of Heat Transfer in a Fluidized Bed Carbon Fuel Cell – G. J. Armstrong, B. R. Alexander, R. E. Mitchell, and T. M. Gür (Stanford University)
10:40	**481**	Iinfluences of Cells Assembling on Energetic Models and Simulations of Li-Ion Packs for Electric Vehicles Applications – K. Mamadou, T. Delaplagne, S. Hing, and F. Karoui (CEA-INES)
11:00	**482**	The Impact of Diffusion-Induced Convection on Transference Number Measurements – J. Liu and C. W. Monroe (University of Michigan)
11:20	**483**	A Model for Energy Storage Systems in the Frequency Domain – E. M. Krieger and C. B. Arnold (Princeton University)
11:40	**484**	Study of Energy Storage Materials Using Multi-Length Scale 3D Electron Microscopy – A. K. Shukla, P. Ercius, N. Krins, A. Gautam, S. Wu, J. Cabana, G. Chen, T. J. Richardson, V. Srinivasan, and U. Dahmen (Lawrence Berkeley National Laboratory)
12:00	**485**	Modeling of Volume Change Behavior of Porous Electrodes – K. Kanneganti, J. Moraveji, and J. Weidner (University of South Carolina)

12:20 **486** Towards Onboard Battery Management Systems Using Physics-Based Efficient Reformulated Models – B. Suthar, V. Ramadesigan, P. Northrop (Washington University), W. Sung (Hyundai Motor Company), and V. Subramanian (Washington University)

B2 Electrochemical Capacitors

Battery / Physical and Analytical Electrochemistry
South Pacific 4, Mid-Pacific Conference Center, Hilton Hawaiian Village

Devices and Applications III – 08:00 – 09:40
Co-Chairs: E. Lust and J. M. Ko

08:00 **594** Advances in Solid Electrochemical Capacitors – K. Lian, H. Gao, H. Wu, K. Hu, and S. Ketabi (University of Toronto)

08:40 **595** Planar Electrochemical Capacitor with Gelled Electrolyte – J. R. Miller (JME Inc.), R. A. Outlaw, M. Cai (College of William and Mary), and S. M. Butler (JME Inc.)

09:00 **596** Soft Carbon as Anode Material in Lithium Ion Capacitors with a Propylene Carbonate Based Electrolyte – M. Schroeder (Westfälische Wilhelms University of Muenster), M. Winter, S. Passerini (University of Münster), and A. Balducci (Westfälische Wilhelms University of Muenster)

09:20 **597** Development of Solid-State Photo-Supercapacitor by Coupling Dye-Sensitized Solar Cell Utilizing Conducting- Polymer Charge Relay with Proton-Conducting Membrane Based Electrochemical Capacitor – P. J. Kulesza, M. Skunik, K. Grzejszczyk (University of Warsaw), N. Vlachopoulos, L. Yang, L. Häggman, and A. Hagfeldt (Uppsala University)

Devices and Applications IV – 10:00 – 12:00
Co-Chairs: F. Beguin and K. Tamamitsu

10:00 **598** Specific Performance of Electrical Double Layer Capacitors Based on Different Separator Materials in Room Temperature Ionic Liquid – K. Tõnurist, T. Thomberg, A. Jänes, and E. Lust (University of Tartu)

10:40 **599** Hybrid Supercapacitor Using Mesoporous Carbon and Ti-Based Material – Y. Xia, H. Liu, G. Zhu, and Y. Wang (Fudan University)

11:00 **600** Surface Characterization of Supercapacitor Electrodes after Long-Lasting Constant Current Tests – A. Jänes, R. Kanarbik, J. Eskusson, and E. Lust (University of Tartu)

11:20 **601** Ultrahigh Rate Solid-State Supercapacitors with Graphene Additives – Y. Chen, K. Chiu (Feng Chia University), H. Lin (Nation Taiwan University), and C. Tsai (Taiwan Textile Research Institute)

11:40 **602** Electrochemical Flow Capacitors: A New Concept for High-Power Scalable Energy Storage – C. R. Dennison, V. Presser, J. Campos, K. W. Knehr, E. C. Kumbur, and Y. Gogotsi (Drexel University)

General Session – 14:00 – 16:40
Co-Chairs: C. C. Hu and T. Brousse

14:00 **603** Nanoscale Characterization of CDC Supercapacitors by *In Situ* Scanning Probe Microscopy Methods – T. M. Arruda (Oak Ridge National Laboratory), M. Heon, V. Presser, Y. Gogotsi (Drexel University), and N. Balke (Oak Ridge National Laboratory)

14:20 **604** Pseudocapacitance of MnO_2 Originates from Reversible Insertion/Desertion of Li-Ion Studied Using *In Situ* XAS in Novel Ionic Liquid – M. Deng (National Synchrotron Radiation Research Center), J. Chang (National Central University), C. Wang (National Hsinchu University of Education), J. Chen, and K. Lu (National Synchrotron Radiation Research Center)

14:40 **605** Measuring Ion Transport in Energy Storage Devices Using *In Situ* Time-Resolved Infrared Spectroscopy – F. W. Richey, B. Dyatkin, Y. Gogotsi, and Y. A. Elabd (Drexel University)

15:00 **606** ASAXS Measurements as a Powerful Technique for Structural Investigation of MnO_2-Carbon Hybrid Supercapacitor Electrodes – C. Weber, V. Lorrmann, G. Reichenauer, and J. Pflaum (Bavarian Center for Applied Energy Research)

15:20 **607** *In Situ* Characterization of Transition Metal Nitride Supercapacitor Electrodes – P. Pande, A. E. Sleightholme, P. Rasmussen, A. Deb, J. Penner-Hanh, and L. T. Thompson (University of Michigan)

15:40 **608** Thermodynamics in Porous Electrodes: A Monte Carlo Simulation Study – K. Kiyohara and K. Asaka (National Institute of Advanced Industrial Science and Technology)

16:00 **609** Capacitance and Electric Double Layer Structure in Ionic Liquid-Based Supercapacitors with Nanopatterned and Nanostructured Electrodes – D. Bedrov, L. Xing, and J. Vatamanu (The University of Utah)

16:20 **610** Interaction Nature of Molecular Oxides with Keggin Structure with Carbon Matrices to Improve Capacitance and Cycling Performance in Supercapcitor Cells – A. CUENTAS-GALLEGOS (Universidad Nacional Autónoma de México), T. Brousse (University of Nantes), H. Mosqueda (Universidad Autónoma de Nuevo Leon), C. Martin (University of Nantes), and D. Baeza Rostro (Universidad Nacional Autónoma de México)

ECS Electrochemical Energy Summit (E2S)

B3 Grand Challenges for Energy Conversion and Large Scale Energy Storage

High Temperature Materials / Battery / Energy Technology / Industrial Electrochemistry and Electrochemical Engineering
311, Level 3, Hawaii Convention Center

Energy Storage Policies, Demonstration Projects, and Global Priorities – 08:00 – 09:55
Co-Chair: Bor Yann Liaw

08:00 ECS President, Fernando Garzon – Introduction of Symposium and Speakers (5 Minutes)

08:05 Hawaii's Energy Landscape -Honorable Lieutenant Governor of Hawaii, Brian Schatz (45 Minutes)

08:50 Session Chair, Bor Yann Liaw – Introduction of Keynote Speaker (5 Minutes)

08:55 **611** Grid Scale Energy Storage; Applications, Technology Demonstrations, and a US Perspective – Imre Gyuk (U.S. Dept. of Energy) (45 Minutes)

09:40 Intermission (15 Minutes)

Morning Panel Discussion – 09:55 – 12:00
Co-Chair: Robert Savinell

09:55 Moderator, Robert Savinell – Panel Introduction (5 Minutes)

10:00 **612** The Application and Development of Large-scale Energy Storage Technology in China – Xiaokang Lai (China Electric Power Research Institute) (15 Minutes)

10:15 **613** National Energy Technology Developing Strategy in Korea – Kee-Suk Nahm (Chonbuk National University) and Seung-Young Chung (Korea Institute of Energy Technology Evaluation and Planning) (15 Minutes)

10:30 Panelist, Kei Hosoi – New Energy & Industrial Technology Development Org. (NEDO) (15 Minutes)

10:45 Panelist, Byron Washom – University of California, San Diego (15 Minutes)

11:00 Panelist, Mark Glick – Hawaii State Energy Office (15 Minutes)

11:15 Question & Answer (45 Minutes)

Energy Storage Development and Commercialization Challenges – 14:00 – 15:50
Co-Chair: Xiao-Dong Zhou

14:00 Session Chair, Xiao-Dong Zhou – Keynote Speaker Introductions (5 Minutes)

14:05 **614** Challenges in Commercialization of Energy Storage Systems within the Electric Enterprise – Dan Rastler (Electric Power Research Institute) (45 Minutes)

14:50 **615** Issues and Challenges for Implementation of Large-Scale Energy Storage in Australia – Maria Skyllas-Kazacos (University of New South Wales) (45 Minutes)

15:35 Intermission (15 Minutes)

Afternoon Panel Discussion – 15:50 – 17:55
Co-Chair: Trung Van Nguyen

15:50 Moderator, Trung Van Nguyen – University of Kansas (5 Minutes)

15:55 Panelist, Jun Liu – Pacific Northwest National Laboratory (15 Minutes)

16:10 **616** Status and Development of Energy Storage System In Korea – June-Soo Lee (SK Innovation) (15 Minutes)

16:25 Panelist, Scott Backhaus – Los Alamos National Laboratory (15 Minutes)

16:40 **617** Realities of Economic Screening for Energy Conversion and Storage Technologies – Eric McFarland (University of California, Santa Barbara) (15 Minutes)

16:55 **618** Energy Security with Clean and Green Energy – Georges Kailiwai (United States Pacific Command) (15 Minutes)

17:10 Panelist, Colton Ching - Hawaiian Electric Co. (15 Minutes)

17:25 Question & Answer (30 Minutes)

B4 Intercalation Compounds for Rechargeable Batteries

Battery

South Pacific 2, Mid-Pacific Conference Center, Hilton Hawaiian Village

High Voltage Materials – 08:20 – 12:20
Co-Chairs: Robert Huggins and Nancy Dudney

08:20 **698** Stability and Performance of High-Voltage Cathodes with Pure and Doped Lipon Coatings – Y. Kim, N. J. Dudney, M. Chi, G. M. Veith, S. K. Martha, and J. Nanda (Oak Ridge National Laboratory)

09:00 **699** Controlled Synthesis of High Tap Density $LiMn_{1.5}Ni_{0.5}O_4$ with Tunable Shapes – A. Cao and A. Manthiram (The University of Texas at Austin)

09:20 **700** Impact of $LiMn_{1.5}Ni_{0.5}O_4$ Crystal Surface Facets – G. Chen, B. Hai, A. K. Shukla, and H. Duncan (Lawrence Berkeley National Laboratory)

09:40 Intermission (20 Minutes)

10:00 **701** Unique Electrochemical Cycling Behaviour of Structurally Integrated Layered-Spinel Lithium Nickel Manganese Oxides – A. W. Rowe, C. L. White, and J. Dahn (Dalhousie University)

10:20 **702** Fabrication of Hollow Wires of $LiNi_{0.5}Mn_{1.5}O_4$ and 0.5 Li_2MnO_3-0.5 $LiNi_{1/3}Co_{1/3}Mn_{1/3}O_2$ by the Electrospinning Method – E. Hosono, T. Saito, Y. Mizuno, M. Okubo (National Institute of Advanced Industrial Science and Technology), D. Nishio-Hamane (The University of Tokyo), T. Kudo, and H. Zhou (National Institute of Advanced Industrial Science and Technology)

10:40 **703** Microstructural Comparison of $LiNi_{0.5}Mn_{1.5}O_4$ After 1000 Cycles – X. Song, Y. Fu, and V. Battaglia (Lawrence Berkeley National Laboratory)

11:00 **704** Electrochemistry Driven Structural Transition in High Voltage Lithium-Rich Composite Cathodes – S. K. Martha, J. Nanda, W. Zhou, J. Idrobo, and N. J. Dudney (Oak Ridge National Laboratory)

11:20 **705** 5-V System $LiMn_{1.5-x}Ni_{0.5-Y}M_{x+y}O_4$ for High-Energy Lithium Batteries: Post-Annealing and Coating Effect – D. Liu, A. Guerfi, P. Hovington, J. Trottier, M. Dontigny, J. Hamel-Paquet, M. Trudeau, A. Vijh (Institut de Recherche d'Hydro-Québec), A. Mauger (Université Pierre et Marie Curie), C. Julien (Université Pierre et Marie Curie Paris-6), and K. Zaghib (Institut de Recherche d'Hydro-Québec)

11:40 **706** Effect of the Crystal Chemistry of $LiNi_{1/2}Mn_{3/2}O_4$ Spinels On Its Electrochemical Properties – C. Kim (Lawrence Berkeley National Laboratory), M. Leskes, E. Castillo, C. P. Grey (University of Cambridge), and J. Cabana (Lawrence Berkeley National Laboratory)

12:00 **707** Do You Really Want an Unsafe Battery – R. A. Huggins (Stanford University)

Phosphates and Vanadium Oxides – 14:00 – 18:00
Co-Chairs: Marnix Wagemaker and Karim Zaghib

14:00 **708** Reaction Mechanism of Li_xFePO_4 Analyzed by Potential-Step Chronoamperometry – G. Oyama, Y. Yamada, S. Nishimura, and A. Yamada (The University of Tokyo)

14:20 **709** Iron substitution to increase energy density of lithiated phosphates – L. Daniel, S. Martinet, T. Gutel, C. Bourbon (CEA-LITEN), E. Radvanyi (CEA/LITEN), M. Amuntencei, and S. Patoux (CEA-LITEN)

14:40 **710** Synthesis and Morphology Control of Novel Nanostructured $LiFePO_4$ Cathode Materials for Li-Ion Battery – O. Ayyad and P. Gomez-Romero (CIN2-CSIC)

15:00 **711** Electrochemical Kinetics Studies on $LiMn_{1-x}Fe_xPO_4$ during Lithium Insertion and Extraction – K. Hoshina, H. Inagaki, N. Takami (Toshiba Corporation), H. Munakata, and K. Kanamura (Tokyo Metropolitan University)

15:20 **712** Chemically Partly Delithiated Lithium Manganese Phospho Olivines: Investigations of Lattice and Atomic Structure and Electrochemistry – M. Köntje (Zentrum für Sonnenenergie und Wasserstoff-Forschung BW (ZSW)), G. Greco (University of Rome), P. Axmann (Zentrum für Sonnenenergie und Wasserstoff-Forschung BW (ZSW)), and M. Wohlfahrt-Mehrens (ZSW-Center for Solar Energy and Hydrogen Research)

15:40 Intermission (20 Minutes)

16:00 **713** Tailored Electrode Morphologies for Insertion Electrodes – M. Wagemaker, D. Singh (Delft University of Technology), A. George, J. Ten Elshof (University of Twente), and F. Mulder (Delft University of Technology)

16:40 **714** Measuring Electrode Tortuosity and Optimizing Electrode Performance – R. D. Deshpande (Lawrence Berkeley National Laboratory), S. Harris (General Motors Global R&D Center), and V. Battaglia (Lawrence Berkeley National Laboratory)

17:00 **715** Vitreous Materials as Electrodes for Lithium Batteries – G. Delaizir (CEMES/CNRS), V. Seznec (LRCS/CNRS), P. Rozier, P. Lecante (CEMES/CNRS), C. Surcin (LRCS/CNRS), P. Salles, and M. Dollé (CEMES/CNRS)

17:20 **716** Surface Coating of Vanadium Pentoxide Nanowires for Improved Cathodic Stability – F. Gittleson, J. Hwang, R. C. Sekol, and A. D. Taylor (Yale University)

17:40 **717** Structural and Electrochemical Characterization of Thermally Treated Vanadium Oxide Nanotubes for Li-Ion Batteries – D. McNulty (University of Limerick), D. Buckley (Materials & Surface Science Institute, University of Limerick), and C. O'Dwyer (University of Limerick)

B6 Lithium-Ion Batteries

Battery / Energy Technology
Coral 3, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Characterization Techniques I – 08:00 – 09:40
Co-Chairs: Nancy Dudney and Kuniaki Tatsumi

08:00 **988** Ac Impedance Analysis of Low Frequency Region for Commercial Lithium Ion Battery under Temperature Control – D. Mukoyama, T. Yokoshima, H. Nara, T. Momma, and T. Osaka (Waseda University)

08:20 **989** AC Impedance Study of the Active Materials Reactions in a Three Electrode Lithium-Ion Secondary Cell – O. S. Mendoza, Y. Nishikawa, H. Ishikawa (Nagaoka University of Technology), Y. Sone (Japan Aerospace Exploration Agency), and M. Umeda (Nagaoka University of Technology)

08:40 **990** Direct Determination of the Thickness and Composition of Electrode-Electrolyte Interface during Electrochemical Reaction – G. M. Veith, J. Browning, L. Baggetto, W. E. Tenhaeff, J. Keum, and N. J. Dudney (Oak Ridge National Laboratory)

09:00 **991** Chronopotentiometric Investigation of Anode Deterioration in Lithium-Ion Secondary Cell Incorporating Reference Electrode – O. S. Mendoza, H. Ishikawa, Y. Nishikawa, Y. Maruyama (Nagaoka University of Technology), Y. Sone (Japan Aerospace Exploration Agency), and M. Umeda (Nagaoka University of Technology)

09:20 **992** *In Situ* Detection of Lithium Plating on Graphite Electrodes Using Electrochemical Microcalorimetry – L. E. Downie (Dalhousie University), V. L. Chevrier (3M Corporate Research Laboratory), J. Dahn (Dalhousie University), and L. J. Krause (3M Corporate Research Laboratory)

Coral 4, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Anodes III (Lithium Titanate-Based Systems) – 08:00 – 09:40
Co-Chairs: Minoru Inaba and Kevin Eberman

08:00 **993** A Novel Green Approach to Synthesis of $Li_4Ti_5O_{12}$ Nanopartculate Anode material – H. Chiu and G. P. Demopoulos (McGill University)

08:20 **994** Limitation of Rate Capability of $Li_4Ti_5O_{12}$ Single-Particle – K. Dokko, K. Yoshida, R. Nozawa, and M. Watanabe (Yokohama National University)

08:40 **995** Carbon Free $Li_4Ti_5O_{12}$ Electrode with Exceptionally High Electrode Capacity and Outstanding Rate Capability – M. Song, A. Benayad, Y. Choi, J. Choi, and K. Park (Samsung Advanced Institute of Technology)

09:00 **996** Microwave-Induced Solid-State Synthesis of $Li_4Ti_5O_{12}$ Nanocrystallites with Enhanced Lithium-Storage Properties – Y. Qiao, X. Hu, Y. Liu, and Y. Huang (Huazhong University of Science and Technology)

09:20 **997** Relaxation Behavior of $Li_{4/3}Ti_{5/3}O_4$ Electrode for Li-ion Secondary Battery – S. Park, S. Uraki, and T. Yao (Kyoto University)

Coral 5, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Safety Aspects of Li-Ion Cells – 08:00 – 09:40
Co-Chairs: Judith Jeevarajan and Mani Nagasubramanian

08:00 **998** Thermal and Electrical Characterization of Nonflammable Electrolytes* in 18650 Full Cells – G. Nagasubramanian (Sandia National Labs), K. Fenton, and C. Orendorff (Sandia National Laboratories)

08:20 **999** Safety and Long-Term Performance of Lithium-Ion Cells in a Pouch Format – J. A. Jeevarajan (NASA)

08:40 **1000** Electrochemical-Calorimetric Studies on Safety Fundamentals of Lithium Ion Battery Pouch Cells – E. Schuster, C. Ziebert, and H. J. Seifert (Karlsruhe Institute of Technology)

09:00 **1001** Thermal and Overcharge Abuse Analysis of a Redox Shuttle for Overcharge Protection of $LiFePO_4$ – J. H. Lamb, C. Orendorff (Sandia National Laboratories), K. Amine, G. Krumdick, Z. Zhang, L. Zhang (Argonne National Laboratory), and A. Gozdz (A123 Systems)

09:20 **1002** Materials Development for Improved Lithium-Ion Battery Safety – K. Fenton (Sandia National Laboratories), G. Nagasubramanian (Sandia National Labs), M. Brumbach, and C. Orendorff (Sandia National Laboratories)

Coral 3, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Characterization Techniques I – 10:00 – 12:20
Co-Chairs: Kuniaki Tatsumi and Nancy Dudney

10:00 **1003** Process Optimisation by the Application of Cylindrical Cells (18650) and Pouch Cells with Reference Electrodes – M. D. Wilka, A. Hoffmann, R. Stern (Center for Solar Energy and Hydrogen Research), and M. Wohlfahrt-Mehrens (ZSW-Center for Solar Energy and Hydrogen Research)

10:20 **1004** Impedance Analysis of Anode and Cathode Separated by Using Micro Reference Electrode on Li-ion Battery – H. Nara, T. Yokoshima, D. Mukoyama, T. Hirabaru, T. Momma, and T. Osaka (Waseda University)

10:40 **1005** Reference Electrodes for Impedance Measurements in Lithium Ion Cells – J. Illig, M. Ender (Karlsruhe Institute of Technology (KIT)), A. Weber (Karlsruher Institut für Technologie), and E. Ivers-Tiffée (Karlsruhe Institute of Technology (KIT))

11:00 **1006** Studies of SDXTM on the Boundary Resistance between Aluminum Current Collectors and Cathode Active Material Layers – Y. Arai, M. Kunisawa, T. Yamaguchi, H. Yokouchi, A. Matsuo, and M. Ohmori (Showa Denko K.K.)

11:20 **1007** Application of Adiabatic and Isothermal Calorimetry in Studying Battery Material Properties and Small Cells – P. Ralbovsky (NETZSCH Instruments North America LLC)

11:40 **1008** Understanding the Performance of Rechargeable Lithium-Ion Batteries for HEV and PHEV Using a New Isothermal Calorimeter – S. Chippett (NETZSCH Instruments North America LLC), J. Ireland, M. Keyser (National Renewable Energy Laboratory), J. Mauger (NETZSCH Instruments North America LLC), A. Pesaran (National Renewable Energy Laboratory), P. Ralbovsky, and G. Widawski (NETZSCH Instruments North America LLC)

12:00 **1009** Study of Generative Gas Species from Lithium-Ion Battery Component under Abuse Conditions – S. Koike, M. Shikano, H. Sakaebe, and H. Kobayashi (National Institute of Advanced Industrial Science and Technology (AIST))

Coral 4, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Anodes IV (Carbon Based Systems) – 10:00 – 12:20
Co-Chairs: Kevin Eberman and Minoru Inaba

10:00 **1010** Prelithiated Graphite Anode SEI Formation by Stabilized Lithium Metal Powder in Li-Ion Batteries – L. Wang (Lawrence Berkeley National Lab), V. Battaglia, and G. Liu (Lawrence Berkeley National Laboratory)

10:20 **1011** Graphene Nanosheets as Negative Electrode for Lithium Ion Battery – A. N. Gildea, S. Vijapur, and G. G. Botte (Ohio University)

10:40 **1012** The Rate of Active Lithium Loss from a Soft Carbon Negative Electrode as a Function of Temperature, Time and Electrode Potential – N. N. Sinha, T. H. Marks, H. M. Dahn, A. J. Smith, J. Burns, D. J. Coyle, J. J. Dahn, and J. Dahn (Dalhousie University)

11:00 **1013** Meta-stable Mesographite Anodes – J. Fang (ITRI), A. Kelarakis (Cornell University), W. Wu, H. Huang, Y. Lin (Industrial Technology Research Institute), E. Giannelis (Cornell University), and L. Tsai (Industrial Technology Research Institute)

11:20 **1014** High Performance Lithium Ion Battery Using Graphene Net Electrode – H. Todoriki, T. Ikenuma, Y. Saito, M. Yukawa, R. Yatabe, M. Yamakaji (Semiconductor Energy Laboratory Co., Ltd), J. Momo, T. Moriwaka, K. Nanba, M. Takahashi, and S. Yamazaki (Semiconductor Energy Laboratory Co., Ltd.)

11:40 **1015** Theoretical Study of Hybrid Bundle of (5,0) Carbon Nanotube on Li-Ion Battery Anode – Y. Wen, B. Shan, X. Liu, X. Duan, and R. Chen (Huazhong University of Science and Technology)

12:00 **1016** Effect of Anode Binders on Low-Temperature Performance of Li-Ion Batteries – J. Eom, L. Cao, and C. Wang (The Pennsylvania State University)

Coral 5, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Separators and Safety Aspects of Li-Ion Cells – 10:00 – 12:00
Co-Chairs: Mani Nagasubramanian and Judith Jeevarajan

10:00 **1017** Development of Heat Resistant Lithium-ion Batteries and Safety Evaluation – M. Morishita (National Institute of Advanced Industrial Science and Technology (AIST)), T. Mukai (National Institute of Advanced Industry of Science and Technology), T. Sakamoto, T. Miyuki (National Institute of Advanced Industrial Science and Technology), and T. Sakai (National Institute of Advanced Industrial Science and Technology (AIST))

10:20 **1018** Composition Ratio-Dependent Structural Evolution of SiO_2/Poly(Vinylidene Fluoride Hexafluoropropylene)-Coated Poly(Ethylene Terephthalate) Nonwoven Composite Separators for Lithium-Ion Batteries – H. Jeong, E. Choi, and S. Lee (Kangwon National University)

10:40 **1019** Transport Properties of Strained Lithium-Ion Battery Separators – J. Cannarella and C. B. Arnold (Princeton University)

11:00 **1020** Polymer Particle Layer Coated on Separator to Improve Lithium-Ion Battery Performance – T. Kaneda, H. Takamatsu, T. Murase, J. Akiike, N. Yasuda, T. Herai, T. Ooishi, and M. Tada (Zeon Corporation)

11:20 **1021** Development of Water-Borne Nanoparticle Ceramic Slurry to Improve Lithium-Ion Batteries Performance – Y. Toyoda, H. Takamatsu, T. Murase, J. Akiike, N. Yasuda, T. Kaneda, T. Herai, T. Ooishi, and M. Tada (Zeon Corporation)

11:40 **1022** Layer-by-Layer Deposition for Improved Performance of Separators for Lithium Ion Batteries – B. El-Zahab, N. Baram, D. Liu, W. Carter, Y. Chiang (MIT), and P. T. Hammond (Massachusetts Institute of Technology)

Coral 3, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Characterization Techniques II – 14:00 – 15:40
Co-Chairs: Robert Kostecki and Fikile Brushett

14:00 **1023** Why Do We Need Polarization and Impedance Measurements of Lithium Insertion Electrodes? – T. Ohzuku, F. Ohgaki, and K. Ariyoshi (Osaka City University)

14:20 **1024** A Method to Measure the Rate of Side Reactions at the Positive and Negative Electrodes in LTO/LiNiMO Cells for the Second-Generation 12 V Lead-Free Batteries – K. Ariyoshi, H. Okada, H. Nishi, and T. Ohzuku (Osaka City University)

14:40 **1025** *In Situ* Fluorescence Spectroscopy of Interfacial Processes in High-Energy Li-ion Batteries – N. S. Norberg, S. F. Lux, I. T. Lucas (Lawrence Berkeley National Laboratory), J. S. Syzdek (Lawerence Berkeley National Laboratory), and R. M. Kostecki (Lawrence Berkeley National Laboratory)

15:00 **1026** Neutron Powder Diffraction Studies of Li-Ion Battery Materials – S. Lee (Korea Atomic Energy Institute)

15:20 **1027** Reducing Coulombic Efficiency Noise in High-Precision Coulometry – T. M. Bond, J. Burns, A. Smith, and J. Dahn (Dalhousie University)

Coral 4, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Anodes V (General) – 14:00 – 15:40
Co-Chairs: Larry Curtiss and Yi Cui

14:00 **1028** Lithium Titanate Prepared from Mesoporous TiO_2 Fiber as Anode Material for Lithium Ion Batteries – S. Ting (The University of Hong Kong), Z. Yang (Nanjing University of Technology), C. V. Li (The University of Hong Kong), W. Zhuang, W. Yao, X. Lu (Nanjing University of Technology), and K. Chan (The University of Hong Kong)

14:20 **1029** Nanosized Mixed Transition Metal Oxides as Superior Anode Material for Li-Ion Batteries – D. Bresser (University of Muenster), E. Paillard, F. Mueller (University of Muenster, Institute of Physical Chemistry, MEET), M. Winter (Westfälische Wilhelms-University Münster), and S. Passerini (University of Muenster, Institute of Physical Chemistry, MEET)

14:40 **1030** Multi-Component effects on the Crystal Structures and Electrochemical Behaviors of Spinel-Structured M_3O_4 (M=Fe, Mn, Co) Anodes in Lithium-Ion Batteries – H. Kim, D. Seo, H. Kim, I. Park, J. Hong, K. Park, and K. Kang (Seoul National University)

15:00 **1031** Hollow Single-Crystalline Mn_3O_4 Nanotubes as a High Capacity Anode Material for Lithium-Ion Batteries – G. Xu, Y. Xu (Xiamen University), H. Sun (Hong University of Science and Technology), X. Peng, J. Li (Xiamen University), S. Yang (Hong Kong University of Science and Technology), L. Huang, and S. Sun (Xiamen University)

15:20 **1032** Porous MnO@C Nanotubes and Their High Lithium-Storage Performances – W. Chen, L. Qie, L. Yuan, W. Zhang, and Y. Huang (Huazhong University of Science and Technology)

Coral 5, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Life Studies I – 14:00 – 15:40
Co-Chairs: Matthieu Dubbarry and Keven Gerring

14:00 **1033** Battery Durability Evaluation Using Load Data of Commercially Available Electric Vehicle – K. Koshika and T. Niikuni (National Traffic Safety and Environment Laboratory)

14:20 **1034** Cycle Life Estimation of Lithium-ion Battery Using for PV Power Leveling Operation – Y. Mita, Y. Kobayashi, and H. Miyashiro (Central Research Institute of Electric Power Industry)

14:40 **1035** Lifetime Evaluation and Modelling of Li-Ion Modules and Cells – P. J. Vie and R. Fotedar (Institute for Energy Technology)

15:00 **1036** Constant-Potential Aging of Commercial Li-Ion Batteries – P. Albertus, J. Christensen (Robert Bosch Research and Technology Center), V. Peng (University of California, Berkeley), M. Hess, R. Klein (Robert Bosch Research and Technology Center), and J. Newman (University of California, Berkeley)

15:20 **1037** Correlating Accelerated Tests to Long-term Data for Li-Ion Batteries – G. Jain (Medtronic Inc), H. Ye (Medtronic Inc.), P. A. Tamirisa, P. Gomadam, E. Scott, and C. Schmidt (Medtronic Inc)

Coral 3, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Characterization Techniques II – 16:00 – 17:40
Co-Chairs: Fikile Brushett and Robert Kostecki

16:00 **1038** *In Situ* Reference Electrode Testing of Lithium Ion Cells – J. R. Belt, C. Ho, and R. Bewley (Idaho National Laboratory)

16:20 **1039** Insight into Thermal Instability of Charged Cathode Materials for Lithium-Ion Batteries: Combined *In Situ* Synchrotron X-ray and Mass Spectroscopy Study – S. Bak (Yonsei University), K. Nam, E. Hu, X. Yu (Brookhaven National Laboratory), K. Chung (Korea Institute of Science and Technology), S. Cho, F. Bonhomme (Johnson Controls Advanced Power Solution), K. Kim (Yonsei University), and X. Yang (Brookhaven National Laboratory)

16:40 **1040** Effect of Low Cell Voltages on the Performance of MCMB Anode and $LiNi_{0.8}Co_{0.2}O_2$ Cathode – R. V. Bugga (California Institute of Technology), M. C. Smart, F. C. Krause, C. Hwang (Calfornia Institute of Technology), P. Degrosse Jr. (California Institute of Technology), S. Santee, and F. Puglia (Yardney Technical Products)

17:00 **1041** Impedance Diagnostic for Overcharged Lithium-Ion Batteries – C. T. Love, K. Swider-Lyons (U.S. Naval Research Laboratory), and C. J. Patridge (NRC/NRL Cooperative Research Associate)

17:20 **1042** Zero-Volt SPEC Cells to Measure the Rates of Side Reactions on the Positive and Negative Electrodes for Long-Life Lithium-Ion Batteries – K. Ariyoshi, H. Nishi, and T. Ohzuku (Osaka City University)

Coral 4, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Anodes V (General) – 16:00 – 18:00
Co-Chairs: Yi Cui and Larry Curtiss

16:00 **1043** Study on the Electrochemical Properties of SnO_2-Polypyrrole Hybrid Nanowires for Li-Ion Batteries Anode – D. Nam, S. Lim, M. Kim, and H. Kwon (Korea Advanced Institute of Science and Technology)

16:20 **1044** High Capacity Li-Ion Batteries Based on Hetero-Nanostructured SnO_2-Sn/CMK-3 Materials – F. M. Hassan, A. Yu, H. Park, Z. Chen (University of Waterloo), X. Xiao (General Motors Global Research & Development Center), and Z. Chen (University of Waterloo)

16:40 **1045** Visualisation of Li Diffusion Pathways in Lithium Lanthanum Titanates – E. E. Jay, I. Seymour, M. Rushton, R. Grimes (Imperial College), and J. A. Kilner (Imperial College London)

17:00 **1046** Effect of Pattern Shape of Sn Anode on Charge-Discharge Performance for Lithium Secondary Batteries – T. Yokoshima, H. Nara, T. Momma, and T. Osaka (Waseda University)

17:20 **1047** Poly(ethylene oxide)-Coated Graphite as an Anode Material for Lithium Ion Batteries – S. Park and G. Liu (Lawrence Berkeley National Laboratory)

17:40 **1048** PeakForce Tapping AFM Outfitted in a Glove-box for *In Situ* Real-time Visualization of SEI formation on Lithium Battery Anodes – C. Li (Bruker Corporation)

Coral 5, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Cell Design Aspects II – 16:00 – 18:00
Co-Chairs: Keven Gerring and Matthieu Dubbarry

16:00 **1049** Electrochemical-Thermal Coupled Modeling for Battery Pack Design – G. Luo, C. Shaffer, and C. Wang (EC Power)

16:20 **1050** Design Optimization of a Battery Pack for Plug-in Hybrid Vehicle Applications – N. Xue, W. Du (University of Michigan), T. Greszler (General Motors), J. Martins (University of Michigan), and W. Shyy (Hong Kong University of Science and Technology)

16:40 **1051** Nanowire Energy Storage Device: Fabrication and Electrochemical Studies – S. Gowda, A. Reddy, and P. Ajayan (Rice University)

17:00 **1052** Advanced Materials Processing for Lithium Ion Battery Applications – D. L. Wood, J. Li, D. Mohanty, S. Kalnaus, B. Armstrong, and C. Daniel (Oak Ridge National Laboratory)

17:20 **1053** Lithium Battery Internal Temperature Sensor and SoC Monitor – R. Srinivasan, B. G. Carkhuff, and A. Q. Rogers (Johns Hopkins University Applied Physics Lab)

17:40 **1054** Dual-Scale Porosity Distribution for Maximizing Power At High Energy Densities – C. K. Erdonmez (Brookhaven National Laboratory), C. Bae (Massachusetts Institute of Technology), Y. Chen, J. Wang (Brookhaven National Laboratory), J. Halloran (University of Michigan), and Y. Chiang (Massachusetts Institute of Technology)

B7 Metal-Air Batteries

Battery / Energy Technology / Fullerenes, Nanotubes, and Carbon Nanostructures
Nautilus 1, Mid-Pacific Conference Center, Hilton Hawaiian Village

Interactions – 08:00 – 12:00
Co-Chairs: V. Thangadurai and Jianming Zheng

08:00 **1171** (Invited) Critical Components of Rechargeable Li-Air Batteries – J. Zhang, W. Xu, J. Xiao, E. Nasybulin, Y. Shao, D. Mei, and J. Zhang (Pacific Northwest National Laboratory)

08:40 **1172** A High Energy Density Rechargeable Zinc-Air Battery for Automotive Application – G. Toussaint, P. Stevens (Electricité de France), R. Rouget, and F. Fourgeot (SCPS)

09:00 **1173** Examining the Interplay of Electrolyte, Electrocatalyst, and Cathode Architecture En Route to High-Capacity, Rechargeable Li-O_2 Batteries – C. N. Chervin, J. W. Long, M. J. Wattendorf, N. W. Kucko, and D. Rolison (U.S. Naval Research Laboratory)

09:20 **1174** Air Dehydration Membranes for Ambient Operation of Non-Aqueous Lithium-Air Batteries – J. Zhang, W. Xu, J. Xiao, X. Chen, E. Nasybulin, and J. Zhang (Pacific Northwest National Laboratory)

09:40 Intermission (20 Minutes)

10:00 **1175** (Invited) Understanding the Cathode Processes in the Non-Aqueous Li-O_2 Battery – O. Fontaine, Y. Chen, S. A. Freunberger, Z. Peng, and P. Bruce (University of St. Andrews)

10:40 **1176** The effect of Layered Structures of Perovskite Oxide Catalyst on Activity for Oxygen-Reduction Reaction – M. Matsuda, T. Murota (Santoku Corportation), and T. Takeguchi (Hokkaido University)

11:00 **1177** Understanding of Electrolyte Stability and Its Impact to Lifespan of Li-O_2 Battery – J. Shui, J. Okasinski, D. Zhao, J. Almer, and D. Liu (Argonne National Laboratory)

11:20 **1178** Electrospun Nanofibrous Bifunctional $LaNiO_3$ Catalysts for Oxygen Reduction Reaction and Oxygen Evolution Reaction – J. Wu and Z. Chen (University of Waterloo)

11:40 **1179** Synthesis and Oxygen Reduction Catalytic Properties of $La_{0.6}Ca_{0.4}CoO_3$ Fine Powders by Sintering with Carbonate – S. Takase, Y. Kanda, and Y. Shimizu (Kyushu Institute of Technology)

Other Media Systems – 13:20 – 16:30
Co-Chairs: Wei Wang and Yangchuan Xing

13:20 **1180** (Invited) Recent Progress in as Highly Efficient Non-Precious Catalysts for Oxygen Reduction Reactions in Alkaline Solutions – J. Cho (Ulsan National Institute of Science and Technology)

13:50 **1181** (Invited) Secondary Li-Air Batteries with Acidic Aqueous Catholytes – O. Crowther (MaxPower Inc) and M. Salomon (MaxPower, Inc.)

14:20 **1182** (Invited) Aqueous Electrolyte-Based Metal-Air Batteries: Challenges for Rechargeable Zinc Electrodes and Reversible Air Electrodes – T. Abe and K. Miyazaki (Kyoto University)

14:50 **1183** Enhancement of Oxygen Transport in the Storage Electrode of a High Temperature Secondary Metal-Air Battery Based on an Oxygen Ion Conducting Electrolyte – H. Landes, R. Reichenbacher, C. Schuh (Siemens Corporate Technology), T. Soller (Siemens AG), G. Zhang, and C. Lu (Siemens Energy Inc)

15:10 **1184** Hybrid Li-air Battery with Sulfuric Acid Electrolyte and Buckypaper Air Cathode – Y. Li, K. Huang (Missouri University of Science and Technology), and Y. Xing (University of Missouri)

15:30 **1185** Improvement in Discharge Performance of an MH/Air Secondary Battery with Multiple Electrodes – M. Mizutani, M. Morimitsu (Doshisha University), and Y. Wada (Kyushu Electric Power Co., Inc.)

15:50 **1186** Comparison of Room Temperature Sodium/Oxygen- and Lithium/Oxygen-Batteries with Liquid Electrolyte – P. Hartmann, C. Bender (Justus-Liebig-University Giessen), A. Garsuch, A. Dürr (BASF SE), J. Janek (Justus Liebig University Gießen), and P. Adelhelm (Justus-Liebig-University Giessen)

16:10 **1187** Effect of Bismuth Additives on the Performance of Iron Electrodes in Alkaline Batteries – A. Manohar, C. Yang, S. Malkhandi, B. Yang, G. Prakash, and S. Narayanan (University of Southern California)

B8 Non-Aqueous Electrolytes for Lithium Batteries

Battery / Energy Technology / Physical and Analytical Electrochemistry
South Pacific 3, Mid-Pacific Conference Center, Hilton Hawaiian Village

Liquid Electrolytes, Organic 4 – 08:00 – 09:40
Co-Chairs: Dr. Lucht and Dr. Jow

08:00 **1245** Solvent-Dependent Solid Electrolyte Interphases on Nongraphite Electrodes – M. Ihara (Sony Corporation), H. Nakai, A. Kita (Sony Energy Devices Corporation), K. Kawase, and T. Kubota (Sony Corporation)

08:40 **1246** Electrolytes with Improved Safety Developed for High Specific Energy Li-Ion Cells with Si-Based Anodes – M. C. Smart, F. C. Krause, C. Hwang, J. Soler, W. C. West, B. Ratnakumar (Calfornia Institute of Technology), and G. Prakash (University of Southern California)

09:00 **1247** Enhanced Morphology and Cycling Efficiency of Li Metal Anode by Electrolyte Additives for Rechargeable Li Batteries – W. Xu, F. Ding, J. Zhang, X. Chen, M. H. Engelhard, M. Sushku, E. Nasybulin, J. Xiao, G. L. Graff, and J. Zhang (Pacific Northwest National Laboratory)

09:20 **1248** Investigation of the Electrolyte Composition in a Li-S Cell upon Long-Term Cycling – R. Schmidt, H. Schneider, J. Tomforde, and T. Weiss (BASF SE)

Liquid Electrolytes, Organic 5 – 10:00 – 12:00
Co-Chairs: Dr. Ishikawa and Dr. Henderson

10:00 **1249** Electrolyte Solvation and Ionic Association: Cyclic Carbonate and Ester-LiTFSI and -$LiPF_6$ Mixtures – W. A. Henderson, D. M. Seo, J. L. Allen, L. A. Gardner, S. Han, and P. D. Boyle (North Carolina State University)

10:40 **1250** Thermal Phase Behavior and Electrochemical/Physicochemical Properties of Carbonate and Ester Electrolytes with $LiBF_4$, LiDFOB and LiBOB – J. L. Allen, S. Han, D. W. McOwen, B. A. Knight, D. M. Seo, P. D. Boyle, and W. A. Henderson (North Carolina State University)

11:00 **1251** Delving into the Properties and Solution Structure of Nitrile-Lithium Difluoro(Oxalato) Borate (LiDFOB) Electrolytes for Li-Ion Batteries – S. Han, J. L. Allen, P. D. Boyle, and W. A. Henderson (North Carolina State University)

11:20 **1252** Ion Transport in Non-Aqueous Liquid Electrolytes Containing Oxide Inclusions – S. K. Das and A. J. Bhattacharyya (Indian Institute of Science)

11:40 **1253** The Influence of Molecular Interactions on Battery Electrolyte Properties and Processes – K. L. Gering (Idaho National Laboratory)

Liquid Electrolytes, Modelling 1 – 14:00 – 15:40
Co-Chairs: Dr. Tasaki and Dr. Borodin

14:00 **1254** Insight into Electrolyte Stability, Decomposition and Transport Properties from DFT and MD Simulations – O. Borodin (U.S. Army Research Laboratory), L. Xing (The University of Utah), and T. Jow (U.S. Army Research Laboratory)

14:40 **1255** Electrolyte Structure Near Charged Electrode Surfaces: A Molecular Dynamics Simulation Study – D. Bedrov, L. Xing, J. Vatamanu (The University of Utah), and O. Borodin (U.S. Army Research Laboratory)

15:00 **1256** Properties of Fluoro-Free Non-Aqueous Electrolytes: Computational Predictions and Experimental Results – J. Scheers (Chalmers University of Technology), W. A. Henderson (North Carolina State University), P. Johansson, and P. Jacobsson (Chalmers University of Technology)

15:20 **1257** Stability of Aprotic Solvents in Li-Air Batteries: Theoretical Investigation of Nucleophilic Substitution by Superoxide, C-H Acidity, and Autoxidation – V. S. Bryantsev, J. Uddin (Liox Power, Inc.), W. Walker (Liox Power Inc.), V. Giordani, S. Zecevic, D. Addison, and G. V. Chase (Liox Power, Inc.)

Liquid Electrolytes, Modelling 2 – 16:00 – 16:40
Co-Chairs: Dr. Borodin and Dr. Tasaki

16:00 **1258** Ab Initio Study on Reduction Mechanisms of Vinylene Carbonate Using Global Reaction Route Mapping Method – K. Miyamoto, R. Asahi (Toyota Central R&D Labs., Inc.), and K. Ohno (Toyota Physical & Chemical Research Institute)

16:20 **1259** DFT Study on Reduction Reactions of Ethylene Carbonate and Propylene Carbonate as Co-Solvents inside Graphite in Lithium-Ion Battery Cells – K. Tasaki (Mitsubishi Chemical Holdings America) and A. Goldberg (Accelrys Software, Inc.)

B9 Polymer Electrolyte Fuel Cells 12 (PEFC 12)

Energy Technology / Corrosion / Physical and Analytical Electrochemistry / Battery / Industrial Electrochemistry and Electrochemical Engineering

Tapa 1, Tapa Conference Center, Hilton Hawaiian Village

A-3.1 Catalyst Layers – 08:00 – 12:00
Co-Chairs: Kunal Karan & Kelly Perry

08:00 **1580** Determination of CL Ionomer Conductivity – K. Karan (Queen's University)

08:40 **1581** STXM Characterization of PEM Fuel Cell Catalyst Layers – D. Susac (AFCC), V. Berejnov, A. P. Hitchcock (McMaster University), and J. Stumper (Automotive Fuel Cell Cooperation Corp.)

09:00 **1582** Analysis and Experiments of Major Parameters in Catalyst Layer Structure Affecting on PEFC Performance – M. Kobayashi, Y. Tabe, and T. Chikahisa (Hokkaido University)

09:20 **1583** Performance Characteristics of PEFCs with Patterned Electrodes Prepared by Piezo-electric Printing – D. Malevich, M. Saha, E. Halliop, B. Peppley, J. Pharoah (Queen's-RMC Fuel Cell Research Centre), and K. Karan (Queen's University)

09:40 Intermission (20 Minutes)

10:00 Poster Awards (Room of Section D) – Jim Fenton and Thomas Schmidt (20 Minutes)

10:20 **1584** Ice-Crystallization Kinetics and Water Movement in Gas-Diffusion and Catalyst Layers – T. J. Dursch, M. Ciontea, G. Trigub, C. Radke (University of California, Berkeley), and A. Weber (Lawrence Berkeley National Laboratory)

10:40 **1585** The effect of Pt Particle Distribution of Various Supported Electrocatalyst on Pt Utilization of Membrane-Electrode Assembly – M. Uchida, K. Kakinuma, H. Uchida, and M. Watanabe (University of Yamanashi)

11:00 **1586** Temperature Sensitivity of Polymer-Electrolyte Fuel Cells with Ultra-Low Catalyst Loadings – M. L. Perry, C. Shovlin, and R. Zaffou (United Technologies Research Center)

11:20 **1587** Effects of Through-plane Thermal Gradients of Anode and Cathode Electrodes on PEMFC Performance – K. Inman and X. Wang (Oakland University)

11:40 **1588** The Spatial Performance Effect of Electrode Defects in PEMFC – G. Bender (National Renewable Energy Laboratory), W. Felt (NREL), and M. Ulsh (National Renewable Energy Laboratory)

Tapa 3, Tapa Conference Center, Hilton Hawaiian Village

B-3.1 Fuel Cells – General (1) – 08:00 – 11:40
Co-Chairs: Sri Narayanan and HyukSang Kwon

08:00 **1589** Design of Al-Fe Alloys for Fast On-board Hydrogen Production from Hydrolysis, and Its Application to PEMFC – K. Eom (Korea Institute of Science and Technology), J. Kwon (University of Michigan), M. Kim, and H. Kwon (Korea Advanced Institute of Science and Technology)

08:40 **1590** Influences of Various Recycled Fuel Conditions on the Stability of Direct Methanol Fuel Cells – K. Park, M. Yang, and J. Park (Sejong University)

09:00 **1591** Immobilized Viologen Polymers for Carbohydrate Fuel Cell – Y. Pan, J. Stockton, D. Hansen, W. Pitt, and D. R. Wheeler (Brigham Young University)

09:20 **1592** *In Situ* and Ex Situ Characterization of Bipolar Plates for PEM Fuel Cells – S. Ladre (Sør-Trøndelag Uviversity College), O. Kongstein, A. Oedegaard (SINTEF Materials and Chemistry), F. Seland (Norwegian University of Science and Technology), and H. Karoliussen (Sør-Trøndelag University College)

09:40 Intermission (20 Minutes)

10:00 Poster Awards (Room of Section D) – Jim Fenton and Thomas Schmidt (20 Minutes)

10:20 **1593** Spatially Resolved Characterization of DMFCs Aged under Critical Conditions – A. Löhmer, K. Wippermann, M. Müller, and D. Stolten (Forschungszentrum Jülich GmbH)

10:40 **1594** The Effect of Gas Diffusion Media on AMFC performance – T. Isomura, K. Fukuta, H. Yanagi (Tokuyama Corp.), S. Ge, and C. Wang (The Pennsylvania State University)

11:00 **1595** Development of High Performance MEA by CS-AFM (Current Sensing – Atomic Force Microscopy) – S. Lee, O. Kwen, D. Lee (Daegu Gyeongbuk Institute of Science & Technology), B. Han (Daegu Gyeongbuk Institute of Science and Technology (DGIST)), S. Hwang, J. Jang, G. Choi, A. Bates (Daegu Gyeongbuk Institute of Science & Technology), and S. Park (University of Louisville)

11:20 **1596** Comparison of H_2S Effects: Using Two Different Ultra-Low Platinum Anode Loadings under Different PEFC Operating Conditions – C. Quesada, T. Rockward, K. C. Rau, and F. H. Garzon (Los Alamos National Laboratory)

Honolulu 2, Tapa Conference Center, Hilton Hawaiian Village

C-3.1 High Temperature and Composite Membranes 2 – 08:00 – 11:40
Co-Chairs: Michael Ulsh and Hideki Nakagawa

08:00 **1597** Novel Anion Conductive Block Copolymers for Alkaline Fuel Cells and Water Electrolysis – P. Kohl, J. Zhou, D. Park, K. Joseph, J. Ahlfield, and H. Beckham (Georgia Institute of Technology)

08:40 **1598** Advanced Hybrid Super Acidic Inorganic-Organic PEMs for Hotter and Drier Operation – A. Herring, J. L. Horan, M. Kuo, J. Jessop, G. Schlichting, and Y. Yang (Colorado School of Mines)

09:00 **1599** Anhydrous Novel Acid-Base Binary and Ternary Systems for Fuel Cell Applications – M. Singh and H. Missan (University of the West Indies)

09:20 **1600** New Composite PEM for High Temperature Fuel Cells – M. E. Cordova, A. Sleczka, E. M. Kelder, and S. J. Picken (TUDelft)

09:40 Intermission (20 Minutes)

10:00 Poster Awards (Room of Section D) – Jim Fenton and Thomas Schmidt (20 Minutes)

10:20 **1601** Zeolite 4A-Methane Sulfonic Acid-Sulfonated Poly (Ether Ether Ketone) Based Mixed Matrix Membranes for Direct Methanol Fuel Cells – S. Meenakshi, S. D. Bhat, A. Sahu, P. Sridhar, and S. Pitchumani (CSIR-Central Electrochemical Research Institute)

10:40 **1602** Polymer Inorganic Composite (PIC) Nanofiber Proton Exchange Membrane for Direct Methanol Fuel Cells – G. Arumugam, V. Kamavaram, V. Veedu, and K. Cheung (Oceanit Laboratories Inc)

11:00 **1603** Nanofiber Composite Membranes for a Regenerative H_2/Br_2 Fuel Cell – J. Park and P. Pintauro (Vanderbilt University)

11:20 **1604** Composite Sulfonated Polyether Ether Ketone (SPEEK) Membranes with 3-(Trihydroxysilyl)-1-Propanesulfonic Acid for a Direct Methanol Fuel Cell (DMFC) – S. Yun, J. Parrondo, and V. Ramani (Illinois Institute of Technology)

Tapa 2, Tapa Conference Center, Hilton Hawaiian Village

D-3.1 Pt-Alloy Cathode Catalysts 1 – 08:00 – 10:20
Co-Chairs: Branko Popov and Hiroyuki Uchida

08:00 **1605** Dispersed PtCo Alloy Catalyst Synthesized by Modified Polyol Reduction Method for PEM Fuel Cells – T. Kawamura and S. Matsumoto (Toyota Motor Corporation)

08:20 **1606** Enhanced ORR and MOR Activities by Bimetallic CoPt and PdPt Electrocatalysts – B. A. Kakade, T. Tamaki, H. Ohashi, and T. Yamaguchi (Tokyo Institute of Technology)

08:40 **1607** Development of Highly Active Pt2Ni/C Catalyst for PEM Fuel Cell – T. Xie, T. Kim, W. Jung, A. Kriston, P. Ganesan, and B. N. Popov (University of South Carolina)

09:00 **1608** Subsurface Enrichment in Highly Active Dealloyed Pt-Ni Catalyst Nanoparticles for Oxygen Reduction – L. Gan (Technical University Berlin), M. Heggen (Forschungszentrum Juelich GmbH), and P. Strasser (Technische Universität Berlin)

09:20 **1609** Core-Shell Fine Structure and Size-Dependent Morphology of Dealloyed Pt Bimetallic Nanoparticle Fuel Cell Electrocatalysts – M. Oezaslan (Technische Universität Berlin), M. Heggen (Forschungszentrum Juelich GmbH), and P. Strasser (Technische Universität Berlin)

09:40 Intermission (20 Minutes)

10:00 Poster Awards (Room of Section D) – Jim Fenton and Thomas Schmidt (20 Minutes)

Honolulu 3, Tapa Conference Center, Hilton Hawaiian Village

E-3.1 Alkaline Membranes and Systems – 08:00 – 12:00
Co-Chairs: Plamen Attanasov & Robert Mantz

08:00 **1610** Anion-Exchange Membrane Fuel Cell for Platinum-free Liquid Fuel Car – K. Asazawa, H. Tanaka (Daihatsu Motor Co. Ltd.), U. Martinez, B. Halevi (The University of New Mexico), A. Serov (University of New Mexico), K. Artyushkova, P. Atanassov (The University of New Mexico), and B. Kiefer (New Mexico State University)

08:40 **1611** Alkaline Durable Anion Exchange Membranes Based on Graft-type Fluoropolymer Films for Hydrazine Hydrate Fuel Cell – K. Yoshimura, H. Koshikawa, T. Yamaki, Y. Maekawa (Japan Atomic Energy Agency), K. Yamamoto, H. Shishitani, K. Asazawa, S. Yamaguchi, and H. Tanaka (Daihatsu Motor Co., Ltd.)

09:00 **1612** Stringing Cations in Hydroxide Exchange Membranes for Low Water-Uptake and High Hydroxide-Conductivity – J. Wang, S. Gu, and Y. Yan (University of Delaware)

09:20 **1613** Highly Anion-Conducting Porous Polymer Electrolyte Membrane for Alkaline Fuel Cells – H. Zarrin, M. Fowler, and Z. Chen (University of Waterloo)

09:40 Intermission (20 Minutes)

10:00 Poster Awards (Room of Section D) – Jim Fenton and Thomas Schmidt (20 Minutes)

10:20 **1614** Modeling and Analysis of Ion Transport Trough Anion Exchange Membranes Used in Alkaline Fuel Cells – S. Castañeda Ramírez and C. Sánchez Sáenz (Universidad Nacional de Colombia)

10:40 **1615** Synthesis of Triarylsulfonium Functionalized Polysulfone for Hydroxide Exchange Membrane Fuel Cells – B. Zhang, S. Gu, J. Wang, Y. Yan (University of Delaware), and A. Herring (Colorado School of Mines)

11:00 **1616** Polymer Backbone Stability of Quaternized Fluorinated Poly(arylene ether)s and Its Impact on AMFC Performance – D. Kim (Honam Petrochemical Corp.), C. H. Fujimoto (Sandia National Laboratories), M. Hibbs (Sandia National Laboratory), D. Wrobleski, and Y. Kim (Los Alamos National Laboratory)

11:20 **1617** Alkaline Stability and AMFC Performance of Perfluorinated Polymer Electrolytes – D. Kim (Honam Petrochemical Corp.), C. H. Fujimoto (Sandia National Laboratories), M. Hibbs (Sandia National Laboratory), and Y. Kim (Los Alamos National Laboratory)

11:40 **1618** The Performance of Anionic Ionomers in Direct Methanol Fuel Cells – K. Joseph, J. Ahlfield, J. Zhou, and P. Kohl (Georgia Institute of Technology)

Tapa 2, Tapa Conference Center, Hilton Hawaiian Village

D-3.1 Pt-Alloy Cathode Catalysts 1 (Continued) – 10:20 – 12:00
Co-Chairs: Branko Popov and Hiroyuki Uchida

10:20 **1619** Oxygen Reduction Reaction on Electrodeposited Pt100-xNix: Influence of alloy composition and dealloying – Y. Liu, C. Hangarter (National Institute of Standards and Technology), U. Bertocci (NIST), and T. Moffat (National Institute of Standards and Technology)

10:40 **1620** High Activity De-alloyed PtMn (M = Co and Ni) Cathodic Catalysts showing OO(H) or O(H) coverage on Pt Consistent with the Sabateir Model – D. E. Ramaker (The George Washington University), K. Caldwell (George Washington University), S. Mukerjee, Q. Jia (Northeastern University), and J. Ziegelbauer (General Motors Central Research and Development)

11:00 **1621** PEMFC Nanoparticle Catalyst Dealloying from Kinetic Monte Carlo Simulations – B. Puchala (Univeristy of Wisconsin-Madison), S. Lin (National Cheng Kung University), L. Wang, and D. Morgan (University of Wisconsin-Madison)

11:20 **1622** Dealloying of Nanoparticles – X. Li (Arizona State University), I. McCue, J. Snyder, J. Erlebacher (Johns Hopkins University), and K. Sieradzki (Arizona State University)

11:40 **1623** Correlation between Local Structure and Catalytic Activity of Monolayer Pt Catalysts for Oxygen Reduction – X. Wang, Y. Orikasa (Kyoto University), M. Inaba (Doshisha University), and Y. Uchimoto (Kyoto University)

Tapa 1, Tapa Conference Center, Hilton Hawaiian Village

A-3.2 Porous Transport Layers – 14:00 – 18:00
Co-Chairs: Emin Kumbur, Trung Nguyen, and Felix Buechi

14:00 **1624** Influence of Hydrohilic and Hydrophobic Double MPL Coated GDL on PEFC Performance – T. Kitahara, H. Nakajima, K. Mori, and M. Inamoto (Kyushu University)

14:20 **1625** Observation of Water Transfer Phenomena in Micro-Porous Layer of PEFC – Y. AOYAMA, K. Kadowaki, Y. Tabe, and T. Chikahisa (Hokkaido University)

14:40 **1626** The Effect of Microporous Layer on PEFC Dryout – D. Malevich, E. Halliop, J. Suryana, B. Peppley, J. Pharoah (Queen's-RMC Fuel Cell Research Centre), and K. Karan (Queen's University)

15:00 **1627** Understanding Mechanism of PTFE Distribution in Fibrous Porous Media – G. Inoue (Kyoto University), N. Ishibe, Y. Matsukuma, and M. Minemoto (Kyushu University)

15:20 **1628** Hydrophobic Gas Diffusion Media for PEM Fuel Cells by Direct Fluorination – T. V. Nguyen (The University of Kansas), A. Ahosseini, and X. Wang (University of Kansas)

15:40 **1629** Measurement of Capillary Presuure Curves in GDLs at Elevated Temperatures – J. Gostick and K. P. Shrestha (Mcgill University)

16:00 Intermission (20 Minutes)

16:20 **1630** Water Distribution in GDL at Optimum Humidification – J. Eller, J. Roth, R. Gaudenzi, S. Irvine, F. Marone, M. Stampanoni (Paul Scherrer Institut), A. Wokaun (Paul Scherrer Institute), and F. Büchi (Paul Scherrer Institut)

16:40 **1631** Three-Dimensional Morphological Characterization of Micro Porous Layers – A. Sadeghi Alavijeh, A. Nanjundappa, M. El Hannach, and E. Kjeang (Simon Fraser University)

17:00 **1632** Investigation of Water Breakthrough and Flow in Gas Diffusion Layers and Relavance to Fuel Cell Water Management – Z. Lu and J. Patterson (Ford Motor Company)

17:20 **1633** Effect of Channel Materials on the Behavior of Water Droplet Emerging from GDL into PEMFC Gas Channels – P. Gopalan and S. Kandlikar (Rochester Institute of Technology)

17:40 **1634** Microstructure-Driven Analysis of Two-Phase Transport in Dual-Layer Diffusion Media of PEFCs – E. A. Wargo (Drexel University), V. P. Schulz (Baden-Wuerttemberg Cooperative State University), A. Cecen, S. R. Kalidindi, and E. C. Kumbur (Drexel University)

Tapa 3, Tapa Conference Center, Hilton Hawaiian Village

B-3.2 Fuel Cells – General (2) – 14:00 – 15:40
Co-Chairs: Takashi Tokumasu and Sri Narayanan

14:00 **1635** Nanoscale Transport Phenomena in PEM of PEFC by Large Scale Molecular Dynamics Simulations – T. Tokumasu (Tohoku University)

14:40 **1636** A Direct DME High Temperature PEM Fuel Cell – A. Vassiliev, J. Jensen, Q. Li, C. Pan, L. Cleemann (Technical University of Denmark), T. Steenberg, H. Hjuler (Danish Power Systems), and N. Bjerrum (Technical Iniversity of Denmark)

15:00 **1637** Percolation in Catalyst Layer of PEMFC – S. A. Stacy and J. Allen (Michigan Technological University)

15:20 **1638** Impact of Structural Plastics as Balance of Plant Components on Fuel Cell Performance – B. Lakshmanan, K. O'Leary, and R. Reid (General Motors Company)

Honolulu 2, Tapa Conference Center, Hilton Hawaiian Village

D-3.2.2 Non-Precious Metal Catalysts – 14:00 – 18:20
Co-Chairs: Akimitsu Ishihara and Plamen Atanassov

14:00 **1639** Electrochemical Characterization of Non-Precious Metal Catalysts Based on Copper-Triazole Complexes for Oxygen Reduction Reaction in PEM Fuel Cells – C. Zhang, G. A. Goenaga, C. Dabke, A. Belapure, A. Papandrew, S. Foister, and T. A. Zawodzinski Jr. (The University of Tennessee)

14:20 **1640** Synthesis and Electrochemical Characterization of Co, Fe and Cu-based Catalysts For ORR In PEM Fuel Cells – G. A. Goenaga (The University of Tennessee), J. Brooksbank (University of Tennessee Knoxville), C. Dabke, C. Zhang, A. Belapure, A. Papandrew, S. Foister, and T. A. Zawodzinski Jr. (The University of Tennessee)

14:40 **1641** Non-PGM Electrocatalysts for ORR: Structure and Reactivity of Dinuclear Heterometallic Catalysts – K. Strickland and S. Mukerjee (Northeastern University)

15:00 **1642** Group 4 and 5 Metal Oxide-Based Compounds as New Non-Platinum Cathode for PEFC – A. Ishihara, S. Yin, K. Suito, K. Hara, K. Matsuzawa, S. Mitsushima, K. Ota (Yokohama National University), M. Matsumoto, and H. Imai (NISSAN ARC Ltd.)

15:40 **1643** ORR Activity of Nb Oxide Based Catalyst Prepared from Nb Compound Including C and N – K. Hara, A. Ishihara (Yokohama National University), M. Matsumoto, M. Arao, H. Imai (NISSAN ARC Ltd.), K. Matsuzawa, S. Mitsushima, and K. Ota (Yokohama National University)

16:00 Intermission (20 Minutes)

16:20 **1644** Oxygen Reduction on TiO_2-Coated Carbon Nanofibers Decorated with Graphene Platelets – J. P. McClure (NC State University), C. Devine, A. Loebl (North Carolina State University), R. Jiang, D. Chu (U.S. Army Research Laboratory), J. Cuomo, G. Parsons, and P. Fedkiw (North Carolina State University)

16:40 **1645** Highly-dispersed Nanoscale Tantalum-based Catalysts Prepared by Electrodeposition as Novel Non-platinum Cathodes for PEFCs – J. SEO (The University of Tokyo), K. Takanabe (King Abdullah University of Science and Technology (KAUST)), J. Kubota, and K. Domen (The University of Tokyo)

17:00 **1646** Bio-inspired Electrocatalysts for ORR: The Case for Structured Mixed Metal Oxides – B. Halevi (The University of New Mexico), C. Harrison, A. Serov, C. Lau (University of New Mexico), K. Artyushkova (The University of New Mexico), B. Kiefer (New Mexico State University), and P. Atanassov (The University of New Mexico)

17:20 **1647** Coaxial TiN-CNT Composites as Effective Low Temperature Fuel Cell Electrocatalyst Supports – D. C. Higgins and Z. Chen (University of Waterloo)

17:40 **1648** Electrospun Iron/Polyacrylonitrile Derived Nanofibrous Catalysts for Oxygen Reduction Reaction – J. Wu, H. Park, D. C. Higgins, and Z. Chen (University of Waterloo)

18:00 **1649** Nitrogen-doped Activated Graphene Supported Platinum Electrocatalyst for Oxygen Reduction Reaction in PEM Fuel Cells – J. Choi, D. Lee, and Z. Chen (University of Waterloo)

Tapa 2, Tapa Conference Center, Hilton Hawaiian Village

D-3.2.1 Pt-Alloy and Core-Shell Cathode Catalysts – 14:00 – 18:20
Co-Chairs: Vojislav Stamenkovic and Hideo Daimon

14:00 **1650** Advanced Electrocatalysts for PEM Fuel Cells – C. Wang, D. Van der Vliet, D. Tripkovic, D. Strmcnik, D. Li, N. M. Markovic, and V. R. Stamenkovic (Argonne National Laboratory)

14:40 **1651** *In Situ* Pt K-Edge XAFS Study on Pt/Au Nanoclusters for Fuel Cell Catalysts – T. Kaito, H. Mitsumoto, S. Sugawara, K. Shinohara (Nissan Motor Co., Ltd), H. Uehara, H. Ariga, S. Takakusagi, and K. Asakura (Hokkaido University)

15:00 **1652** Evaluation of Electrocatalytic Activity and Durability for Oxygen Reduction Reaction of Au Core/Pt Shell Catalysts with Small Core – E. Higuchi, K. Okada, M. Chiku, and H. Inoue (Osaka Prefecture University)

15:20 **1653** Improvement of Durability of Au core/Pt Shell Structured Catalyst – H. Daimon (Doshisha University), N. Aoki (ishihuku metal industry), H. Inoue (Ishifuku Metal Industry Co., Ltd), T. Nishikawa, Y. Ikehata, E. Maki (Doshisha University), H. YAMADA (Nara National College of Technology), and M. Inaba (Doshisha University)

15:40 **1654** Synthesis of Pt-Au Nanoparticle Netlike Assembly as High Active and Durable Catalysts for ORR – Z. Zhou, H. Wang, L. Song, C. Chen, N. Tian, and S. Sun (Xiamen University)

16:00 Intermission (20 Minutes)

16:20 **1655** *In Situ* XAFS Study on the Structure and Behavior of PEFC Core-Shell Pt-M/C (M = Au, Pd) Catalysts under Stepwise Voltage Operation Conditions – S. Nagamatsu (The University of Electro-Communications, Tokyo), T. Arai, M. Yamamoto, H. Oyanagi (Honda R&D Co., Ltd.), T. Ishizaka, H. Kawanami (AIST), T. Uruga (JASRI/SPring-8), M. Tada (Insitute for Molecular Science), and Y. Iwasawa (The University of Electro-Communications, Tokyo)

16:40 **1656** Enhanced Oxygen Reduction Performance and Durability for Titanium Dioxide Modified PtAu/C Nanoparticles – C. Liu (National Central University), M. Janyasupab (Case Western Reserve University), Y. Zhang (Shanghai University), C. Lai, J. Lin, L. Tsai (Industrial Technology Research Institute), C. Liu (Case Western Reserve University), and K. Wang (National Central University)

17:00 **1657** PtPd Areogels as a New Class of High Surface Area Catalysts towards the Oxygen Reduction Reaction – W. Liu (Technical University Dresden), A. Rabis (Paul Scherrer Institute), A. Foeslke (Paul Scherrer Institut), R. Kötz (Paul Scherrer Institute), J. Yuan (TU Dresden), A. Hermann (Technical University Dresden), P. Rodriguez (Paul Scherrer Institut), A. Eychmüller (Technical University Dresden), and T. J. Schmidt (Paul Scherrer Institute)

17:20 **1658** Pt-Sn(Oxidized Shell)/C and Pt-Sn(Reduced)/C as Cathode Catalysts for the Oxygen Reduction Reaction in Polymer Electrolyte Fuel Cells: Catalyst Performances and Characterization – G. Samjeske, S. Nagamatsu, K. Nagasawa, Y. Imaizumi, S. Takao, O. Sekizawa (The University of Electro-Communications, Tokyo), T. Yamamoto (The University of Tokushima), T. Uruga (JASRI/SPring-8), and Y. Iwasawa (The University of Electro-Communications, Tokyo)

17:40 **1659** PtSc Alloy Nanocrystals as Electrocatalysts with High Specific and Mass Activity for Oxygen Reduction Reaction – Y. Zhang (University of Delware), Z. Zhuang, and Y. Yan (University of Delaware)

18:00 **1660** Hydrogen Oxidation at Small Amount of Pt on TiO_2-SiO_2 – W. Zhang, S. Shironita, and M. Umeda (Nagaoka University of Technology)

Honolulu 3, Tapa Conference Center, Hilton Hawaiian Village

E-3.2 Acid Direct Fuel Cells. Materials and Systems – 14:00 – 17:20
Co-Chairs: Cynthia Rice and Adam Lewera

14:00 **1661** Hydrocarbon Electrolytes with Nitrile Groups for Direct Methanol Fuel Cells – S. Hürter, M. Müller, D. Stolten (Forschungszentrum Jülich GmbH), and M. Guiver (National Research Council Canada)

14:20 **1662** Meso-Structured Aluminosilicate-Nafion Hybrid Membranes for DMFCs – S. Meenakshi, A. Sahu, S. D. Bhat, P. Sridhar, S. Pitchumani (CSIR-Central Electrochemical Research Institute), and A. K. Shukla (Indian Institute of Science)

14:40 **1663** Mechanistic Studies of Palladium Based Catalysts in the Reactions of Alcohols Electrooxidation – A. Serov (University of New Mexico), U. Martinez, K. Artyushkova, B. Halevi, and P. Atanassov (The University of New Mexico)

15:00 **1664** Multiscale modeling for Direct Ethanol Fuel Cells – R. Ribadeneira, D. C. Orozco, and J. Molina (Universidad Nacional de Colombia)

15:20 **1665** Tungsten Carbide on Multiwalled Carbon Nanotube as a Co-Catalyst for Methanol Oxidation – M. Rahsepar (Shiraz University), P. Nikolaev (Sungkyunkwan University), and H. Kim (DGIST)

15:40 Intermission (20 Minutes)

16:00 **1666** Electrode Degradation of Direct Methanol Fuel Cells Evidenced by X-ray Tomography – Q. Li, D. Spernjak, and Y. Kim (Los Alamos National Laboratory)

16:20 **1667** Catalysts for Direct Formic Acid Fuel Cells – C. A. Rice and A. Bauskar (Tennessee Tech University)

16:40 **1668** Effect of Nanometallic Catalysts on Electrochemical Oxidation of Glycerol – V. Tran, T. Nguyen, T. Lam, T. Co, and T. Nguyen (Vietnam National University)

17:00 **1669** Product Distribution on Ethylene Glycol Oxidation Reaction for Carbon Neutral Energy Cycle System – T. Takeguchi, H. Arikawa, K. Sato (Hokkaido University), M. Yamauchi (Kyushu University), and R. Abe (Kyoto Univetsity)

B10 Renewable Fuels from Sunlight and Electricity

Energy Technology / High Temperature Materials / Physical and Analytical Electrochemistry / New Technology Subcommittee

Nautilus 2, Mid-Pacific Conference Center, Hilton Hawaiian Village

Electrochemical Synthesis of Fuels – 08:00 – 09:40
Co-Chairs: Nguyen Minh and Sri R. Narayan

08:00 **1809** Mechanistic Studies during Electro-Oxidation of Urea on Ni-Co Catalyst in Alkaline Medium – V. Vedharathinam and G. G. Botte (Ohio University)

08:20 **1810** Development of Methanol Electrolysis System for Hydrogen Production – T. I. Valdez, K. Billings, and A. K. Kisor (California Institute of Technology)

08:40 **1811** Electrochemical Reduction of CO_2 to Value-Added Products: The effect of Electrode Structure and Electrolyte – H. Jhong, M. R. Thorson, S. Ma, A. Salehi, and P. J. Kenis (University of Illinois at Urbana-Champaign)

09:00 **1812** Carbon Dioxide Decomposition and Oxygen Generation Via SOEC – H. Guo and B. Kang (West Virginia University)

09:20 **1813** Low Overpotential CO_2 Reduction on Nanostructured Copper Electrodes – C. W. Li and M. Kanan (Stanford University)

Electrocatalytic and Catalytic Synthesis of Fuels – 10:00 – 12:20
Co-Chairs: Deryn Chu and Sri R. Narayan

10:00 **1814** Room Temperature Electrochemical Synthesis of Oxygenates through a Carbonate Anion Pathway – N. Spinner and W. E. Mustain (University of Connecticut)

10:20 **1815** Degradation of Solid Oxide Electrolysis Cells Applied for H_2O/CO_2 Co-Electrolysis – Y. Tao, S. D. Ebbesen, and M. Mogensen (Technical University of Denmark)

10:40 **1816** Hydrogen Production Via Electrolysis in Cu-Cl Thermochemical Cycle – S. N. Lvov, R. Schatz, S. Kim, S. Khurana, A. Morse, M. Chung, and M. Fedkin (The Pennsylvania State University)

11:00 **1817** Nanostructured Molybdenum Carbide as Pt-Free Catalysts for Hydrogen Evolution – W. Chen, C. Wang, K. Sasaki (Brookhaven National Laboratory), N. Marinkovic (University of Delaware), W. Xu, J. Muckerman, Y. Zhu, and R. R. Adzic (Brookhaven National Laboratory)

11:20 **1818** Reverse Combustion: The Efficient Electrochemical Conversion of Carbon Dioxide and Water to Organic Fuels Using an Aromatic Amine Catalyst – A. B. Bocarsly, T. Shaw, E. Zeitler, K. Liao, Y. Hu, Z. Detweiler, M. Baruch, J. Herb, and J. White (Princeton University)

11:40 **1819** Reactive Molecular Dynamics Modeling of Interfacial Phenomena in Solid Oxide Fuel Cells – B. V. Merinov (California Institute of Technology), A. C. Van Duin (The Pennsylvania State University), and W. Goddard III (California Institute of Technology)

Fuel Production from Renewable Sources – 14:00 – 15:20
Co-Chairs: Deryn Chu and Fanglin Chen

14:00 **1820** Modeling the Behavior of a Solar-Hydrogen Generator – S. Haussener (Lawrence Berkeley National Laboratory), C. Xiang (California Institute of Technology), A. Berger, J. Newman (University of California, Berkeley), N. S. Lewis (California Institute of Technology), and A. Weber (Lawrence Berkeley National Laboratory)

14:20 **1821** Renewable Liquid Fuels from Sunlight – P. G. Hoertz, J. Bittle, A. Miller, D. Murry, C. Bonino, J. Newman, and J. Trainham (RTI International)

14:40 **1822** Low-Cost Renewable Hydrogen from Sunlight and Water – S. Y. Reece (Sun Catalytix)

15:00 **1823** Thermochemical Water Splitting with Zirconium-Substituted Cerium Oxides – Y. Hao (California Institute of Technology), W. Chueh (Sandia National Laboratories), and S. M. Haile (California Institute of Technology)

Fuel Cells and Electrochemistry – 15:30 – 18:00
Co-Chairs: Kevin Huang and Xingjian Xue

15:30 **1824** Heterogeneous Nanostructures: Fast Electrochemistry for High-To-Ultrahigh Power Electrical Energy Storage – S. Lee (University of Maryland)

16:00 **1825** Kinetics of Oxidation of CO and H_2 and Reduction of CO_2 and H_2O in Ni/YSZ Based Solid Oxide Cells – S. D. Ebbesen and M. Mogensen (Technical University of Denmark)

16:20 **1826** Understanding Trends in Electrocatalytic Activity for CO Evolution – H. A. Hansen, J. Varley, A. A. Peterson, and J. K. Nørskov (Stanford University)

16:40 **1827** The Status of Direct Methanol Fuel Cell System Lessons Learned and the Road Ahead – D. Chu and R. Jiang (U.S. Army Research Laboratory)

17:00 **1828** X-ray Absorption Measurements on Perovskite Electrodes for the Oxygen Evolution Reaction – M. Risch, K. Stoerzinger, K. May (Massachusetts Institute of Technology), A. Mansour (Naval Surface Warfare Center), and Y. Shao-Horn (Massachusetts Institute of Technology)

17:20 **1829** Crossover in a Homogeneous-Catalyst Reactor – J. Newman (University of California, Berkeley)

17:40 **1830** Proton Conductive Niobium Phosphates as Electrolytes for Fuel Cells Operating with Renewable Biofuels – Y. Huang, Q. Li, T. Anfimova, A. H. Jensen, J. Jensen, E. Christensen, and N. Bjerrum (Technical University of Denmark)

B11 Sodium Batteries

Battery / Energy Technology / High Temperature Materials
Lehua, Kalia Conference Center, Hilton Hawaiian Village

Na-Ion Batteries – Anodes – 08:00 – 11:20
Co-Chairs: Jordi Cabana and Shinichi Komaba

08:00 **1852** High Capacity Negative Electrodes for Na-Ion Batteries: Insertion Mechanism and SEI Layer – S. Komaba, T. Ishikawa, Y. Matsuura, W. Murata, N. Yabuuchi, S. Shimazu (Tokyo University of Science), J. Son, Y. Cui, H. Oji (Japan Synchrotron Radiation Research Institute), K. Gotoh (Okayama University), and K. Takeda (Kyoto University)

08:30 **1853** Reversible Insertion of Sodium in Tin – L. D. Ellis, T. D. Hatchard, and M. N. Obrovac (Dalhousie University)

08:50 **1854** First-Principles Study on Alkali Metal-Graphite Intercalation Compounds – K. Nobuhara, H. Nakayama, S. Nakanishi, and H. Iba (Toyota Motor Corporation)

09:10 **1855** Electrochemical Properties of Titanium-Based Anode Materials for Rechargeable Na Ion Battery – H. Nakayama, M. Nose, K. Nobuhara, S. Nakanishi, and H. Iba (Toyota Motor Corporation)

09:30 Intermission (30 Minutes)

10:00 **1856** GaV_4S_8 : A New Class of Anode Material for Sodium-Ion Batteries – C. Michelet (IMN – CNRS), O. Crosnier, T. Brousse (University of Nantes), P. Moreau, and D. Guyomard (IMN – CNRS)

10:20 **1857** Electrochemical Insertion of Na Ion into Nanocarbon Materials for Sodium Ion Batteries – T. Matsushita, Y. Ishii, and S. Kawasaki (Nagoya Institute of Technology)

10:40 **1858** Reaction of Li and Na with Iron Oxide/ Carbon Nanotube Composite Electrode in Ionic Liquid Electrolyte – M. Egashira, Y. Tsubouchi, D. Ogawa, N. Yoshimoto, and M. Morita (Yamaguchi University)

11:00 **1859** Microwave Synthesized $NaTi_2(PO_4)_3$ Anode Materials For Rechargeable Aqueous Electrolyte Sodium-Ion Battery – W. Wu, A. Mohamed, and J. F. Whitacre (Carnegie Mellon University)

Na-Ion Batteries – Electrode Materials and Electrolytes – 14:00 – 18:00
Co-Chairs: Naoki Yabuuchi and Palani Balaya

14:00 **1860** $Na_3V_2(PO_4)_3/C$: A Novel Porous Sodium Ion Insertion Host For Sodium Ion Battery Applications – K. Saravanan, L. Bing, and P. Balaya (National University of Singapore)

14:20 **1861** Quinone-Based Organic Active Materials for Use in Sodium and Magnesium Batteries – M. Yao, H. Senoh, H. Sano (National Institute of Advanced Industrial Science and Technology), K. Kuratani, T. Kiyobayashi, and H. Sakaebe (National Institute of Advanced Industrial Science and Technology (AIST))

14:40 **1862** Na-Ion Capacitor Using Activated Carbon and Na Pre-Doped Hard Carbon – K. Kuratani (National Institute of Advanced Industrial Science and Technology (AIST)), M. Yao, H. Senoh, N. Takeichi (National Institute of Advanced Industrial Science and Technology), T. Sakai, and T. Kiyobayashi (National Institute of Advanced Industrial Science and Technology (AIST))

15:00 **1863** Synthesis and Characterization of $Na_{3+x}M_xZr_{2-x}Si_2PO_{12}$ for Solid State Na-Ion Battery Applications – G. Hitz, K. Lee, and E. D. Wachsman (University of Maryland)

15:20 **1864** Electrochemical Sodium Ion Intercalation Property of $Na_{2.7}Ru_4O_9$ in Nonaqueous and Aqueous Electrolytes – Y. Jung (Korea Advanced Institute of Science and Technology), S. Hong (Daegu Gyeongbuk Institute of Science and Technology), and D. Kim (Korea Advanced Institute of Science and Technology)

15:40 Intermission (20 Minutes)

16:00 **1865** Charge and Discharge Properties of Sodium Secondary Batteries Using Molten NaFSA-KFSA – A. Fukunaga, T. Yamamoto, T. Nohira, R. Hagiwara (Kyoto University), K. Numata, E. Itani, S. Sakai, K. Nitta, and S. Inazawa (Sumitomo Electric Industries, Ltd.)

16:20 **1866** New Sodium Imidazolium Salts for Battery Electrolytes – A. Plewa-Marczewska, T. Trzeciak, L. Niedzicki (Warsaw University of Technology), J. S. Syzdek (Lawerence Berkeley National Laboratory), E. Sasim, M. Dranka, G. Z. Zukowska, M. Marcinek, and W. Wieczorek (Warsaw University of Technology)

16:40 **1867** Conductivity and Viscosity of Perchlorate Salts Dissolved in Nonaqueous Solvents – N. Uemura (National Institute of Advanced Industrial Science and Technology), K. Kuratani, T. Kiyobayashi (National Institute of Advanced Industrial Science and Technology (AIST)), and H. T. Takeshita (Kansai University)

17:00 **1868** Low-Temperature, Low-Cost Liquid Metal Batteries – B. L. Spatocco, P. J. Burke, and D. R. Sadoway (Massachusetts Institute of Technology)

17:20 **1869** *In Situ* Measurements to Extract Potential, Local Current and Charging Current Distributions in the Electric and Electrolyte Phases of an EDL Capacitance Electrode – K. C. Hess, J. F. Whitacre, and S. Litster (Carnegie Mellon University)

17:40 **1870** Advanced Electrochemical Energy Storage Development at Pacific Northwest National Laboratory for Renewable Integration and Smart Grid Applications – V. Sprenkle, S. Kim, W. Wang, G. Xia, J. Kim, and D. Choi (Pacific Northwest National Laboratory)

B12 Solid State Ionic Devices 9 – Ion Conducting Thin Films and Multilayers

High Temperature Materials

South Pacific 1, Mid-Pacific Conference Center, Hilton Hawaiian Village

Proton Conductors – 08:00 – 11:40
Co-Chairs: Sean Bishop and Hiroshige Matsumoto

08:00 **1961** Enhanced Proton Conductivity by Hydrogenation in Anodic ZrO_2-WO_3-SiO_2 Nanofilms – K. Ye, Y. Aoki, E. Tsuji (Hokkaido University), S. Nagata (Tohoku University), and H. Habazaki (Hokkaido University)

08:20 **1962** Water-Absorbing Porous Electrolyte Based on Sulfated Hydrous Titania and Application to Water Electrolysis – S. Kim, T. Sakai (Kyushu University), J. Hamagami (Kurume National College of Technology), Y. Okuyama, H. Oda, T. Ishihara, and H. Matsumoto (Kyushu University)

08:40 **1963** Current-Voltage Relation in $(La,Ce)PO_4$ Mixed-Conducting Ceramics – H. L. Ray and L. De Jonghe (Lawrence Berkeley National Laboratory)

09:00 **1964** Proton Conductivity and Stability of In^{3+} Doped SnP_2O_7 with Varying P:M – C. R. Kreller, M. Wilson, R. Mukundan, E. L. Brosha, and F. H. Garzon (Los Alamos National Laboratory)

09:20 **1965** Simulations of Proton Conduction in Tin Pyrophosphates – N. J. Henson, F. H. Garzon, and R. Mukundan (Los Alamos National Laboratory)

09:40 Intermission (20 Minutes)

10:00 **1966** First-Principles Defect Equilibrium Calculations in Rare-Earth Phosphate Electrolytes with Mixed Conductivity – N. Adelstein, H. L. Ray, M. Asta, and L. De Jonghe (Lawrence Berkeley National Laboratory)

10:20 **1967** Effect of Multi-Site Doping on The Conductivity of ABO_3 Perovskite Mixed Proton/Electron Conductors – K. Pan and E. D. Wachsman (University of Maryland)

10:40 **1968** Nanoionics Applied to Proton Conducting Ceramics – J. Tong, D. Clark, S. Nikodemski, M. Shang, A. Herring, C. Wolden, A. Bunge, and R. O'Hayre (Colorado School of Mines)

11:00 **1969** Functional Relationships between Structure and Transport in the BZY and BCY Proton Conductors – A. Braun and Q. Chen (Empa)

11:20 **1970** Improving the Performance of Solid Oxide Fuel Cells with $BaZrO_3$ Electrolyte by Using Sinteractive Anodic Powders – L. Bi, E. Fabbri (National Institute for Materials Science), and E. Traversa (Univeristy of Roma Tor Vergata)

SOFC Performance – 14:00 – 18:20
Co-Chairs: Teruhisa Horita and Xiao Dong Zhou

14:00 **1971** Magnesium Manganese Spinel Coatings for Solid Oxide Fuel Cell Interconnects – S. Joshi, C. Silva, and A. Petric (McMaster University)

14:20 **1972** Increased Performance Stability of SOFC Cathodes by Use of Protective Coatings on Metallic Interconnectors – M. Kornely (Karlsruher Institut für Technologie), N. Menzler (Forschungszentrum Jülich GmbH), A. Weber, and E. Iver-Tiffée (Karlsruher Institut für Technologie)

14:40 **1973** Imaging of Oxide Ionic Diffusion at Cathode/Interlayer/Electrolyte Interfaces for Solid Oxide Fuel Cells: long-term operation effects – T. Horita, D. Cho, T. Shimonosono, M. Nishi, H. Kishimoto, K. Yamaji, and H. Yokokawa (National Institute of Advanced Industrial Science and Technology)

15:00 **1974** Novel Anode Material for Direct Hydrocarbon Solid Oxide Fuel Cells – C. Yang, Z. Yang, G. Xiao, L. Zhang (University of South Carolina), M. Han (China University of Mining and Technology), and F. Chen (University of South Carolina)

15:20 **1975** Efficient High Power Density SOFCs with Zirconia/Bismuth Oxide Bilayered Electrolytes – K. Lee and E. D. Wachsman (University of Maryland)

15:40 **1976** Process Integration for Scale-Up of $Ce_{0.9}Gd_{0.1}O_{1.95}$ Electrolyte-Based LT-SOFCs – H. Yoon, C. M. Gore, A. A. Lidie, K. Lee, and E. D. Wachsman (University of Maryland)

16:00 Intermission (20 Minutes)

16:20 **1977** Performance of Solid Oxide Fuel Cells on H_2, NH_3 and Hydrocarbon Fuels – M. Han, J. Xiong, and S. C. Singhal (China University of Mining and Technology)

16:40 **1978** Improved Power Density by (Mn, Fe) Doped CeO_2 as a Oxide Anode for Ni-Fe Metal Support SOFC – Y. Ju, S. Ida, and T. Ishihara (Kyushu University)

17:00 **1979** Effect of Co Addition on Sintering and Electrical Properties of La-Doped CeO_2 as a Buffer Layer for Doped $LaGaO_3$ Electrolyte Films of Solid Oxide Fuel Cells – J. Hong, S. Ida, and T. Ishihara (Kyushu University)

17:20 **1980** Effect of Fuel Utilization on the Performance of Nickel/Zirconia Anode-Supported SOFCs – O. A. Marina (Pacific Northwest National Laboratory), C. Coyle, D. Edwards, and J. Stevenson (PNNL)

17:40 **1981** Durability of SOFC Against Thermal and Redox Cycling – M. Hanasaki, C. Uryu (Kyushu University), S. Taniguchi (International Research Center for Hydrogen Energy), Y. Shiratori, and K. Sasaki (Kyushu University)

18:00 **1982** Sulfur-Poisoning in Reformate Fuelled Anode Supported Solid Oxide Fuel Cells – A. Kromp, S. Dierickx (Karlsruher Institut für Technologie (KIT)), A. Leonide (Siemens Corporate Technology), A. Weber (Karlsruher Institut für Technologie), and E. Ivers-Tiffée (Karlsruhe Institute of Technology (KIT))

D2 Materials Degradation in Energy Systems: Corrosion and Hydrogen-Material Interactions

Corrosion / Battery / Energy Technology

306A, Level 3, Hawaii Convention Center

Hydrogen Interactions with Materials – 08:00 – 12:10
Co-Chairs: Lillard, Hebert, and Scully

08:00 **2167** Electrochemical and Metal-Phase Processes Accompanying Hydrogen Absorption in Aluminum During Aqueous Corrosion – K. R. Hebert, O. O. Capraz, P. Shrotriya, and G. Zhang (Iowa State University)

08:20 **2168** Effect of Absorbed Hydrogen on Cavity Formation at High Temperature Water and Its Role on SCC Growth – K. Arioka (Institute of Nuclear Safety System)

08:50 **2169** The Effects of Chromate, Molybdate, and other Selected Inhibitors on Surface and Crack Tip Corrosion Inhibition – S. B. Madden and J. R. Scully (University of Virginia)

09:20 **2170** Hydrogen Diffusion and Trapping in High Purity Al and Aluminum Alloy 5083-H131 – J. Ai, M. Lim, and J. R. Scully (University of Virginia)

09:50 Intermission (20 Minutes)

10:10 **2171** Lattice Defects Induced by Hydrogen Absorption in Metallic Materials – H. Suzuki, K. Takai (Sophia University), and M. Fujinami (Chiba University)

10:40 **2172** The Hydriding of Uranium: Bulk Transport and Trapping of Hydrogen in Uranium – R. Lillard (University of Akron), C. D. Taylor, J. R. Wermer, N. A. Mara, and J. C. Cooley (Los Alamos National Laboratory)

11:00 **2173** The Influence of Hydrogen on Nuclear Fuel Corrosion Inside a Failed Waste Container – M. E. Broczkowski, L. Wu, Z. Qin (Western University), and D. W. Shoesmith (University of Western Ontario)

11:30 **2174** ZrO_2 Passive Layer Stability Loss in the Presence of Hydrogen Defects – Connections to Pit Initiation – M. Youssef and B. Yildiz (Massachusetts Institute of Technology)

11:50 **2175** The effect of Thermal Hydrogenation Processing on the Oxide Layer Formation of Ti-6Al-4V Alloy – L. Wang, S. Yu (National Defense University), C. Shen (Yuan Ze University), C. Chang, and C. Tsai (National Defense University)

D4 High Resolution Characterization of Corrosion Processes 3

Corrosion

314, Level 3, Hawaii Convention Center

Microelectrochemical Methods & Microscopy – 08:00 – 09:40
Co-Chairs: K. Zavadil and K. Azumi

08:00 **2271** Microscopic Polarization Behavior and Thermodynamic Stability of TiS and $Ti_4C_2S_2$ Inclusions in Stainless Steels – N. Shimahashi, I. Muto, Y. Sugawara, and N. Hara (Tohoku University)

08:20 **2272** Microelectrochemical Investigation of Pit Initiation and Selective Dissolution between MnS and Stainless Steel – A. Chiba, I. Muto, Y. Sugawara, and N. Hara (Tohoku University)

08:40 **2273** *In Situ* Ex-Polarized TEM Observation on Dissolution of MnS Inclusions and Metastable Pitting of Authentic Stainless Steel – B. Zhang, Y. Zhou, and X. Ma (Chinese Academy of Sciences)

09:00 **2274** Corrosion and Dealloying of Crystallized Amorphous Steel – F. U. Renner, M. Duarte, J. Lengsfeld, K. J. Mayrhofer, and P. Choi (Max-Planck-Institut für Eisenforschung)

09:20 **2275** Combining Microelectrochemical Methods with Electron Microscopy to Explore Pit Initiation in Aluminum – K. R. Zavadil (Sandia National Laboratory)

Optical & Spectroscopic Methods – 10:00 – 11:00
Co-Chairs: K. Azumi and K. Zavadil

10:00 **2276** Observation of Metal Dissolution under LaminarFlow in a Microfluidic Channel – Copper with Chloride Solution – - S. Sakugawa, N. Kotake, and M. Hayase (Tokyo University of Science)

10:20 **2277** The effect of Sulfate and Chloride Ions on the Rust Composition of Weathering Steel – T. Ohtsuka, S. Tanaka, M. Koya, A. Hyono, and M. Ueda (Hokkaido University)

10:40 **2278** Marine Aerosol Drop Size Effects on the Corrosion Behavior of Plain Carbon Steel – E. Schindelholz, B. Risteen, R. Kelly (University of Virginia), and I. S. Cole (CSIRO Materials Science and Engineering)

Inhibition & Coatings – 11:00 – 12:00
Co-Chairs: K. Azumi and K. Zavadil

11:00 **2279** Corrosion Inhibition by Zinc Corrosion Products on Zinc-Coated Steel – Y. Sato and K. Azumi (Hokkaido University)

11:20 **2280** Improving the Corrosion Protection Properties of Al_2O_3 ALD Nanocoatings on Steel – J. Swiatowska, B. Díaz, V. Maurice, A. Seyeux (CNRS Chimie ParisTech), E. Härkönen, M. Ritala (University of Helsinki), S. Tervakangas, J. Kolehmainen (DIARC-Technology Inc.), S. E. Potts, W. Kessels (Eindhoven University of Technology), and P. Marcus (CNRS Chimie ParisTech)

11:40 **2281** Environmental and Temporal Characterization of a Self-Healing Coating with Galvanic Protection – A. J. Maisano, R. Srinivasan, M. W. Patchan, L. M. Baird, E. D. LaBarre, and J. J. Benkoski (Johns Hopkins University Applied Physics Lab)

Scanning Probe Methods – Development – 14:00 – 15:00
Co-Chairs: P. Schmutz and K. Zavadil

14:00 **2282** Application of Mg-Ion Selective and Antimony Electrodes for the Characterization of Corrosion Reactions by Scanning Electrochemical Microscopy – J. Izquierdo (University of La Laguna), L. Nagy (University of Pécs), J. Santana (University of Las Palmas de Gran Canaria), I. Bitter (Budapest University of Technology and Economics), G. Nagy (University of Las Palmas de Gran Canaria), and R. M. Souto (University of La Laguna)

14:20 **2283** High Resolution Characterization of Pitting Corrosion Using a Novel Environmental SVET and White Light Interferometry – S. Geary, H. N. McMurray (Swansea University), and A. De Vooys (Sustainable Product Engineering Centre for Innovative Functional Industrial Coatings)

14:40 **2284** Studies with the Three-Dimensional Scanning Vibrating Technique: Investigation into the effect of Spot Weld Electrode Life and Quality on the Corrosion Behavior of Galvanized Automotive Steel – B. P. Wilson (Aalto University), J. R. Searle (Baglan Bay Innovation & Knowledge Centre), K. Yliniemi (Aalto University), D. A. Worsley, and H. McMurray (Swansea University)

Scanning Probe Methods – Applications – 15:00 – 16:00
Co-Chairs: P. Schmutz and K. Zavadil

15:00 **2285** The Influence of Rare-Earth Doping and Non-Stoichiometry on the Corrosion of Uranium Dioxide – H. He, K. O'Neil, O. Semenikhin (Western University), and D. W. Shoesmith (University of Western Ontario)

15:20 **2286** EDTA as a Tool to Probe Cathodic Corrosion (Trenching) on AA2024-T3 – H. N. McMurray, G. Williams, and A. Coleman (Swansea University)

15:40 **2287** Localised SKP Studies of Cathodic Disbondment on Chromium/Chromium Oxide Coated Steel – D. J. Warren and H. N. McMurray (Swansea University)

Scanning Probe Methods – Applications – 16:20 – 17:20
Co-Chairs: K. Zavadil and P. Schmutz

16:20 **2288** Investigation of Copper Corrosion Inhibition by Ethyl Xanthate with Frequency-Dependent Alternating-Current Scanning Electrochemical Microscopy – J. J. Santana and R. M. Souto (University of La Laguna)

16:40 **2289** Damage Evolution Quantification of Hybrid Coatings on Aluminum Alloy by Surface and Electrochemical Techniques – I. Barraza-Fierro, T. Gao, M. Soucek, and H. Castaneda (The Unviersity of Akron)

17:00 **2290** Study of Electrochemical Corrosion Behavior of Nanocrystalline Thin Film by Electrochemical Techniques and *In Situ* AFM – L. Liu, Y. Li, and F. Wang (Chinese Academy of Sciences)

D7 Pits and Pores 5: A Symposium in Honor of David Lockwood

Corrosion / Luminescence and Display Materials
323B, Level 3, Hawaii Convention Center

Applications – 08:00 – 10:00
Co-Chairs: J. Gole and A. Kovacs

08:00 **2425** Porous Silicon as a Biomaterial – M. J. Sailor (University of California at San Diego)

08:30 **2426** Silicon Nanowires: A General Platform for Biosensing – R. Boukherroub (CNRS & Université Lille1)

09:00 **2427** Innovative Applications of Porous Structures of Alumina and Silicon – R. B. Wehrspohn, S. Schweizer (Martin-Luther-University Halle-Wittenberg), B. Gesemann, P. Göring, and M. Lelonek (SmartMembranes GmbH)

09:20 **2428** Three-Dimensional Structure of (110) Porous Silicon with In-Plane Optical Birefringence – M. Fujii, S. Shichi (Kobe University), T. Nishida, H. Yasuda (Osaka University), K. Imakita, and S. Hayashi (Kobe University)

09:40 Intermission (20 Minutes)

Oxide Formation & Ordered Nanostructures – 10:00 – 12:10
Co-Chairs: H. Masuda and D. N. Buckley

10:00 **2429** Formation of Area and Thickness Controlled Porous Type Aluminum Anodic Oxide Films by Sf-MDC – M. Sakairi, T. Yamaguchi, T. Murata, and K. Fushimi (Hokkaido University)

10:20 **2430** Irregularity and Defects of Porous Anodic Oxide Films Formed on Metals – S. Ono and H. Asoh (Kogakuin University)

10:40 **2431** Scan Rate and Fluoride Concentration effect on the Anodic Growth of Self-Aligned Titanium Dioxide Nanotubes in Phosphates – E. Krasicka-Cydzik, A. Kaczmarek, I. Glazowska, and K. Bialas Heltowski (University of Zielona Góra)

11:00 **2432** Pit Initiation at MnS Nano-Inclusions in Carbon Steel under Exposure to Sulfate-Reducing Bacterium D. alkanexedens – B. H. Davis, Z. Suo (Montana State University), I. Beech (University of Oklahoma), D. Paul, J. Hammond (Physical Electronics), and R. Avci (Montana State University)

11:20 **2433** Bulk Diffusion Controlled Dealloying – Q. Chen and K. Sieradzki (Arizona State University)

11:40 **2434** The Strong Rashba Spin-Orbit Interaction in $Hg_{0.77}Cd_{0.23}$ Te Inversion Layer – G. Yu, X. Liu, L. Wei, T. Lin, J. Chu, Y. Wei, and J. Yang (Shanghai Institute of Technical Physics)

Ordered Nanostructures & Applications – 14:00 – 15:30
Co-Chairs: H. Tsuchiya and R. Avci

14:00 **2435** Pitting Corrosion Behavior and Grain Evolution of Shot Peened 304 Type Stainless Steel – T. D. Widodo and K. Noda (Shibaura Institute of Technology)

14:20 **2436** Formation of Interconnected Nano-Channels in Highly-Ordered Anodic Alumina – B. Huang, Y. Tian, B. Shan, and R. Chen (Huazhong University of Science and Technology)

14:40 **2437** TiO_2 Nanotubes and Other Self-organized Anodic Structures: Formation and Applications – P. Schmuki (University of Erlangen-Nuremberg)

15:10 Concluding Remarks (20 Minutes)

E3 Chemical Mechanical Polishing 12

Dielectric Science and Technology
317B, Level 3, Hawaii Convention Center

CMP Symposium (E3) Day 2 – 08:00 – 11:40
Co-Chairs: Bahar Basim and Iqbal Ali

08:00 **2505** Critical Cu Line Scaling Challenges – J. Lu (Micron Technology, Inc.), T. Tran, G. Herdt, N. Petrov, Y. Hu, V. Antonov, D. Collins, P. Murali, Z. Zhang, S. Kondoju, and S. Ireland (Micron Technology Inc.)

08:40 **2506** Development of SiN CMP Slurry with Selectivity Control – Y. Kim, K. Kim, J. Lee, I. Hwang, and S. Nam (Samsung Electronics)

09:00 **2507** Investigation of the Slurry for Poly Si Stopping CMP Process – Y. Pyon, C. Seong, J. Lim, K. Bae, K. Park, K. Kim, and Y. Shin (Samsung Electronics)

09:20 **2508** Combinational effect of Hydroplane and Alkaline Agent on Remaining Particle Reduction for Silicon Wafer Polishing – H. Hwang, H. Cui, J. Lim, J. Jo, J. Park (Hanyang University), E. Choi, J. Ahn (LG Siltron), and J. Park (Hanyang University)

09:40 Intermission (20 Minutes)

10:00 **2509** Triblogical, Thermal, and Kinetic Attributes of 300 vs. 450 mm Chemical Mechanical Planarization Processes – Y. Jiao, X. Liao, C. Wu, Y. Zhuang (University of Arizona), S. Theng (Araca, Inc.), Y. Sampurno (University of Arizona), M. Goldstein (Intel Corporation), and A. Philipossian (University of Arizona)

10:40 **2510** Chemical Mechanical Polishing for Extreme Ultraviolet Lithography Mask Substrates – A. Hariprasad (Clarkson University), R. Teki (SEMATECH), and S. V. Babu (Clarkson University)

11:00 **2511** Effect of CMP Additives on the Agglomeration Rate of Alumina Nanoparticles – N. Brahma (University of California) and J. B. Talbot (University of California, San Diego)

11:20 **2512** Microreplicated Pad Conditioner for Advanced CMP Applications – C. Gould, J. Zabasajja, and D. Le-Huu (3M Company)

E4 Gallium Nitride and Silicon Carbide Power Technologies 2

Electronics and Photonics / Dielectric Science and Technology

316C, Level 3, Hawaii Convention Center

GaN Material Processing and Characetrization – 08:00 – 10:00
Co-Chairs: Reenu Garg and Robert Kaplar

08:00 **2567** GaN Technology for Energy Efficient Electronics – K. Boutros, R. Chu, B. Hughes, and S. Khalil (HRL Laboratories, LLC)

08:20 **2568** Nanoscale Probing of Interfaces in GaN for Devices Applications – F. Giannazzo, G. Greco, P. Fiorenza, R. Lo Nigro, F. Roccaforte (CNR-IMM), and A. Scuderi (STMicroelectronics)

08:40 **2569** Ti Silicide Electrodes Low Contact Resistance for Undoped AlGaN/GaN Structure – K. Tsuneishi, J. Chen, K. Kakushima, P. Ahmet, Y. Kataoka, A. Nishiyama, N. Sugii, K. Tsutsui, K. Natori (Tokyo Institute of Technology), T. Hatorri (Frontier Research Center), and H. Iwai (Tokyo Institute of Technology)

09:00 **2570** Fully Copper-Based Metallization for GaN High Electron Mobility Transistor Devices – E. Yi Chang, Y. Lin, L. Chang, Y. Chen, and Y. Wong (National Chiao Tung University)

09:20 Intermission (40 Minutes)

10:00 **2571** XPS analysis of AlGaN/GaN Surface after Chemical and N-Containing Plasma Treatments – R. Meunier, A. Torres, M. Charles, E. Morvan (CEA – Leti), C. Petit-Etienne (CNRS – LTM), O. Renault, and T. Billon (CEA – Leti)

10:20 **2572** Characterizations of GaN Films Grown on Si (111) Substrates under Various Growth Temperatures of Multiple AlN Buffer Layers – B. Tran, E. Chang Yi, K. Lin, T. Luong, H. Yu, M. Huang, C. Chung, H. Trinh, H. Nguyen, C. Nguyen, and Q. Luc (National Chiao Tung University)

10:40 **2573** Characteristics of GaN Nanowires Produced Using VLS Method on the Growth Temperatures – J. Yoon (Korea Basic Science Institute), B. Oh (Chungnam National University), and J. Yang (Korea Basic Science Institute)

E9 Fundamentals and Applications of Microfluidic and Nanofludic Devices

Electronics and Photonics / Physical and Analytical Electrochemistry / Sensor

301B, Level 3, Hawaii Convention Center

Theory and Modeling of Nanoscale Transport Phenomena – 08:00 – 10:00
Co-Chairs: Ali Beskok and Helmut Baumgart,

08:00 **2760** Molecular Dynamics Simulation of Effects of Nanoparticles on Pulmonary Surfactant – G. Hu (Institute of Mechanics, CAS), B. Jiao (Institute of Mechanics), and Y. Zuo (University of Hawaii at Manoa)

08:40 **2761** Molecular Theory of Fluid Transport and Electrokinetic Potential for Microfluidics and Nanofluidics – A. Kovalenko (National Institute for Nanotechnology, and University of Alberta)

09:00 **2762** Effect of Solvent Polarization in Nano-Confined Electric Double Layer with Finite Ion Sizes – S. Das and S. Mitra (University of Alberta)

09:20 **2763** Influence of Slippage and Charge Leakage on the Electric Field Induced Patterns in Thin Bilayers – K. Mondal, S. Sen, P. Kumar, and D. Bandyopadhyay (Indian Institute of Technology Guwahati)

09:40 Intermission (20 Minutes)

Microfluidic Devices and Processes I – 10:00 – 12:00
Co-Chairs: Sang W. Joo and Shizhi Qian

10:00 **2764** Insulator-based Dielectrophoresis in Microfluidics – X. Xuan (Clemson University)

10:40 **2765** Microfluidic Cell Electrofusion Chip based on Discrete Sidewall Microelectrodes – N. Hu (Yeungnam University), S. Qian (Old Dominion University), S. Joo (Yeungnam University), J. Yang, and X. Zheng (Chongqing University)

11:00 **2766** A Microfluidic Device for Dielectric Spectroscopy of Jurkat Cells – A. Beskok, A. C. Sabuncu, J. Zhuang, and J. Kolb (Old Dominion University)

11:20 **2767** Triaxial Magnetic Fields Enable Mixing and Controlled Flows in Microfluidic Devices – J. Martin, K. Solis, and L. Rohwer (Sandia National Laboratories)

11:40 **2768** Novel Non-equilibrium Electrokinetic Micromixer with Nanoporous Membrane – S. Hwang and S. Song (Hanyang University)

Microfluidic Devices and Processes II – 14:00 – 16:40
Co-Chairs: Guoqing Hu and Jyh-Ping Hsu

14:00 **2769** Template-Based Synthesis of Aligned Carbon Nanotube Arrays for Microfluidic and Nanofluidic Applications – M. Golshadi and M. Schrlau (Rochester Institute of Technology)

14:20 **2770** Sensing Performance of EGFET pH Sensors with CuO Nanowires Fabricated on glass substrate – T. Yang, S. Chang, C. Li, and S. Chang (National Cheng Kung University)

14:40 **2771** Manipulation of DNA Translocation Through Polyelectrolyte Brushes-Functionalized Nanopores – L. Yeh (National Yunlin University of Science and Technology), M. Zhang, S. Qian (Old Dominion University), J. Hsu (National Taiwan University), S. Joo (Yeungnam University), and S. Tseng (Tamkang University)

15:00 **2772** A Low Voltage Portable Nano-Pore Electroosmotic Pump with Passive Zeta Potential Control – D. Gu, S. Yalcin, H. Baumgart, S. Qian, A. Beskok, and O. Baysal (Old Dominion University)

15:20 **2773** Hyphenating Capillary Isoelectric Focusing with Gas-phase Electrophoretic Mobility Molecular Analyzer for Determination of Proteins in Human Tear Fluids – T. Ma and Y. Fung (The University of Hong Kong)

15:40 **2774** Micro-PIV Measurements of Induced-Charge Electroosmosis Around a Metal Rod – A. Beskok, C. Canpolat, and S. Qian (Old Dominion University)

16:00 **2775** Thin-Film Heat Switch Based on Electrohydrodynamic Flow in a Dielectric Fluid – A. H. Mueller, N. Weisse-Bernstein (Los Alamos National Laboratory), M. Yazdani (United Technologies Research Center), R. Eppstein (ThermoDynamic Films LLC.), and M. Hehlen (Los Alamos National Laboratory)

16:20 Intermission (20 Minutes)

Interfaces, Droplets, Multiphase and Particulate Flows – 16:40 – 18:40
Co-Chairs: Xiangchun Xuan and Ashutosh Sharma

16:40 **2776** Carbon Nanotubes Laden Hydrogel Microsphere Preparation Using Microfluidic Device – T. Dang (Yeungnam University), Y. Kim (Research Institute of Advanced Energy Technology, Kyungpook National University, South Korea.), G. Kim (School of Mechanical Engineering, Kyungpook National University, South Korea), and S. Joo (Yeungnam University)

17:00 **2777** Superhydrophobicity and Graphene Oxide Nanosheets to Prevent Biofouling in EWOD based Lab-on-chip Devices – G. Perry, F. Lapierre, Y. Coffinier, V. Thomy, and R. Boukherroub (CNRS & Université Lille1)

17:20 **2778** Influence of Lateral Confinement on the Dewetting Induced Patterns on Chemically Patterned Surfaces – D. Bandyopadhyay (Indian Institute of Technology Guwahati), A. Sharma (Indian Institute of Technology), A. Sehgal (Rhodia Inc., Center for Research and Technology, Bristol, PA 19007), and A. Karim (The University of Akron)

17:40 **2779** Spreading of a Micro-Droplet on a Physicochemically Heterogeneous Porous Medium – A. Kumar, V. Prasad S, T. Banerjee, and D. Bandyopahdyay (Indian Institute of Technology Guwahati)

18:00 **2780** The Flow Transitions of a Liquid-Liquid Multiphase Flow Inside Microchannels – S. Timung, V. Tiwari, T. Mandal, and D. Bandyopadhyay (Indian Institute of Technology Guwahati)

18:20 **2781** Electrohydrodynamic and Electrokinetic Instabilities in Elastic Membranes Confined Between Electrolyte Films – M. Dey (Yeungnam University) and D. Bandyopadhyay (Indian Institute of Technology Guwahati)

E11 Nonvolatile Memories

Dielectric Science and Technology / Electronics and Photonics
313C, Level 3, Hawaii Convention Center

ReRAM-Technology Challenges – 08:00 – 09:40
Co-Chairs: H. Akinaga and K. Kobayashi

08:00 **2834** Recent Progress in Modeling the Operation of Resistive Switching Memory Devices – Y. Nishi and B. Magyari-Kope (Stanford University)

08:40 **2835** ReRAM $SrTiO_3$-$La_{0.7}Sr_{0.3}O_3$ Multilayer Oxide Structures: Playing with Space Charge Interfaces – J. L. Rupp, B. Yildiz, and H. L. Tuller (Massachusetts Institute of Technology)

09:00 **2836** Nonvolatile Resistance Switching in Electrodeposited Co_3O_4 – J. A. Koza, Z. He, M. Willmering, and J. Switzer (Missouri University of Science and Technology)

09:20 **2837** Fully Transparent Non-Volatile Memory Using Multi-Layer Graphene Electrode – P. Yang (National Taiwan University), S. Jen (National Tsing Hua University), W. Chang (National Taiwan University), P. Chiu (National Tsing Hua University), and J. He (National Taiwan University)

Emerging Nonvolatile Memories-1 – 10:00 – 12:00
Co-Chairs: Z. Karim and Y. Suzuki

10:00 **2838** Atom Movement Controlled Devices: Atomic Switches and Atom Transistor – T. Hasegawa and M. Aono (National Institute for Materials Science)

10:30 **2839** Molecular Flash Memories – S. Paydavosi (MIT), K. Aidala (Mount Holyoke College), P. Brown, P. Hashemi, T. Osedach, J. Hoyt, and V. Bulovic (MIT)

11:00 **2840** Self-rectifying Flexible Nonvolatile Small-molecule Memory-cell Embedded with Ni Nanocrystals Surrounded by NiO Tunneling Barrier – H. Seung, J. Lee, J. Lee, M. Song, J. Hong, and J. Park (Hanyang University)

11:20 **2841** Flexible Polymer Memory-cell with Au Nanocrystals Embedded in Polystyrene – K. Kwon, H. Seung, D. Yang, D. Park, J. Hong, and J. Park (Hanyang University)

11:40 **2842** Effect of Buffer LiF Layer on Nonvolatile Memory Characteristics for Polymer Memory-cell with Au Nanocrystals Embedded in Polystyrene – J. Lee, K. Kwon, D. Yang, D. Park, J. Hong, and J. Park (Hanyang University)

ReRAM-Unipolar Devices and Characterizations – 14:00 – 16:00
Co-Chairs: N. Takaura and Z. Karim

14:00 **2843** Crossbar Memory Using TiO_2 Thin Film-based Schottky Diode and Unipolar Switching Cell – G. Kim, J. Lee, J. Han, S. Song, J. Seok, J. Yoon, K. Yoon, and C. Hwang (Seoul National University)

14:30 **2844** Direct Observation of Redox Reactions during Resistance Switching by using Synchrotron Radiation Spectroscopy – H. KUMIGASHIRA (Institute of Materials Structure Science, KEK)

15:00 **2845** Direct Observation of Conducting Nanofilaments in BMO Resistive Switching Memory – C. Kang (National Taiwan University), W. Kuo, C. Huang (National Chiao Tung University), W. Chang (National Taiwan University), W. Wu, Y. Chu (National Chiao Tung University), and J. He (National Taiwan University)

15:20 **2846** Conditions for Formation and Rupture of Multiple Conductive Filaments in a Cu/TaOx/Pt Device – Y. Kang, M. Verma, T. Liu, and M. Orlowski (Virginia Tech)

15:40 **2847** De-Process and Physical Characterization of HfO_2 based Resistive Memory as Studied by C-AFM – U. Celano, Y. Chen, D. Wouters, M. Jurczak, and W. Vandervorst (imec)

Emerging Nonvolatile Memories -2 – 16:20 – 18:00
Co-Chairs: S. Shingubara and K. Kobayashi

16:20 **2848** Fabrication of a Vertical Nanogap for Nonvolatile Memories – S. Furuta, Y. Masuda, T. Takahashi, M. Ono (Funai Electric Advanced Applied Technology Research Institute Inc.), Y. Naitoh (National Institute of Advanced Industrial Science and Technlogy), and T. Shimizu (National Institute of Advanced Industrial Science and Technology)

16:40 **2849** Physical Model of Nonvolatile Resistance Switching Using Simple Nanogap Electrode – Y. Naitoh, M. Horikawa, H. Suga (National Institute of Advanced Industrial Science and Technlogy), T. Shimizu (National Institute of Advanced Industrial Science and Technology), S. Furuta, Y. Masuda (Funai Electric Advanced Applied Technology Research Institute Inc.), T. Sumiya (Funai Electric Advanced Applied Technology Research Institute), T. Takahashi, and M. Ono (Funai Electric Advanced Applied Technology Research Institute Inc.)

17:00 **2850** Impact of Air on Photo-Assisted Atomic Switch – T. Hino, T. Hasegawa (National Institute for Materials Science), H. Tanaka (Osaka University), T. Tsuruoka, Y. Okawa (National Institute for Materials Science), T. Ogawa (Osaka University), and M. Aono (National Institute for Materials Science)

17:20 **2851** Engineering Dielectric Stacks for Charge-Trapping Non-Volatile Memory – H. Zhu, Q. Li (George Mason University), H. Li (NIST & George Mason University), H. Yuan, D. Ioannou (George Mason University), and C. A. Richter (NIST)

17:40 **2852** Ferroelectric Nonvolatile Nanowire Memory Circuit using Single ZnO Nanowire and Ferroelectric Polymer Top Layer – Y. Lee (Yonsei University), P. Jeon (Institute of Physics and Applied Physics), K. Lee, R. Ha, H. Choi, and S. Im (Yonsei University)

E13 Plasma Processing 19

Dielectric Science and Technology / Electronics and Photonics
324, Level 3, Hawaii Convention Center

Thin Film Etching Processes – 08:40 – 10:00
Co-Chairs: M. Engelhardt and H. P. Gillis

08:40 **2943** Deep Silicon Etching with CCP based Process Approaches for Small and Medium Size TSV Applications – M. Rudolph, J. Paul (Fraunhofer-Center Nanoelectronic Technologies), and S. Wege (Plasma-Consulting)

09:00 **2944** The Chemical Reaction of IGZO Thin Film as the Effect of Inert Gas in CF_4/Ar Plasmas – Y. Joo, J. Woo, Y. Chun, and C. Kim (Chung-Ang University)

09:20 **2945** Etching Characteristics of Top Metal Electrode and IGZO channel layer in Inductively Coupled Plasma System – Y. Chun, Y. Joo, J. Woo, and C. Kim (Chung-Ang University)

09:40 Intermission (20 Minutes)

Plasma CVD – 10:00 – 11:20
Co-Chairs: M. Engelhadt and H. P. Gillis

10:00 **2946** Interplay Between Plasma Modification of Surfaces and Atomic Layer Deposition for Semiconductor Applications – J. Swerts, C. Adelmann, S. Armini, A. Delabie, L. Nyns, M. Popovici, M. Schaekers, P. Verdonck, and S. Van Elshocht (imec)

10:40 **2947** Hybrid Sublimation ECR-PECVD System for Fabrication of Rare Earth Doped Silicon Based Thin Film Structures – R. Dabkowski, J. Wojcik, and P. Mascher (McMaster University)

11:00 **2948** Characterization and Modelling of CH_4-CO_2 Microwave Plasmas for Nano-Smooth Diamond Coatings and Homogeneous Nano-Diamond Grain Synthesis – L. Vandenbulcke (Valcoating Technologies), T. Gries, S. De Persis (CNRS), and M. Vandenbulcke (Valcoating Technologies)

AP Plasma and Micro-Plasma Applications – 11:20 – 12:20
Co-Chairs: M. Engelhadt and H. P. Gillis

11:20 **2949** Charge-based Delivery of Molecules to Skin Using Atmospheric Plasmas – A. M. Hoff, R. Connolly, T. Chapman, J. Llewellyn, R. Gilbert, and M. Jaroszeski (University of South Florida)

11:40 **2950** Analysis and Applications of Nonthermal Atmospheric Plasma: High Electric Field Plasma and Plasma Discharges/Jets – Y. B. Manga and K. Ou (Taipei Medical University)

12:00 **2951** Evaluation of Micro Plasma formed in the Narrow Gap in Electrolyte Solution – H. Tamai (Hokkaido University), M. Hafner, A. Hassel (Johanes Kepler University Linz), H. Tachikawa, and K. Azumi (Hokkaido University)

E17 SiGe, Ge, and Related Compounds: Materials, Processing, and Devices 5

Electronics and Photonics
316A, Level 3, Hawaii Convention Center

GeSn Session 2: GeSn Epitaxy – 08:00 – 09:50
Co-Chair: Benjamin Vincent

08:00 **3211** GeSn Materials: Challenges and Applications – R. Loo, V. Benjamin, F. Gencarelli, E. Geert, W. Liesbeth, C. Matty, H. Marc, and T. Aaron (imec)

08:30 **3212** GeSn Alloys on Si Using Deuterated Stananne and Higher-Order Germanes: Synthesis and Properties – G. Grzybowski, R. Beeler, L. Jiang, A. Chizmeshya, J. Kouvetakis, and J. Menendez (Arizona State University)

08:50 **3213** Crystalline Properties and Strain Relaxation Mechanism of CVD Grown GeSn – F. Gencarelli, B. Vincent, A. Kumar (imec), J. Demeulemeester, A. Vantomme (KU Leuven), A. Franquet, J. Meersschaut, W. Vandervorst, R. Loo, M. Caymax (imec), K. Temst (KU Leuven), and M. Heyns (imec)

09:10 **3214** Reduced Pressure CVD Epitaxial Growth of $Ge_{1-x}Sn_x$ Using $SnCl_4$ and Ge_2H_6 – S. Wirths, D. Buca, A. Tiedemann, P. Bernardy, B. Holländer, T. Stoica, D. Grützmacher (Forschungszentrum Juelich), and S. Mantl (Forschungszentrum Jülich)

09:30 **3215** Thermal Chemical Vapor Deposition of Epitaxial Germanium Tin Alloys – Y. Huang, C. Wang, M. Jin, E. Sanchez (Applied Materials, Inc.), and Y. Kim (Applied Materials)

GeSn Session 3: GeSn Epitaxy – 10:05 – 11:55
Co-Chairs: Benjamin Vincent

10:05 **3216** Growth and Optical Properties of $Ge_{1-x}Sn_x$ Alloy Thin Films with a High Sn Content – S. Zaima, O. Nakatsuka, M. Nakamura (Nagoya University), W. Takeuchi (Nagoya Univ.), Y. Shimura (Nagoya University), and N. Taoka (Nagoya Univ.)

10:35 **3217** Growth of $Ge_{1-x}Sn_x$ Alloys Using Combined Sources of Solid Tin and Gaseous Germane – S. Su, B. Cheng, D. Zhang, G. Zhang, C. Xue, and Q. Wang (Institute of Semiconductors, Chinese Academy of Sciences)

10:55 **3218** Growth and Characterization of Heteroepitaxial Layers of Ge1-x-ySixSny Ternary Alloy – T. Yamaha (Nagoya Univ.), O. Nakatsuka (Nagoya University), S. Takeuchi (Covalent Silicon Corp.), W. Takeuchi, N. Taoka (Nagoya Univ.), K. Araki (Covalent Materials Co.), K. Izunome (Covalent Silicon Corp.), and S. Zaima (Nagoya University)

11:15 **3219** Single Crystalline GeSn on Silicon by Solid Phase Crystallization – R. Lieten, S. Decoster, M. Menghini, J. Seo, A. Vantomme, and J. Locquet (KU Leuven)

11:35 **3220** Tin Deuteride (SnD_4) Stabilization – R. F. Spohn and C. B. Richenberg (Praxair, Inc.)

GeSn Session 4: GeSn FET – 13:10 – 14:50
Co-Chairs: Benjamin Vincent and Yee-Chia Yeo

13:10 **3221** Tin-Incorporated Source/Drain and Channel Materials for Field-Effect Transistors – Y. Yeo, G. Han (National University of Singapore), X. Gong (National University of Singapore (NUS)), L. Wang, W. Wang, Y. Yang (National University of Singapore), P. Guo, B. Liu (NUS), S. Su, G. Zhang, C. Xue (Institute of Semiconductors, Chinese Academy of Sciences), and B. Cheng (State Key Laboratory on Integrated Optoelectronics)

13:40 **3222** GeSn Channel n and p MOSFETs – S. Gupta, R. Chen (Stanford University), B. Vincent, D. Lin (IMEC), B. Magyari-Kope (Stanford University), M. Caymax, J. Dekoster (IMEC), J. S. Harris, Y. Nishi, and K. Saraswat (Stanford University)

14:10 **3223** High Hole Mobility in Strained Germanium-Tin (GeSn) Channel pMOSFET Fabricated on (111) Substrate – G. Han (National University of Singapore), S. Su (Institute of Semiconductors, Chinese Academy of Sciences), Y. Yang, P. Guo (National University of Singapore), X. Gong (National University of Singapore (NUS)), L. Wang, W. Wang, C. Guo (National University of Singapore), G. Zhang, C. Xue, B. Cheng (Institute of Semiconductors, Chinese Academy of Sciences), and Y. Yeo (National University of Singapore)

14:30 **3224** Negative Bias Temperature Instability Study on $Ge_{0.97}Sn_{0.03}$ P-MOSFETs with Si_2H_6 Passivation, HfO_2 High-k Dielectric and TaN Metal Gate – X. Gong (National University of Singapore (NUS)), S. Su (Institute of Semiconductors, Chinese Academy of Sciences), B. Liu (National University of Singapore (NUS)), L. Wang, W. Wang, Y. Yang, E. Kong (National University of Singapore), B. Cheng (Institute of Semiconductors, Chinese Academy of Sciences), G. Han, and Y. Yeo (National University of Singapore)

Emerging Applications Session 3: Novel Devices and Memories – 15:05 – 17:05
Co-Chair: Tejas Krishnamohan

15:05 **3225** Si/SiGe Thermoelectric Generators – D. J. Paul, A. Samarelli, L. Ferre Llin, Y. Zhang, J. Weaver, P. Dobson (University of Glasgow), S. Cecchi (Politecnico di Milano), J. Frigerio, F. Isa (L-NESS, Politecnico di Milano), D. Chrastina (L-NESS Dip. di Fisica – Politecnico di Milano), G. Isella (Politecnico di Milano), T. Etzelstorfer, J. Stangl (Johannes Kepler Universität), and E. Müller Gubler (ETH Zurich)

15:25 **3226** SiGe Band-to-Band Tunneling Calibration based on p-i-n Diodes: Fabrication, Measurement and Simulation – K. Kao, A. Verhulst, R. Rooyackers, A. Hikavyy, R. Loo, A. Milenin (imec), J. Tolle (ASM America), H. Dekkers, E. Simoen (imec), V. Machkaoutsan, J. Maes (ASM Belgium), K. De Meyer, N. Collaert, M. Heyns, C. Huyghebaert, and A. Thean (imec)

15:45 **3227** Tunneling Field-Effect Transistor with Novel $Ge/In_{0.53}Ga_{0.47}As$ Tunneling Junction – P. Guo, Y. Yang (National University of Singapore), Y. Cheng (Institute of Materials Research and Engineering), G. Han (National University of Singapore), C. Chia (Institute of Materials Research and Engineering), and Y. Yeo (National University of Singapore)

16:05 **3228** Germanium Tin Tunneling Field Effect Transistor for Sub-0.4 V Operation – Y. Yang, K. Low, G. Han, and Y. Yeo (National University of Singapore)

16:25 **3229** Si/SiGe Tunneling Static Random Access Memories – G. Ternent and D. J. Paul (University of Glasgow)

16:45 **3230** Ge Surface-Energy-Driven Secondary Grain Growth for Vertical Channel in 3D NAND Flash Memories – S. Lee, Y. Son, and E. Yoon (Seoul National University)

316B, Level 3, Hawaii Convention Center

Epitaxy Session 3: *In Situ* Doping of Si, SiGe, and Ge Epilayers – 15:05 – 16:55
Co-Chairs: Roger Loo and Bernd Tillack

15:05 **3231** Epitaxial Growth and Applications of Low-Resistivity Phosphorous-Doped $Si_{1-x}C_x$ – T. N. Adam (University at Albany), N. Loubet (STMicroelectronics), A. Reznicek, V. Paruchuri (IBM Research), R. Sampson (STMicroelectronics), and D. Sadana (IBM Research)

15:35 **3232** Selective Epitaxial Growth of Heavily Boron-Doped Silicon with Uniform Doping Depth Profile – Z. Zhu, Z. Cong, and R. Balasubramanian (Applied Materials Inc.)

15:55 **3233** High Tensile Strained *In Situ* Phosphorus Doped Silicon Epitaxial Film for nMOS Applications – Z. Ye, S. Chopra, R. Lapena, Y. Kim, and S. Kuppurao (Applied Materials)

16:15 **3234** Microstructure Development and Its Effects on the Electrical Properties in Epitaxially Grown *In Situ* Boron and Carbon (co)-doped Highly Strained High Percentage Silicon-Germanium Layers – A. Reznicek (IBM Research), T. N. Adam (University at Albany), J. Li, Z. Zhu (IBM Semiconductor Research and Development Center), H. Hovel, J. De Souza (IBM Thomas J. Watson Research Center), S. W. Bedell (IBM T.J. Watson Research Center), V. Paruchuri (IBM Thomas J. Watson Research Center), and D. Sadana (IBM T.J. Watson Research Center)

16:35 **3235** *In Situ* Boron (B) Doped Germanium (Ge:B) Grown on (100), (110), and (111) Silicon: Crystal Orientation and B Incorporation Effects – G. Han, Q. Zhou, P. Guo, W. Wang, Y. Yang, and Y. Yeo (National University of Singapore)

F4 Emerging Materials and Processes for Energy Conversion and Storage

Electrodeposition / Battery / Energy Technology

313B, Level 3, Hawaii Convention Center

Session II: Emerging Materials, Processes and Devices for Solar Cells Continued – 07:40 – 10:00

Co-Chairs: C. K. Chan and E. Podlaha

07:40 **3367** Designing the Far-red Sensitive Squaraine Dyes for Dye-Sensitized Solar Cells in the Light of Photo-Physical Investigations – S. S. Pandey (Kyushu Institute of Techology), R. Watanabe, Y. Ogomi (Kyushu Institute of Technology), G. Miguel, M. Marchena, A. Douhal (Universidad de Castilla-la Mancha), and S. Hayase (Kyushu Institute of Technology)

08:00 **3368** Graphene-Quantum Dots Composite for Photovoltaic Devices – S. Guo, W. Wang, C. Ozkan, and M. Ozkan (University of California, Riverside)

08:20 **3369** Electrodeposition of Zn-based Chalcogenide Materials – K. Park, D. Kim, and B. Yoo (Hanyang University)

08:40 **3370** Electrodeposition and Growth of Widegap Copper Indium Selenide Thin Films – S. Menezes and Y. Li (InterPhases Solar, Inc.)

09:00 **3371** Possibility of Large-Size Single Crystal Growth in Seed Cast-Grown Monocrystalline Silicon – B. Gao (Research Institute for Applied Mechanics), H. Harada, Y. Miyamura (National Institute for Materials Science), S. Nakano, and K. Kakimoto (Research Institute for Applied Mechanics)

09:40 Intermission (20 Minutes)

Session III: Thin Film Catalysts for Fuel Cells and H2 Production – 10:00 – 12:40

Co-Chairs: E. Podlaha and C. K. Chan

10:00 **3372** High Performance of "Intelligent" Conductive Ceramic Anodes for Solid Oxide Fuel Cells Based on Infiltration – L. Adijanto, V. Balaji Padmanabhan, R. Küngas, J. Vohs, and R. Gorte (University of Pennsylvania)

10:20 **3373** Synthesis and Characterization of Molybdenum Nitride for Electrosynthesis Applications – M. Sykora, A. H. Mueller, C. R. Kreller, E. L. Brosha, and F. H. Garzon (Los Alamos National Laboratory)

10:40 **3374** Enhancement of Visible-Light-Induced Oxygen Evolution at a WO_3 Film by Cobalt Ions in an Electrolyte Solution – M. Yagi and M. Kajita (Niigata University)

11:00 **3375** Investigation of Carbon Deposition in Three-Dimensionally Ordered Macroporous Ni-YSZ Anode – H. Munakata, Y. Katsuki, and K. Kanamura (Tokyo Metropolitan University)

11:20 **3376** Phase Analysis and Electrical Conductivity of Mn-doped and Fe-doped Ceria – L. Zhao, S. R. Bishop, and K. Sasaki (Kyushu University)

11:40 **3377** Sulfonated Polyether Ether Ketone (SPEEK) Membrane for Water Electrolysis – R. Venkatkarthick, A. Sankari (Central Electrochemical Research Institute), S. Meenakshi, S. D. Bhat, P. Sridhar, S. Pitchumani (CSIR-Central Electrochemical Research Institute), S. Vasudevan, D. Jonas Davidson, G. Sozhan, and S. Ravichandran (Central Electrochemical Research Institute)

12:00 **3378** Effects of Sr Doping on Crystallization, Conductivity and Vanadium Reduction of $La_{1-x}Sr_xVO_3$ Electrode in Reducing Atmosphere – K. Fung, C. Liu, C. Ni, and S. Tsai (National Cheng Kung University)

12:20 **3379** Effect of Nickel Surface Structure on Urea Electrolysis: An Experimental Study – B. Hassler, D. A. Daramola, A. Miller, and G. G. Botte (Ohio University)

Session IV: Thin Film Catalysts for Fuel Cells and H2 Production – 14:00 – 18:20

Co-Chairs: L. Deligianni, J. Talbot, C. K. Chan, and Q. Huang

14:00 **3380** (Invited) A Bilayer Membrane of Photocatalytic Nanotube Array and Hydrogen Permeable Metal for High-Purity Hydrogen Production – K. Noda and M. Hattori (Kyoto University)

14:40 **3381** Electrodeposited Pt100-xPbx Alloys and Intermetallics for Direct Formic Acid Fuel Cell – S. Hwang (Korea Institute of Energy Research), J. Bonevich (National Institute of Standards and Technology), J. Kim (Seoul National University), and T. Moffat (National Institute of Standards and Technology)

15:00 **3382** Characterization of the Electronic and Electrochemical Properties of Cu_2O and Fe_2O_3 modified TiO_2 Nanotubes – L. Tsui and G. Zangari (University of Virginia)

15:20 **3383** Direct Electrodeposition of Porous Platinum – L. Jones, A. Ott, T. Junk, and S. Bhargava (RMIT University)

15:40 **3384** The Effect of Surface Modification on the Properties of a Nickel Catalyst: A Theoretical Study – D. A. Daramola, B. Hassler, and G. G. Botte (Ohio University)

16:00 Intermission (20 Minutes)

16:20 **3385** Preparation of Nanostructured Pd Anodes for Alkaline Direct Ethanol Fuel Cells (DEFC) by Electrochemical Milling and Faceting (ECMF) – Y. Chen, A. Lavacchi, F. Vizza, A. Marchionni, J. Filippi, M. Bevilacqua (ICCOM_CNR), M. Innocenti (University of Florence), and H. Miller (ICCOM-CNR)

16:40 **3386** Bringing Conjugated Polymers and Oxide Nanoarchitectures into Intimate Contact: Light Induced Electrodeposition of Polypyrrole and Polyaniline on Nanoporous WO_3 or TiO_2 Nanotube Arrays – C. Janaky, N. De Tacconi, W. Chanmanee (The University of Texas at Arlington), and K. Rajeshwar (The University of Texas)

17:00 **3387** The Mechanism of Visible-Light-Derived Photocurrent Generation at an Antimony Sulfide / Metal Oxide Electrode – A. Shoji, T. Ueno, H. Kabaki, S. Okuyama, and M. Yagi (Niigata University)

17:20 **3388** Carbon-Supported Iron(III)-Corrole as a Non-Precious Metal Catalyst for Fuel Cell Application – I. Shown, H. Huang (Academia Sinica), S. Wang, S. Chang (National Taiwan University of Science and Technology), H. Hsu, H. Du (Academia Sinica), C. Wang (National Taiwan University of Science and Technology), L. Chen (National Taiwan University), and K. Chen (Academia Sinica)

17:40 **3389** Photoelectrochemical Generation of Hydrogen Using p-type $CaFe_2O_4$ Photocathodes – R. Venkatkarthick, C. Krithiga Devi, L. John Berchmans, S. Vasudevan, D. Jonas Davidson, G. Sozhan, and S. Ravichandran (Central Electrochemical Research Institute)

18:00 **3390** Development of Electrically Controlled Energetic Materials (ECEM) – E. Rozumov (Army Research Development & Engineering Center), K. Chung, D. Kaminsky, P. Anderson, P. Cooke, K. Griswold, M. Donadio, M. Sussman, J. Laquidara, C. Adam, D. Thompson, T. Manning, J. Wyckoff, V. Panchal, E. Caravaca (ARDEC), W. Sawka, M. McPherson, and T. Buescher (DSSP LLC)

G2 Synthesis and Engineering General Session

Industrial Electrochemistry and Electrochemical Engineering

304B, Level 3, Hawaii Convention Center

Synthesis and Engineering General Session – 08:00 – 12:00
Co-Chairs: M. Sudoh, John Staser, and Gerri Botte

08:00 **3460** Two Dimensional Electrochemical-Thermal Coupled Models for Lithium-Ion Battery and Battery Stacks – S. De, P. Northrop (Washington University), S. Santhanagopalan (National Renewable Energy Laboratory), and V. Subramanian (Washington University)

08:30 **3461** Experimental Investigation of Two-Phase Electrolysis Under Normal and Zero Gravity – P. Mandin, Z. Derhoumi (Université de Bretagne Sud), and H. Roustan (Rio Tinto Alcan)

08:50 **3462** Performance of Acid-doped Polybenzimidazole Membranes for the Hybrid Sulfur Electrolyzer – J. Jayakumar, A. Gulledge, J. Staser, B. Benicewicz, and J. Weidner (University of South Carolina)

09:10 **3463** On A Few Innovations of Chlor-alkali Membrane Process in Japan – N. Kawasaki (M-UN) and Y. Nakajima (naka-Electrolytic System Lab)

09:30 **3464** *In Situ* Structural Analysis on the Growth Mechanism Pathways of Hydrothermal Synthesized CeO2 Nanocrystals – E. Teo (Republic Polytechnic), M. Lin (Institute of Materials Research and Engineering, A*STAR (Agency of Science, Technology and Research)), Z. Fu, S. Ng (Republic Polytechnic), J. Tan, and H. Tan (Institute of Materials Research and Engineering, A*STAR (Agency of Science, Technology and Research))

09:50 Intermission (10 Minutes)

10:00 **3465** Electrochemical Oxidation of Phenol at Boron-doped Diamond Electrode in Exponential Decay Modulated Current Supply – X. Xing (The Key Laboratory of Water and Sediment Sciences), H. Li, and J. Ni (Department of Environmental Engineering, Peking University, the Key Laboratory of Water and Sediment Sciences, Ministry of Education, Beijing100871, China)

10:20 **3466** Photooxidation Treatment of Organic Materials on Titanium Dioxide Photoelectrode in Aqueous Solution Containing Sodium Chloride – D. Kodama, Y. Kohno, and Y. Maeda (Shizuoka University)

10:40 **3467** Wear Resistant, Functional Hard Chrome Plated from a Trivalent Bath – M. Inman, T. Hall, B. Kagajwala, and E. J. Taylor (Faraday Technology Inc.)

11:00 **3468** Suppression of PbO_2 Deposition on Nano-Structured IrO_2-Ta_2O_5/Ti Anodes in Acidic Solutions – K. Kawaguchi, G. Haarberg (Norwegian University of Science and Technology), and M. Morimitsu (Doshisha University)

11:20 **3469** Investigating the Surface Structure of the Ti/SnO_2-Sb_2O_5 Anode and the Effect on its Electro-catalysis – Q. Ni, D. W. Kirk, and S. Thorpe (University of Toronto)

11:40 **3470** Growth Mechanism of WO_3•$0.33H_2O$ Hierarchical Structure Prepared by Hydrothermal Method – X. He and C. Hu (Chongqing University)

I3 Molten Salts and Ionic Liquids 18

Physical and Analytical Electrochemistry / Electrodeposition / Energy Technology

301A, Level 3, Hawaii Convention Center

Session in Honor of the Bredig Award Winner: Prof. Derek Fray – 08:20 – 12:00
Co-Chairs: M. Gaune-Escard and G. Chen

08:20 **3714** All That You Wanted to Know About Lanthanide Halides But Were Afraid to Ask – M. Gaune-Escard (Ecole Polytechnique), L. Rycerz (Technical University), S. Kuznetsov (KSC RAS), S. Gadzuric (University of Novi Sad), I. Chojnacka, J. Kapala, B. Salamom (Technical University), M. Berkani (Université A. Mira), M. Butman (Ivanovo State University of Chemistry and Technology), and W. Gong (Huizhou University)

08:40 **3715** Behaviour of Cr Species in the Molten System NaF – AlF_3 – (Al_2O_3) – V. Danielik, P. Fellner, D. Sulekova (Slovak University of Technology), and J. Thonstad (Norwegian University of Science and Technology)

09:00 **3716** Electrochemical Near-Net-Shape Production Via the FFC Cambridge Process --- Dedication to the Special Session for the 2012 Max Bredig Award – D. Hu and G. Z. Chen (University of Nottingham)

09:40 Intermission (20 Minutes)

10:00 **3717** Deoxidation of Titania Foams – E. Krasicka-Cydzik (University of Zielona Góra)

10:20 **3718** Towards Sustainable Metals Production by Molten Oxide Electrolysis – L. Yin, A. Allanore, and D. R. Sadoway (Massachusetts Institute of Technology)

11:00 **3719** Synchrotron X-ray Diffraction Monitoring of the Operation of an Inert Anode Utilised in a Cambridge FFC-Cell – G. A. Snook, M. Rowles, M. Styles, K. McGregor, I. Madsen, A. Urban, N. Scarlett (CSIRO), and D. Riley (ANSTO)

11:20 **3720** The Development of Ionic Liquid-Based Thermoelectrochemical Cells – J. M. Pringle, T. J. Abraham, and D. R. MacFarlane (Monash University)

11:40 **3721** Room Temperature Ionic Liquid as Electrolyte for Lithium Ion Battery – Y. FUNG (Hong Kong University) and Y. Yang (Xiamen University)

Rare Earth and Nuclear Chemistry – 14:00 – 17:00
Co-Chairs: T. Nohira and A. Ispas

14:00 **3722** Current Status of Technologies for Recycling Rare Earth Metals – T. H. Okabe (The University of Tokyo)

14:40 **3723** Extraction of Rare Earth Metals from Nd-based Scrap by Electrolysis from Molten Salts – A. Martinez, O. Kjos, E. Skybakmoen, A. Solheim (SINTEF), and G. Haarberg (Norwegian University of Science and Technology)

15:00 **3724** Separation of Dy and Nd (La) Using Molten Salt and an Alloy Diaphragm – H. Konishi, H. Ono (Osaka University), T. Nohira (Kyoto University), and T. Oishi (AIST)

15:20 Intermission (20 Minutes)

15:40 **3725** Electrochemical Formation of RE-Ni (RE=Pr, Nd, Dy) Alloys in Molten Halides – T. Nohira, S. Kobayashi, K. Kondo, K. Yasuda, R. Hagiwara (Kyoto University), T. Oishi (AIST), and H. Konishi (Osaka University)

16:20 **3726** Processing Al-Sc Alloys at Liquid Aluminum Cathode in KF-AlF_3 Molten Salt – Q. Liu, J. Xue, J. Zhu, Y. Qian, and L. Feng (University of Science and Technology Beijing)

16:40 **3727** Electrorefining of Zirconium from Zircaloy-4 Cladding Hulls in LiCl-KCl Molten Salts – C. Lee, K. Kang, M. Jeon, C. Heo, and J. Yang (Korea Atomic Energy Research Institute)

Kahili 1/2, Kalia Conference Center, Hilton Hawaiian Village

Bredig Award Dinner – 18:30 – 21:00
Co-Chair: P. Trulove

18:30 Ticketed Award Banquet

20:00 **3728** Exploring Novel Uses of Molten Salts – D. Fray (University of Cambridge)

J2 Luminescence and Display Materials: Fundamentals and Applications

Luminescence and Display Materials

323A, Level 3, Hawaii Convention Center

Luminescent Semiconductor Materials Continued – 08:20 – 10:00
Co-Chairs: Lauren Shea-Rohwer and Anant Setlur

08:20 **3943** Efficient Materials for High Quality Light Sources: Present Status and Future Prospects – J. Carreras and C. Hunt (Catalonia Institute for Energy Research (IREC))

09:00 **3944** Highly Efficient Phosphor-Converted White Light Emitting Diode by Electrophoretic Deposition – J. Choi (University of California, San Diego), M. Anc, A. Piquette, M. Hannah, K. C. Mishra (Osram Sylvania), J. B. Talbot, and J. McKittrick (University of California, San Diego)

09:20 **3945** Nano-Pyramids Structure for Enhancement of Light Extraction Efficiency by Nanoimprint Lithography – C. Yoo, Y. Song, B. Kim, K. Kim, J. Son, and J. Lee (Pohang University of Science and Technology)

09:40 Intermission (20 Minutes)

Organic Luminescent Materials and Devices – 10:00 – 15:20
Co-Chairs: Uwe Happek and John Collins

10:00 **3946** Highly Reliable Encapsulation Films for OLEDs Composed of SiN_x and SiO_xC_y Prepared Using SWP-CVD – S. Ueno (Shimadzu Corporation), M. Yomogida (Shimadzu Emit Co. Ltd.), M. Suzuki, Y. Konishi, and K. Azuma (Shimadzu Corporation)

10:40 **3947** Green-Color Selective Organic Photodetector with High Sensitivity for Image Sensor Application – K. Lee, D. Leem, K. Park, S. Lim, Y. Jin, S. Lee, K. Kim (Samsung Advanced Institute of Technology), and S. Park (Seoul National University)

11:00 **3948** Thermo-switchable Emission and Coloration of Composite Material Containing Luminescent Europium(III) Complex and Fluoran Dye – K. Nakamura (Chiba University), Y. Kobayashi (Graduate School of Advanced Integration Science, Chiba University), K. Kanazawa, and N. Kobayashi (Chiba University)

11:20 **3949** Color tunable organic plasmon-emitting diodes – I. Lee, K. Kim, S. Kim, B. Koo, B. Lee, and J. Lee (Pohang University of Science and Technology)

11:40 **3950** Electroswitchable Emission of the Luminescent Eu(III) Complex based on Electrochemical Reaction – K. Kanazawa, K. Nakamura, and N. Kobayashi (Chiba University)

12:00 Lunch Break (120 Minutes)

14:00 **3951** Ultrafine Silver Nanowire Networks as Scattering Core in Organic Light Emitting Diodes – B. Lee, K. Kim, S. Kim, I. Lee, B. Koo, and J. Lee (Pohang University of Science and Technology)

14:20 **3952** Enhancing Light Outcoupling of Flexible Organic Light Emitting Diodes by Domain Selective-Etching – I. Lee, K. Kim, S. Kim, B. Koo, B. Lee, and J. Lee (Pohang University of Science and Technology)

14:40 **3953** Triboluminescent Properties of EuD_4TEA and ZnS:Mn and Their Use for Smart Sensors – R. Fontenot, K. Bhat (Alabama A&M University), W. A. Hollerman (University of Louisiana at Lafayette), and M. Aggarwal (Alabama A&M University)

15:00 **3954** Using Triboluminescence To Detect Ballistic and Hypervelocity Impacts – W. A. Hollerman (University of Louisiana at Lafayette) and R. Fontenot (Alabama A&M University)

Friday, October 12

09:30h..... Technical Session Coffee Break

B6 Lithium-Ion Batteries

Battery / Energy Technology
Coral 3, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Operational Methodologies – 08:00 – 09:40
Co-Chairs: John Wang and David Wetz

08:00 **1055** Cycling Fatigue Induced on Electrochemical Energy Storage Cells as a Rresult of High C Pulsed Charging – P. M. Novak, D. A. Wetz, and B. Shrestha (The University of Texas at Arlington)

08:20 **1056** The Impact of High Pulsed Loading on the Fatigue of Electrochemical Energy Storage Devices – B. Shrestha, D. A. Wetz, and P. M. Novak (The University of Texas at Arlington)

08:40 **1057** Heating Strategies for Li-Ion Batteries Operated from Subzero Temperatures – Y. Ji and C. Wang (The Pennsylvania State University)

09:00 **1058** Thermal Management for Startup of Li-Ion Batteries – C. Shaffer and C. Wang (EC Power)

09:20 **1059** Rechargeable Lithium-ion Batteries For Wireless Smart Designs & Extreme Conditions – F. Fusalba, H. Rouault (CEA), L. Daniel (CEA-LITEN), M. Chami, D. Mourzagh, and G. Moreau (CEA)

Coral 4, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Anodes V (General) – 08:00 – 09:40
Co-Chairs: Tetsuya Kajita and Gleb Yushin

08:00 **1060** Negative Electrode Properties of Carbon-Coated Si Leaf Powder for Lithium-Ion Batteries – M. Saito, T. Okubo, T. Yamada, C. Yodoya (Doshisha University), A. Kamei, M. Hirota, T. Takenaka (Oike & Co., Ltd.), A. Tasaka, and M. Inaba (Doshisha University)

08:20 **1061** Temperature Dependence of Cycle Performance at Various Cut-Off Voltages of Li-Ion Batteries Using SiO Anode – T. Kajita, J. Iriyama, H. Takahashi, R. Kasahara, T. Numata, S. Serizawa, and K. Utsugi (NEC corporation)

08:40 **1062** Anodic Compatibility of LiTDI Based Electrolytes with MPCVD Manufactured Si/C Nanostructured Electrodes – P. Wieczorek (Warsaw University of Technology), A. Bitner (ALISTORE-European Research Institute), L. Niedzicki (Warsaw University of Technology), A. Plewa-Marczewska (ALISTORE-European Research Institute), E. Zero-Sasim, G. Zukowska, M. Kasprzyk (Warsaw University of Technology), F. Lindgren, K. Edström (Uppsala University), W. Wieczorek, and M. L. Marcinek (Warsaw University of Technology)

09:00 **1063** Microstructural Evolution during Battery Charge and Discharge in Si Alloy Anode – J. Cho, J. Moon (MK Electron Co., Ltd.), C. Kang, S. Kim, S. Son (Seoul National University), C. Lee, S. Kang, Y. Kim (Samsung SDI), S. Lee (University of Colorado at Boulder), and K. Oh (Seoul National University)

09:20 **1064** Ultra-Strong Silicon-Coated Carbon Nanotube Fabric as Multi-Functional Lithium Ion Battery Anodes – K. Evanoff, J. Benson (Georgia Tech), M. Schauer (Nanocomp), I. Kovalenko (Georgia Institute of Technology), D. Lashmore (Nanocomp), J. Ready (Georgia Tech), and G. Y. Yushin (Georgia Institute of Technology)

Coral 3, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Modeling – 10:00 – 12:20
Co-Chairs: Venkatasailanathan Ramadesigan and Mattieu Dubarry

10:00 **1065** Determination and Evaluation of Charge Distribution in Lithium Battery Electrodes – T. J. Richardson, C. Sirisopanaporn, V. Srinivasan, J. Liu, and V. Zorba (Lawrence Berkeley National Laboratory)

10:20 **1066** Multiscale Multiparadigm in Silico Design of New Materials for Li-ion Batteries – W. Goddard III, B. V. Merinov, A. Jaramillo-Botero (California Institute of Technology), H. Kim (Graduate School of EEWS (WCU), KAIST, Republic of Korea), D. Seo (Seoul National University, Republic of Korea), H. Kim, and K. Kang (Seoul National University)

10:40 **1067** Computational Framework for Modeling Multi-Physics Phenomenon of Li-Ion Batteries across Various Hierarchies – S. Allu, S. Pannala (Oak Ridge National Laboratory), P. Mukherjee (Texas A&M University), W. Elwasif, and J. Turner (Oak Ridge National Laboratory)

11:00 **1068** Evaluation Model for Used Lithium-Ion Battery Life – K. Kaji, K. Tanaka, K. Maeda, H. Akimono, J. Zhang, and H. Horie (The University of Tokyo)

11:20 **1069** Parameterizing Li-Ion Cell Models Supported by Microstructure Reconstructions – M. Ender, J. Illig, and E. Ivers-Tiffée (Karlsruhe Institute of Technology (KIT))

11:40 **1070** Electrothermal Simulation of Spirally-Wound Lithium Ion Cells – R. Spotnitz, G. Yeduvaka (Battery Design LLC), D. Schad, V. Gudimetta, J. Votteler, G. Damblanc, C. Lueth, E. Oxenham, and S. Hartridge (CD-adapco)

12:00 **1071** Ab Initio Study of Li Interaction with Graphene, Multi-Layer Graphene and Graphite Relevant for Li-Ion Electrode Materials – K. A. Persson and E. Lee (Lawrence Berkeley National Laboratory)

Coral 4, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Anodes II (Tin Based Systems) (Continued) – 10:00 – 12:20
Co-Chairs: Gleb Yushin and Tetsuya Kajita

10:00 **1072** Binder Assisted Stabilization of Pure Sn Based Anode for Lithium Ion Batteries – S. Xun, X. Song, J. Chong, V. Battaglia, and G. Liu (Lawrence Berkeley National Laboratory)

10:20 **1073** Porous Sn-C Composite Synthesized by Electrochemical Method for the Binder-free Anode of Li-ion Battery – J. Jeun, W. Kim, K. Park, K. Kang, and S. Hong (Seoul National University)

10:40 **1074** SnO Microcrystals vs. Nanoparticles as Anode for Lithium Ion Batteries – C. T. Cherian, M. Reddy, C. Sow, and B. Chowdari (National University of Singapore)

11:00 **1075** Electrochemical Analysis of Sn Electrodeposition to Optimize Preparation Process of SnOC Anode Material – M. Jeong, H. Nara, T. Yokoshima, T. Momma, and T. Osaka (Waseda University)

11:20 **1076** Multi-scaled Sn Dispersed in Ni-Ti Shape Memory Alloy as High Performance Anode for Li-ion Battery – R. Hu, H. Liu, and M. Zhu (South China University of Technology)

11:40 **1077** Autogenically-Prepared Spherical Carbon Particles (SCPs) and SCP-Sn Composites as Anodes for Li-Ion Batteries – V. G. Pol, K. C. Lau, L. A. Curtiss, and M. M. Thackeray (Argonne National Laboratory)

Coral 3, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Modeling – 14:00 – 15:40
Co-Chairs: Matthieu Dubbarry and Venkatasailanathan Ramadesigan

14:00 **1078** Effect of Particle Morphology on Stress in a Lithium-Ion Battery Using an Integrated Model in 2-D – R. T. Purkayastha and R. M. McMeeking (University of California, Santa Barbara)

14:20 **1079** Simulation-Based Prediction of Residual Performance of Lithium-Ion Batteries – K. Maeda, W. Imamura, K. Tanaka, H. Akimoto, and H. Horie (The University of Tokyo)

14:40 **1080** Modeling of Fracture Initiation and Propagation in Lithium Ion Battery Electrodes – P. Barai (University of Tennessee Knoxville), S. Simunovic (Oak Ridge National Laboratory), and P. Mukherjee (Texas A&M University)

15:00 **1081** Modeling of the Interactions of Uniformly Sized Nanoparticles – B. Orvananos (Universiy of Michigan), H. Yu (University of Michigan), T. Ferguson, M. Bazant (Massachusetts Institute of Technology), and K. Thornton (University of Michigan)

15:20 **1082** Dynamic Optimization Using Efficient Reformulated Models for Maximizing Energy Storage and Life of Lithium-Ion Batteries – V. Ramadesigan, P. Northrop (Washington University), R. Braatz (Massachusetts Institute of Technology), and V. Subramanian (Washington University)

Coral 4, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Anodes V (General) – 14:00 – 15:40
Co-Chairs: Pradeep Guduru and Corey Love

14:00 **1083** Synthesis of Co_3O_4-SnO_2 Multi-Layered Hollow Sphere and Their High Reversible Capacity for Anode of Li-Ion Battery – W. Kim, Y. Hwa, J. Jeun, H. Sohn, and S. Hong (Seoul National University)

14:20 **1084** Development of Li-Ion Rechargeable Battery Using Glassy SnO-P_2O_5 Anode and Glass-Ceramic $LiFePO_4$ Cathode and Their Safety Evaluation – A. Yamano, M. Morishita (National Institute of Advanced Industrial Science and Technology (AIST)), H. Yamauchi, T. Nagakane, A. Sakamoto, M. Ohji (Nippon Electric Glass), and T. Sakai (National Institute of Advanced Industrial Science and Technology (AIST))

14:40 **1085** Development of Li-Ion Rechargeable Battery Using Glassy SnO-P_2O_5 Anode and Glass-Ceramic $LiFePO_4$ Cathode Materials – T. Nagakane, H. Yamauchi, A. Sakamoto, M. Ohji (Nippon Electric Glass), A. Yamano, M. Morishita, and T. Sakai (National Institute of Advanced Industrial Science and Technology (AIST))

15:00 **1086** Study of the Factors that Enable Carbon-Free Insulating Li-Ion Battery Electrodes – C. Kim, C. Alexander, N. S. Norberg, R. M. Kostecki, and J. Cabana (Lawrence Berkeley National Laboratory)

15:20 **1087** Single-Crystalline Porous Indium Phosphide as Novel Anode Material for Li-Ion Batteries – M. Gerngross, E. Quiroga-González, J. Carstensen, and H. Föll (Christian-Albrechts-University of Kiel)

Coral 3, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Life Studies II – 16:00 – 18:00
Co-Chairs: Kevin Gerring and Mark Verbrugge

16:00 **1088** A Thermodynamics-based Approach to Predicting Path Dependence of Aging in Electrochemical Cells: Part 2. Large-scale Simulation of Cell Aging Across Multiple US Cities – K. L. Gering (Idaho National Laboratory)

16:20 **1089** Cycle-Life Study and Aging Mechanism Diagnosis of NCM Composite/Graphite Cells – J. Wang (HRL Laboratories), P. Liu (HRL Laboratories LLC), J. Hicks-Garner, L. Westman, E. Sherman, S. Soukiasian (HRL Laboratories), M. W. Verbrugge (General Motors Global R&D Center), and H. Tataria (General Motors)

16:40 **1090** Characterization of Cycle-Life Aging in Automotive Lithium-Ion Pouch Cells – J. Marcicki, A. Bartlett, M. Canova, A. Conlisk, G. Rizzoni, Y. Guezennec (Ohio State University), X. Yang, and T. Miller (Ford Motor Company)

17:00 **1091** A Common Capacity Loss Trend: $LiFePO_4$ Cell's Cycle and Calendar Aging – Y. Miyaki, K. Hayashi, T. Makino, K. Yoshida, M. Terauchi, T. Endo, and Y. Fukushima (Sony Energy Devices Corporation)

17:20 **1092** Capacity Fading of Mechanically Stressed Lithium-Ion Pouch Cells – J. Cannarella and C. B. Arnold (Princeton University)

17:40 **1093** Battery Cycle Life Prediction with Coupled Chemical Degradation and Fatigue Mechanics – R. D. Deshpande (Lawrence Berkeley National Laboratory), M. W. Verbrugge (General Motors Global R&D Center), Y. Cheng (University of Kentucky), J. Wang, and P. Liu (HRL Laboratories LLC)

Coral 4, Mid-Pacific Conference Center, Hilton Hawaiian Village

Lithium-Ion Batteries: Anodes V (General) – 16:00 – 17:40
Co-Chairs: Corey Love and Pradeep Guduru

16:00 **1094** Lithium Storage Properties of Defect-Introduced Graphene Sheets – W. Lee, S. Suzuki, and M. Miyayama (The University of Tokyo)

16:20 **1095** Study of Solid Electrolyte Interface (SEI) on Graphite Anodes – J. Benson, J. Lee, N. Nitta, A. Magasinski, I. Kovalenko, T. Joshi, T. Fuller, and G. Yushin (Georgia Institute of Technology)

16:40 **1096** Origin of Voltage Hysteresis of the Li-Cu-TiS_2 Displacement Reaction System: A Multi-Scale Simulation Based on Thermodynamics and Kinetics – H. Yu, J. Bhattacharya, C. Ling, A. Van Der Ven, and K. Thornton (University of Michigan)

17:00 **1097** The Effect of the Active Material of Lithium battery to the Contact Resistance between Carbon and Aluminum Current Collector – C. Honda, S. Onodera, K. Tachibana, and T. Nishina (Yamagata University)

17:20 **1098** Entangled Structures of Germanium Nanowires & Graphite Nanofibers for the Anode of Lithium Ion Batteries – S. Woo, S. Choi (Sungkyunkwan University), J. Park (Samsung Electronics), S. Hwang (Samsung Advanced Institute of Technology), and D. Whang (Sungkyunkwan University)

B9 Polymer Electrolyte Fuel Cells 12 (PEFC 12)

Energy Technology / Corrosion / Physical and Analytical Electrochemistry / Battery / Industrial Electrochemistry and Electrochemical Engineering

Tapa 1, Tapa Conference Center, Hilton Hawaiian Village

A-4.1 Fuel Cell Performance and Degradation – 08:00 – 12:00
Co-Chairs: Dusan Spernjak and Cynthia Rice-York

08:00 **1670** Ex Situ Characterization of Degradation Mechanisms of MEAs by Imaging XPS and SEM – K. Artyushkova (The University of New Mexico), A. Patel (University of New Mexico), P. Atanassov (The University of New Mexico), M. Dutta, V. Colbow, and S. Wessel (Ballard Power Systems)

08:20 **1671** PEMFC Gas Diffusion Media Degradation Determined by Acid-Base Titrations – J. Chlistunoff, K. C. Rau, R. Mukundan, and R. L. Borup (Los Alamos National Laboratory)

08:40 **1672** Influence of *In Situ* and Ex Situ Aging of Gas Diffusion Layers on Fuel Cell Performance Degradation – D. Spernjak, J. D. Fairweather, T. Rockward, K. C. Rau, R. L. Borup, and R. Mukundan (Los Alamos National Laboratory)

09:00 **1673** Subzero Degradation Analysis of Membrane Electrode Assemblies Modified with Additives – A. Pistono (Tennessee Technological University), C. A. Rice (Tennessee Tech University), J. Lewis, and V. Ramani (Illinois Institute of Technology)

09:20 **1674** PEM Fuel Cell Performance and Durability with Different Treatments of Microporous Layer – D. Spernjak, R. Mukundan (Los Alamos National Laboratory), P. Wilde, R. Schweiss (SGL Carbon GmbH), K. L. More (Oak Ridge National Laboratory), D. Langlois, J. D. Fairweather, and R. L. Borup (Los Alamos National Laboratory)

09:40 Intermission (20 Minutes)

10:00 **1675** Effects of Pt Concentration of Carbon Supported Catalysts on High Temperature PEMFC Performance – J. O. Park, J. Ha, S. Hong, Y. Lee (Samsung Advanced Institute of Technology), M. Takezawa (Samsung Yokohama Research Institute), and K. Choi (Samsung Advanced Institute of Technology)

10:20 **1676** Improvement of PEFC Performance by Removing GDLs – K. Takeuchi (Nippon Soken, Inc.)

10:40 **1677** Effect of Gas Diffusion Layer Design on PEM Fuel Cell MEA Water Removal in an Under Humidified Environment – J. Bellerive and A. Bellemare-Davis (Ballard Power Systems)

11:00 **1678** PEMFC GDE Oxygen Mass Transport Coefficient Separation with Different Gas Diluents – T. V. Reshetenko (University of Hawaii at Manoa) and J. St-Pierre (University of Hawaii)

11:20 **1679** The Dew Point Temperature as a Criterion for Optimizing PEMFC Operating Conditions – T. Berning (Aalborg University)

11:40 **1680** Handheld Characterization Probe for Catalytic Assessments of Electrodes and MEAs – D. Carr, B. Slote, K. Jayne, and M. C. Kimble (Reactive Innovations, LLC)

Tapa 2, Tapa Conference Center, Hilton Hawaiian Village

D-4.1.1 Corrosion-Resistant Pt Cathodes – 08:00 – 12:00
Co-Chairs: Michael Lennartz and Kazunari Sasaki

08:00 **1681** The Potential of Non-Carbon Supported Electrocatalyst for Automotive Fuel-Cells – J. Suchsland (SolviCore), B. Klose-Schubert, D. Herein, and M. Lennartz (Umicore)

08:40 **1682** Microstructure and Durability of Non-Carbon Supported Cathode Prepared by a Direct Dry Deposition Technique – R. Maric, J. Roller, M. Arellano-Jiménez, W. E. Mustain, and C. Carter (University of Connecticut)

09:00 **1683** Corrosion-Resistant PEFC Cathode Catalysts Based on Sub-Stoichiometric Titanium Oxide Supports – T. Ioroi, M. Asahi, S. Yamazaki, Z. Siroma, N. Fujiwara, and K. Yasuda (National Institute of Advanced Industrial Science and Technology)

09:20 **1684** Alternative Electrocatalyst Support Materials for Polymer Electrolyte Fuel Cells – K. Sasaki, S. Hayashi, K. Kanda, Y. Takabatake, T. Tsukatsune, T. Higashi, F. Takasaki, Z. Noda, and A. Hayashi (Kyushu University)

09:40 Intermission (20 Minutes)

10:00 **1685** Electrochemical Characterization of Pt Catalysts Supported on $Sn_{0.96}Nb_{0.04}O_{2-\delta}$ and $Sn_{0.96}Sb_{0.04}O_{2-\delta}$ with Aggregated Structure in Rotating Disk Electrode and Membrane Electrode Assembly Measurements – K. Kakinuma, Y. Chino, M. Uchida, H. Uchida, S. Deki, and M. Watanabe (University of Yamanashi)

10:20 **1686** Mixed Metal Oxides as Corrosion-Resistant Catalyst Supports for Polymer Electrolyte Fuel Cells – A. Kumar and V. Ramani (Illinois Institute of Technology)

10:40 **1687** Titania and Carbon Nanotube Composite Catalyst Supports for Durable Electrocatalyst Performance – W. A. Rigdon (University of South Carolina), J. J. Sightler (USC), D. Larrabee (University of South Carolina), E. McPherson, and X. Huang (USC)

11:00 **1688** Conductive Nanostructured Materials for Supported Metal Catalysts – J. Sansinena (Los Alamos National Laboratory (LANL)), M. Wilson, and F. H. Garzon (Los Alamos National Laboratory)

11:20 **1689** Molybdenum Carbide as Support for Platinum Catalysts for Oxygen Reduction in Fuel Cells – L. Elbaz (Los Alamos National Laboratory), J. Philips (Naval Postgraduate School Monterey), N. J. Henson, and E. L. Brosha (Los Alamos National Laboratory)

11:40 **1690** Vanadium Carbide Derived Carbon as a Possible Catalyst Support for PEMFC – E. Härk (University of Tartu), J. Nerut, K. Vaarmets, S. Sepp, P. Valk, R. Jäger (Universtity of Tartu), and E. Lust (University of Tartu)

Honolulu 2, Tapa Conference Center, Hilton Hawaiian Village

D-4.1.2 Non-Precious Metal Catalysts 2 – 08:00 – 12:00
Co-Chairs: Piotr Zelenay and Shigenori Mitsushima

08:00 **1691** Catalytic Activity and Stability of Ta Compounds for Oxygen Reduction Reaction – S. Mitsushima, Y. Fujita, A. Ishihara, Y. Ohgi, K. Matsuzawa (Yokohama National University), M. Matsumoto, M. Arao, H. Imai (NISSAN ARC Ltd.), and K. Ota (Yokohama National University)

08:20 **1692** Non-Precious Metal Oxygen-Reduction Catalysts for PEM Fuel Cells Based on N-Doped Ordered Porous Carbon – A. Dorjgotov, J. Ok, Y. Jeon (Yonsei University), S. Yoon (Kyushu University), and Y. Shul (Yonsei University)

08:40 **1693** Evaluation of Nitrogen Species and Microstructre of Silk-Derived Activated Carbon as Non-Precious Metal Catalyst for PEFC Cathode – H. Fukunaga, T. Shimoyama, N. Takahashi, T. Takatsuka (Shinshu University), and H. Kishimoto (Dai Nippon Printing Co. Ltd)

09:00 **1694** Insight into the Possible Nature of the Active Catalytic Site in Non-Precious Metal Fuel Cell ORR Catalysis – P. Zelenay, G. Wu, H. T. Chung, M. Blair, E. F. Holby, C. D. Taylor (Los Alamos National Laboratory), and M. Neidig (University of Rochester)

09:20 **1695** Active Site Modeling: Non-Precious Metal Based Catalysts for ORR – E. F. Holby, C. D. Taylor, G. Wu, and P. Zelenay (Los Alamos National Laboratory)

09:40 Intermission (20 Minutes)

10:00 **1696** Using a Dual Plasma Process to Produce Cobalt-Polypyrrole Catalysts for the Oxygen Reduction Reaction in Fuel Cells – C. Walter (INP Greifswald), K. Kummer (European Synchrotron Radiation Facility), D. Vyalikh (TU Dresden), A. Quade, V. Brüser, and K. Weltmann (INP Greifswald)

10:20 **1697** Low-Cost, High-Efficiency Non-PGM Cathode Catalysts Using MOFs as Precursors – D. Zhao, J. Shui, C. Chen, S. Comment, B. Reprogle, and D. Liu (Argonne National Laboratory)

10:40 **1698** Basicity of Non-precious Metal Catalysts for Oxygen Reduction – N. D. Leonard and S. Calabrese Barton (Michigan State University)

11:00 **1699** Templated Non-PGM Electrocatalysts for Polymer Electrolyte Fuel Cells – P. Atanassov (The University of New Mexico), A. Serov (University of New Mexico), B. Halevi, K. Artyushkova (The University of New Mexico), and B. Kiefer (New Mexico State University)

11:20 **1700** Investigation of Fe-N-C Cathode Catalysts in Laminar Flow Fuel Cells – M. Naughton (University of Illinois at Urbana-Champaign), N. D. Leonard, S. Calabrese Barton (Michigan State University), and P. J. Kenis (University of Illinois at Urbana-Champaign)

11:40 **1701** Development of Hybrid Cathode Catalyst for PEM Fuel Cells – T. Kim, W. Jung, T. Xie, A. Kriston, P. Ganesan, and B. N. Popov (University of South Carolina)

Honolulu 3, Tapa Conference Center, Hilton Hawaiian Village

E-4.1 Electrolysis and Alkaline Fuel Cell Materials – 08:20 – 10:40
Co-Chairs: Christopher Arges and EunAe Cho

08:20 **1702** High Temperature Electrochemical Hydrogen Pump Cell Using a PBI Membrane at High Current Densities – T. J. Petek, J. S. Wainright, and R. F. Savinell (Case Western Reserve University)

08:40 **1703** Testing of 17-Cell Dimensionally Stable Membrane (DSA) High-Pressure Electrolysis Stack – A. K. Kisor (California Institute of Technology), M. Errico (Caltech/ JPL), T. I. Valdez (California Institute of Technology), M. Hamdan, J. Willey, T. Norman, C. Mittelsteadt (Giner Inc.), and M. Hoberecht (NASA/ Glenn Research Center)

09:00 **1704** Optimization of Clamping Pressure for High Pressure (Proton Exchange Membrane) PEM Electrolyzers – O. F. Selamet, M. Acar, M. Ergoktas, and M. Mat (Nigde University)

09:20 **1705** Comparing Platinum and Palladium as Hydrogen Oxidation/Evolution Electrocatalysts in Alkaline Medium – J. Herranz, P. Rheinländer, S. Henning, and H. A. Gasteiger (Technische Universität München)

09:40 Intermission (20 Minutes)

10:00 **1706** Carbonate and Bicarbonate Ion Transport in Alkaline Anion Exchange Membranes – A. M. Kiss, T. D. Myles (University of Connecticut), K. N. Grew (U.S. Army Research Laboratory), A. A. Peracchio, G. J. Nelson, and W. K. Chiu (University of Connecticut)

10:20 **1707** Alkaline Stability and Ion Conductivity of Polysulfone Anion Exchange Membranes (AEMs) with Different Cation Chemistries – C. G. Arges and V. Ramani (Illinois Institute of Technology)

B11 Sodium Batteries

Battery / Energy Technology / High Temperature Materials
Lehua, Kalia Conference Center, Hilton Hawaiian Village

High Temperature Sodium Batteries – 08:00 – 11:20
Co-Chairs: David Hall and Jeffrey Fergus

08:00 **1871** The Effect of Discharge Duration Distribution on Sodium Metal Halide Battery Cycle Life for Uninterruptible Power Supplies – D. B. Hall (GE Global Research)

08:30 **1872** Solid Electrolytes for Sodium Batteries – J. W. Fergus (Auburn University)

09:00 **1873** Novel Sodium-Zinc Chloride Battery – X. Lu, G. Li, J. Kim, J. Lemmon, V. Sprenkle, and Z. Yang (Pacific Northwest National Laboratory)

09:20 **1874** Development of Sodium-Metal Halide Batteries for Energy Storage – G. G. Tao, N. Weber (Materials and Systems Research Inc.), and A. V. Virkar (The University of Utah)

09:40 Intermission (20 Minutes)

10:00 **1875** Molten Sodium Battery with NaSICON Ceramic Membrane – A. Eccleston, M. Robins (Ceramatec, Inc.), S. V. Bhavaraju (Ceramatec Inc.), Y. Kim, W. Koh, J. Chae, and J. Kim (SK Innovation)

10:20 **1876** Effects of Nickel Content and Operating Conditions on Cathode Degradation of Sodium-Nickel Chloride (Zebra) Battery – G. Li, X. Lu, J. Kim, and V. Sprenkle (Pacific Northwest National Laboratory)

10:40 **1877** Development of a Brass Supported Zinc-Chloride Sodium Cell – D. C. Bogdan Jr. (General Electric Company), M. Vallance, K. Gourishankar, H. Seshadri, G. Sundararajan, and A. Viswanathan (GE Global Research)

11:00 **1878** Influence of Sulfur Concentration on Low Temperature Operation of the Cell Na/β"-Alumina/S(IV) in $AlCl_3$-NaCl Melt – T. J. Dunstan (Electrochemical Systems Inc.) and J. Caja (Electrochemical Systems, Inc.)

E17 SiGe, Ge, and Related Compounds: Materials, Processing, and Devices 5

Electronics and Photonics

316A, Level 3, Hawaii Convention Center

Related Compounds Session 1: Heterogeneous Integration – 08:00 – 10:00
Co-Chair: Alexander Reznicek

08:00 **3236** Materials Integration for III-V/SiGe+CMOS Integrated Circuit Platforms (Invited) – E. A. Fitzgerald, P. Sharma, M. Bulsara, T. Milakovich (Massachusetts Institute of Technology), S. Ringel, A. Pitera, J. Hennessy, and A. Malonis (4Power LLC)

08:30 **3237** Heterogeneous Integration of III-V Devices and Si CMOS on a Silicon Substrate – T. Kazior (Raytheon)

09:00 **3238** Heterogeneous Integration of InP HBTs on CMOS: Leveraging and Providing Value to Conventional Silicon Technologies – J. C. Li, Y. Royter, P. Patterson, T. Hussain, J. Duvall, M. Montes, I. Valles, F. Ku, M. Boag-O'Brien, A. Lopez, D. Le, D. Zehnder, S. Kim, S. Chen, T. Oh, M. Akmal, E. Wang, D. Hitko, M. Sokolich, D. Chow, P. Brewer, and K. Elliott (HRL Laboratories LLC)

09:30 **3239** Wafer-level Heterogeneous Integration of GaN HEMTs and Si (100) MOSFETs – H. Lee, Z. Li, M. Sun, K. Ryu, and T. Palacios (Massachusetts Institute of Technology)

Related Compounds Session 2: Processing – 10:15 – 12:00
Co-Chair: Alexander Reznicek

10:15 **3240** Scalable GaN-on-Silicon Using Rare Earth Oxide Buffer Layers – F. Arkun (Translucent Inc), M. Lebby, R. Dargis, R. Roucka, R. S. Smith, and A. Clark (Translucent Inc.)

10:45 **3241** Formation and Characterization of Nickel Germanosilicide on $Si_{1-x}Ge_x/Si/SiO_2/Si$ – W. Yoo (WaferMasters, Inc.), N. Hasuike, H. Harima, and M. Yoshimoto (Kyoto Institute of Technology)

11:05 **3242** Low Specific Ohmic Contacts to n-type Germanium Using a Low Temperature NiGe Process – K. F. Gallacher, P. Velha, D. J. Paul, I. Maclaren (University of Glasgow), M. Myronov (University of Warwick), and D. Leadly (Warwick University)

11:25 **3243** Formation of 1.7-nm-thick-EOT Germanium Dioxide Film with a High-Quality Interface Using a Direct Neutral Beam Oxidation Process – A. Wada (Tohoku University), R. Zhang, S. Takagi (The University of Tokyo), and S. Samukawa (Tohoku University)

11:45 Concluding Remarks (15 Minutes)

I3 Molten Salts and Ionic Liquids 18

Physical and Analytical Electrochemistry / Electrodeposition / Energy Technology

301A, Level 3, Hawaii Convention Center

Materials – 08:00 – 11:40
Co-Chairs: M. Foley and A. Bund

08:00 **3729** The Structure of Nickel Compounds in the Ionic Liquid 1-Ethyl-3-Methyl Imidazolium Chloride/ Aluminum Chloride – D. F. Roeper (Excet, Inc.), C. Graham (United States Naval Academy), K. Pandya (Brookhaven National L), and W. O'Grady (Excet, Inc.)

08:20 **3730** Intercalation Chemistry of Ionic Liquids – T. E. Sutto (Naval Research Laboratory)

08:40 **3731** Dispersion of Organically Modified Layered Silicates in Melt Blended Poly(lactic acid) Composites: Effects of Cation Head Groups and Oxygenated Alkyl Chains – D. M. Fox (American University), M. Zammarano (National Institute of Standards and Technology), and M. Novy (American University)

09:00 **3732** Ionic Liquids for Controlled Synthesis of Functional Materials – P. Fulvio, H. Luo, and S. Dai (Oak Ridge National Laboratory)

09:40 Intermission (20 Minutes)

10:00 **3733** Use of Ionic Liquid as a New Medium under Vacuum Conditions – S. Kuwabata, A. Imanishi (Osaka University), T. Torimoto (Nagoya University), and T. Tsuda (Osaka University)

10:40 **3734** Control of Formation Process of Au Nanoparticles Prepared by Low Energy Quantum Beam Irradiation in Ionic Liquid – A. Imanishi, T. Arimura, T. Sakamoto, T. Tsuda, S. Kuwabata, and K. Fukui (Osaka University)

11:00 **3735** Simple Fabrication of Pt Nanoparticle-Carbon Nanotube Composite with Ionic Liquid-Sputtering Method – K. Yoshii, T. Tsuda, T. Arimura, A. Imanishi (Osaka University), T. Torimoto (Nagoya University), and S. Kuwabata (Osaka University)

11:20 **3736** Fabrication of 3D Polymer Structures from Room-Temperature Ionic Liquid by Quantum Beam Techniques – H. Minamimoto, K. Inoue, T. Tsuda, A. Imanishi, S. Seki, and S. Kuwabata (Osaka University)