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)