

## Wednesday, October 10

09:00h..... Technical Exhibit

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

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

18:00h..... General Poster Session



### Nanotechnology General Session

All Divisions / New Technology Subcommittee

Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center

### A2 – Nanotechnology General Session Poster Session – 18:00 – 20:00 Co-Chairs: Fanglin (Frank) Chen, Oana Leonte, Sirikanda Nuansaeng, and William Mustain

- 269 Functionalized Nanoporous Membrane Electrodes for ASV Analysis of Water – H. Bessbousse, T. Wade, and M. Clochard (CEA-CNRS-Ecole Polytechnique)
- 270 Silicon Nanowire Based Thermoelectric Device – M. Jang, Y. Park, Y. Hyun (ETRI), W. Choi (KAIST), and T. Zyung (ETRI)
- 271 Studies of Boron Diffusivities on (001) and (110) Substrate Orientation in Si and Ge along Vertical/Out-Of Plane and Lateral/In-Plane Directions by SIMS and C-V Measurement on the Designed Test Pattern – M. Liao, C. Chen, L. Chang, C. Yang (National Taiwan University), C. Hsieh (Industrial Technology Research Institute), and M. Lee (National Taiwan Normal University)
- 272 Measurement of the Band Gap of Amorphous Silicon Based Thin Film with STEM-EELS – T. Motoya, T. Furuhashi (Mitsubishi Electric Corporation), and H. Kurata (Kyoto University)
- 273 Electrical Properties and Microstructures of ZnO:Ga Films Formed by Magnetron Sputtering – N. Yamamoto, K. Morisawa, H. Makino, and T. Yamamoto (Kochi University of Technology)
- 274 Size effect on Photocatalytic Activity of Magnetite Nanoparticles under Visible-Light Irradiation – Y. Chen (National Cheng Kung University)
- 275 Liquid Phase Synthesis of Quantum Dots without Rare Metals and Toxic Elements – T. Makimura, S. Takeshita, and T. Isobe (Keio University)
- 276 Diameter-Dependent Performance of the Metal Oxide Nanowire Lithium-Ion Battery Anodes Controlled by a Simple Contact Printing Method – S. Lee, J. Kim, and W. Kim (Gwangju Institute of Science and Technology)
- 277 Quantum Chemical Molecular Dynamics Simulations of Mechano-Chemical Reactions during Copper Chemical Mechanical Polishing Processes – K. Kawaguchi, T. Ishikawa, Y. Higuchi, N. Ozawa, T. Shimazaki, and M. Kubo (Tohoku University)

- 3976 Silica-Overcoated Copper-Indium-Sulfide Quantum Dot-Polymer Composite Plate as a Robust Wavelength Converter of White Light-Emitting Diode – W. Song, E. Jang, and H. Yang (Hongik University)
- 3977 Tunable Green-Red-Emitting  $\text{Ca}_{14}\text{Mg}_2[\text{SiO}_4]_8:\text{Eu}^{2+}, \text{Mn}^{2+}$  Phosphor: the Structural and Optical Properties, and Their Application to Near-UV LED-based White LEDs – K. Lee and W. Im (Chonnam National University)
- 3978 The Formation of the Hexagonal Pyramid Facets on Wet Etching Patterned Sapphire Substrate – Y. Chen (Nation Chiao Tung University), F. Hsiao, and Y. Wu (National Chiao Tung University)
- 3979 High Brightness III – V Light-Emitting Diodes on Diamond/Silicon Composite Substrate – T. Chang, J. Hu (Nation Chiao Tung University), Y. Wu, and B. Lin (National Chiao Tung University)
- 3980 Organic Light-Emitting Diodes with Contact-Printed Red Emissive Layer – S. Peng, J. Jou, S. Chen, and P. Wu (National Tsing Hua University)
- 3981 Color Tuning of Red-Emission  $\text{Eu}_{1-x}\text{Ba}_x\text{Si}_2\text{O}_7$  Phosphors for White-Light-Emitting Diode – K. Park, K. Seo, J. Kim (Pukyong National University), T. Kim (Lumimicro Co., LTD), and G. Kim (Korea University of Technology and Education)
- 3982 Blue Excitability of Yellow  $\text{Zn}_{1-x}\text{Mn}_x\text{S}$  Phosphor and Its LED Application – K. Park, K. Seo, H. Lim, J. Kim (Pukyong National University), T. Kim (Lumimicro Co., LTD), and G. Kim (Korea University of Technology and Education)
- 3983 Green  $\text{CaSc}_2\text{O}_4:\text{Ce}^{3+}$  Phosphor for White-Light-Emitting Diode – K. Park, K. Seo, S. Lim, H. Lim, J. Lim, J. Kim, L. Jiang, J. Kim (Pukyong National University), T. Kim (Lumimicro Co., LTD), and G. Kim (Korea University of Technology and Education)
- 3984 Luminescence Properties and Stability Improvement by  $\text{SiO}_2$  Coating on Various Phosphors for Near UV-Emitting LEDs – J. Han (University of California, San Diego), M. Hannah, A. Piquette (Osram Sylvania), J. Talbot (University of California, San Diego), K. C. Mishra (Osram Sylvania), and J. Mckittrick (University of California, San Diego)

- **278** Surface Potential Measurement of PCBM/CuPc Films on Indium Tin Oxide Electrode by DFM/KPFM – N. Satoh (Chiba Institute of Technology), S. Katori, K. Kobayashi, K. Matsushige, and H. Yamada (Kyoto University)
- **279** Template-Free Electrochemical Growth of One-Dimensional Metal Nanostructures – S. Park (University of Science and Technology), H. Shin, Y. Kim (Korea Research Institute of Standards and Science), H. Park (University of Science and Technology), and J. Song (Korea Research Institute of Standards and Science)
- **280** First-Principles Calculations on the Chemical Mechanical Polishing Mechanism of SiO<sub>2</sub> Glasses by CaZrO<sub>3</sub> and SrFeO<sub>3</sub> Abrasive Particles – M. Nakamura, T. Ishikawa, Y. Higuchi, N. Ozawa, T. Shimazaki, and M. Kubo (Tohoku University)
- **281** Synthesis and Characterization of Mesoporous Silica-Magnetite Nanocomposites – J. Lee, M. Yoon, and H. Hwang (Inha University)
- **282** Nitrogen Incorporated Ultrananocrystalline Diamond/Nonhydrogenated Amorphous Carbon Composite Films Prepared by Pulsed Laser Deposition – S. S. Al-Riyami and T. Yoshitake (Kyushu University)
- **283** Development of High Efficient Sulfur-Doped TiO<sub>2</sub> Photocatalysts Hybridized with Graphitic Carbon Nitride – K. Kondo, N. Murakami, and T. Ohno (Kyushu Institute of Technology)
- **284** Tight-Binding Quantum Chemical Molecular Dynamics and First-Principles Molecular Dynamics Studies of Super-Low Friction Mechanism on Carbon Nitride Coatings – S. Sato, S. Bai, T. Ishikawa, Y. Higuchi, N. Ozawa, T. Shimazaki, K. Adachi (Tohoku University), J. Martin (Ecole Centrale de Lyon), and M. Kubo (Tohoku University)
- **285** Preparation of Au Nano or Micro Pattern on Hydrogels for Optical Applications – N. Shimamoto, Y. Tanaka, H. Mitomo (Hokkaido University), R. Kawamura (Riken), K. Ijiri, K. Sasaki (Hokkaido University), and Y. Osada (Riken)
- **286** Polymer-Nanocrystal Composites for Electrochromic Devices – E. Runnerstrom, G. Garcia, R. Buonsanti, A. Llodes, T. Pick, B. Helms, and D. Milliron (Lawrence Berkeley National Laboratory)
- **287** Visible Light Response of Shape Controlled Rutile TiO<sub>2</sub> Nanorod Photocatalyst by LSPR Absorption – A. Tanibata, N. Murakami, and T. Ohno (Kyushu Institute of Technology)
- **288** Effect of Sintering Temperature on the Microstructure of Nanocrystalline Ni-yttria Stabilized Zirconia Cermet – K. Park, J. Kim, C. Kim (Sejong University), S. Nam, K. Cho, and J. Choi (Samchun Pure Chemical Co.)
- **289** Synthesis, Characterization and Electrochemical Property of Graphene-Doped LiFePO<sub>4</sub> Cathode Material – H. V. Nguyen, E. Jin, and H. Gu (Chonnam National University)
- **290** Electrochemical Characteristics of Zn Doped TiO<sub>2</sub> for Dye-Sensitized Solar Cells – E. Jin, X. Zhao, H. V. Nguyen, and H. Gu (Chonnam National University)
- **291** Electrochemical Properties of Quasi-Solid Electrolyte Containing Graphene Oxide Dye Sensitized Solar Cell – X. Zhao, E. Jin, and H. Gu (Chonnam National University)
- **292** Electrochemical Characteristics of ZrO<sub>2</sub> Nanofiber added TiO<sub>2</sub> for Dye-Sensitized Solar Cells – E. Jin, W. Wang (Chonnam National University), J. Park (Southwestern Research Institute of Green Energy Technology), and H. Gu (Chonnam National University)
- **293** Fabrication of Dye-Sensitized Solar Cell with Community of Electrolyte and Pt Counter Electrode – X. Zhao, E. Jin, and H. Gu (Chonnam National University)
- **294** New Prepared TiO<sub>2</sub> was used in Photoelectrode with High Efficiency on Dye-Sensitized Solar Cells – W. Wang, E. Jin, and H. Gu (Chonnam National University)
- **295** Densification and Crystallization of Conducting La<sub>0.7</sub>Sr<sub>0.3</sub>VO<sub>3</sub> Nanopowder Derived from Hydrothermal Process – K. Fung, C. Cho, C. Liu, C. Ni, and S. Tsai (National Cheng Kung University)
- **296** Gallium Phosphide Nanowires for Solar Energy Conversion – W. Wen and S. Maldonado (University of Michigan)
- **297** *In Situ* Monitoring of Photodegradation of Methylene Blue on Recyclable Gold Modified TiO<sub>2</sub> Nanotube (TiO<sub>2</sub>-NTs) Arrays by Using Surface-Enhanced Raman Scattering – R. Li and A. Zhou (Utah State University)
- **298** Controllable Variable Memory States Using Capacitive Coupling of Trapped Electrons – M. Lee, Y. Kim, and J. Lee (Kookmin University)
- **299** Electrical Conductivity and Microstructure of NiO-CGO Composites Prepared By One Step Synthesis – D. A. Macedo (Federal University of Rio Grande do Norte), F. M. Figueiredo, S. G. Patricio (University of Aveiro), R. M. Nascimento, A. E. Martinelli, C. A. Paskocimas (Federal University of Rio Grande do Norte), and F. M. Marques (University of Aveiro)
- **300** Toxicity Assay-On-Chip for Engineered Nanomaterials – K. Garde and S. Aravamudhan (North Carolina A&T State University)
- **301** n-Type Ultrananocrystalline Diamond/Hydrogenated Amorphous Carbon Composite Films Prepared by Pulsed Laser Deposition – S. Al-Riyami (Kyushu University), H. Setoyama, K. Sumitani, Y. Hirai (Kyushu Synchrotron Light Research Center), and T. Yoshitake (Kyushu University)
- **302** Active Targeting, Fluorescence Imaging, and NIR Photothermal Therapy of Malignant Tumors – H. Green, E. Rosenthal, C. Rodenburg, D. Martyshkin, S. Mirov, and W. Grizzle (The University of Alabama at Birmingham)

**Co-Chairs: E. J. Taylor and C. Bock**

- 08:00 **303** (Invited) Addressing a Medical Need: Introduction of the Battery for the Implantable Cardiac Defibrillator – E. S. Takeuchi, A. C. Marschlok, and K. J. Takeuchi (Stony Brook University)
- 08:40 **304** Fuel Cell Technology Readiness – S. Petrovic (Oregon Institute of Technology)
- 09:00 **305** Catalysis Research for Polymer Electrolyte Fuel Cell (CaRPE-FC): A Case Study on an Academic Led, Tri-Party Research Program in Canada – T. Navessin (Blueprime Technology Consulting) and S. Holdcroft (Simon Fraser University)
- 09:20 **306** (Invited) Next Generation Heavy Duty Bus Fuel Cells: An Industry-Academic Collaboration – S. Knights (Ballard Power Systems), E. Kjeang, S. Holdcroft, K. Malek (Simon Fraser University), J. Kolodziej, M. Lauritzen, M. Watson, and J. DeVaal (Ballard Power Systems)
- 09:40 Intermission (20 Minutes)
- 10:00 **307** (Invited) Academia-Industry Synergy for Innovative PEFC Catalyst Layer and its Materials – A. Ohma (Nissan Motor Co., Ltd.)
- 10:20 **308** Creating a Sustainable Business in the Hydrogen and Fuel Cell Market – K. E. Ayers, E. B. Anderson, C. B. Capuano, L. T. Dalton, and A. Roemer (Proton OnSite)
- 10:40 **309** DMFC Power Modules for Materials Handling Vehicles – J. Mergel (Forschungszentrum Jülich)
- 11:00 **310** Technology Transfer between University and Industry in Uzbekistan: Techno Park Model – N. Mahamatov (Turin Polytechnic University in Tashkent)
- 11:20 **311** Electrochemical Discrimination of Ascorbic Acid Diastereomers Using Dihydroxyalkanedithiol-modified Au Electrode – M. Komatsu, T. Ando, and S. Suzuki (Tokai University)
- 11:40 **312** Through the Looking Glass: A Journey into Innovation – R. Jalan (ElectroChem, Inc.)

**Co-Chairs: K. Malek and M. Inman**

- 14:00 **313** (Invited) From Lab Bench to Marketplace: Building New Electrochemical Technologies – Y. Chiang (Massachusetts Institute of Technology)
- 14:20 **314** Turning the Tides: New Mexico Materials for Japanese Cars – P. Atanassov (The University of New Mexico)
- 14:40 **315** A Case Study of Technological Innovation Related to ElectroPolishing of Stainless Steel Valves and Fittings – E. J. Taylor and M. Inman (Faraday Technology Inc.)
- 15:00 Intermission (20 Minutes)

- 15:20 **316** Electrochemical Cesium Recovery Using Nanoparticle Film of Copper Hexacyanoferrate – H. Tanaka, R. Chen, C. Fukushima, M. Asai, T. Kawamoto (AIST), M. Kurihara (Yamagata University), M. Arisaka, T. Nankawa, and M. Watanabe (Japan Atomic Energy Agency)
- 15:40 **317** Integration of a New Electroplated Magnetic Alloy with Power Semiconductor Wafer Manufacturing Processes – T. Liakopoulos (Empirion Inc.), A. Panda, M. Wilkowski, and A. Lotfi (Empirion Inc)
- 16:00 **318** A Novel Technique of Quantifying Micro Insulation Defects on Grain-Oriented Electrical Steel Using the Scanning Vibrating Electrode Technique – L. T. Cassemis, J. H. Sullivan (Swansea University), and D. Power (Orb Works-Tata Steel)
- 16:20 **319** Role of Dimensional Parameters for Determination of Diffusion Coefficient (D) and Surface Exchange Coefficient (K) Case Study for Oxygen Storage Materials, Electrode Materials for SOFCs, and Materials for Li-Ion and Na Batteries – K. Zheng, D. Baster, J. Molenda, and K. Swierczek (AGH University of Science and Technology)

**Batteries and Energy Technology  
Joint General Session – In Honor of James McBreen**Battery / Energy Technology  
Coral 1, Mid-Pacific Conference Center,  
Hilton Hawaiian Village**Flow Battery Membrane – 08:00 – 12:00  
Co-Chairs: M. Hickner and Alex Papandrew**

- 08:00 **402** Polymer Membrane for Redox Flow Battery Application – D. Kim, E. Mi Choi, E. Kang, and K. Kang (Honam Petrochemical Corp.)
- 08:20 **403** Role of Membrane Properties on Species Crossover and Capacity Loss of a Vanadium Redox Flow Battery – K. W. Knehr, E. Agar, C. R. Dennison, A. R. Kalidindi (Drexel University), D. Chen, M. Hickner (The Pennsylvania State University), and E. C. Kumbur (Drexel University)
- 08:40 **404** Redox Flow Battery in Combination with Hydrogen Evolution/Oxidation Electrode – Z. Siroma, S. Yamazaki, M. Yao, N. Fujiwara, M. Asahi, and T. Ioroi (National Institute of Advanced Industrial Science and Technology)
- 09:00 **405** Nonaqueous Redox Flow Battery Development at Pacific Northwest National Laboratory – W. Wang, W. Xu, L. Cosimbescu, D. Choi, L. Li, and Z. Yang (Pacific Northwest National Laboratory)
- 09:20 **406** Effect of Porous Electrode Configuration on Redox Flow Battery Performance – S. Kim (Pacific Northwest National Laboratory), D. Stephenson (Brigham Young University), G. Xia, Z. Nie, and V. Sprenkle (Pacific Northwest National Laboratory)
- 09:40 Intermission (20 Minutes)

- 10:00 **407** Vanadium Redox Flow Battery Efficiency and Durability Studies of Sulfonated Diels Alder Poly(Phenylene)s – C. H. Fujimoto (Sandia National Laboratories), S. Kim (Pacific Northwest National Laboratory), R. Stanis (Gas Technology Institute), and M. Hickner (The Pennsylvania State University)
- 10:20 **408** Direct Measurement of Vanadium Crossover in an Operating Vanadium Redox Flow Battery – D. C. Sing and J. P. Meyers (The University of Texas at Austin)
- 10:40 **409** Component Optimization for High Performance Redox Flow Batteries – S. Kim (Pacific Northwest National Laboratory), D. Chen (The Pennsylvania State University), Z. Nie (Pacific Northwest National Laboratory), M. Hickner (The Pennsylvania State University), C. H. Fujimoto (Sandia National Laboratories), and V. Sprenkle (Pacific Northwest National Laboratory)
- 11:00 **410** Redox-Active Organic Molecules for Non-Aqueous Flow Batteries – F. R. Brushett, L. Zhang, J. T. Vaughey, and A. N. Jansen (Argonne National Laboratory)
- 11:20 **411** Crossover Measurements for Vanadium Redox Flow Batteries Using Electron Spin Resonance – J. S. Lawton, A. M. Jones, D. S. Aaron, Z. Tang (The University of Tennessee Knoxville), A. Papandrew, and T. A. Zawodzinski Jr. (The University of Tennessee)
- 11:40 **412** Cationic Uptake Influence on PFSA Membrane Performance in Vanadium Redox Flow Battery – Z. Tang, J. S. Lawton, D. S. Aaron (The University of Tennessee Knoxville), A. Papandrew, and T. A. Zawodzinski Jr. (The University of Tennessee)

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

**Solid Oxide Fuel Cells I – 08:00 – 11:40**  
**Co-Chairs: J. S. Hardy and Ryan O'Hare**

- 08:00 **413** Fabrication and Performance Evaluation of Direct Methane Fueled Ni-GDC Anode-Supported SOFC Unit Cells Operated at Intermediate Temperature (650°C) – H. Ko, J. Myung, J. Lee, and S. Hyun (Yonsei University)
- 08:20 **414** Effects of Sn-Doped Ni-Based Anodes on Performance and Durability of CH<sub>4</sub>-Fueled SOFCs – J. Myung, H. Ko, J. Lee, and S. Hyun (Yonsei University)
- 08:40 **415** Enhanced Densification of SDC Barrier Layers on Anode Supported Solid Oxide Fuel Cells – J. W. Templeton (Pacific Northwest National Laboratory), Z. Lu (Praxair Inc.), J. S. Hardy, and J. W. Stevenson (Pacific Northwest National Laboratory)
- 09:00 **416** Tubular Segmented-in-Series Solid Oxide Fuel Cell with Metallic Interconnect Films: Performance Study through Mathematical Modeling – J. Lee, B. Son, S. Park, S. Lee, T. Lim, and R. Song (Korea Institute of Energy Research)
- 09:20 **417** Anode-Supported Flat-Tubular SOFCs with Ag-Infiltrated Cathodes: Performance and Durability – R. Song, J. Lee, S. Lee, T. Lim, and S. Park (Korea Institute of Energy Research)

- 09:40 Intermission (20 Minutes)
- 10:00 **418** Non Noble Metal Thin Film Solid Oxide Fuel Cell – I. Chang, S. Ji, Y. Lee, and S. Cha (Seoul National University)
- 10:20 **419** Sputtered Thin Film Pt vs LSCF for Low Temperature Solid Oxide Fuel Cells – Y. Lee, I. Chang, S. Ji, and S. Cha (Seoul National University)
- 10:40 **420** Enhanced Oxide Ion Kinetics in Low-Temperature Solid Oxide Fuel Cells by Atomic Layer Deposited Cermet Interlayer – J. An, Y. Kim, T. M. Gür, and F. B. Prinz (Stanford University)
- 11:00 **421** Performance and Stability of Zn-Doped BSCF Cathode for IT-SOFCs – D. Jung, H. Park, J. Kim, K. Moon, S. Seo, and C. Kwak (Samsung Advanced Institute of Technology)
- 11:20 **422** Fabrication of Ni-YSZ Nano-Composite Electrode for Solid Oxide Fuel Cells via Thin Film Technique – G. Cho, Y. Lee, J. Choi, and S. Cha (Seoul National University)

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

**Fuel Cell/Energy Conversion – 14:00 – 17:00**  
**Co-Chairs: S. Mukerjee and Aswin Manohar**

- 14:00 **423** A New-Style Energy Conversion Scheme: Photo-Assist Fuel Cell Based on Titania Nanotube Arrays – P. Xiao, H. He, F. Liu, and Y. Zhang (Chongqing University)
- 14:20 **424** CdS/CdSe Co-Sensitized Quantum Dots Solar Cells with Different Density of ZnO Nanowire Arrays – J. Tian, Z. Liang, R. Gao, Q. Zhang, and G. Cao (University of Washington)
- 14:40 **425** Regenerative Fuel Cells for Grid Applications – V. Yufit and N. Brandon (Imperial College London)
- 15:00 **426** The Hydrogen Fuel Cell Vehicles Powertrain Possible Roles in the Post Kyoto Perspective in the Pacific RIM Area – M. Romeri (Independent Consultant)
- 15:20 **427** Preparation and Characterization of Ti Based Supports for Electrochemical Energy Conversion Devices – S. Siracusano, A. Stassi, E. Modica, V. Baglio, and A. Aricò (CNR-ITAE)
- 15:40 Intermission (20 Minutes)
- 16:00 **428** Understanding Oxygen Reduction in Complex Metal Organic and Inorganic Composites for Fuel Cell, Electrolyzer and Energy Storage Applications – S. Mukerjee (Northeastern University), T. M. Arruda (Oak Ridge National Laboratory), K. Abraham, M. Trahan, and N. Ramaswamy (Northeastern University)
- 16:20 **429** Electrochemical Reactions on Oriented Pt-V and Pt-Ni-V Metal Alloy Thin Films – C. C. Hays, M. A. Johnson, P. Bahrami, J. G. Kulleck, and H. Greer (California Institute of Technology)
- 16:40 **430** Remote Performance Monitoring of Photovoltaic Systems with Battery Storage – S. Petrovic, G. Kirby, J. Bockelman, M. Payne, J. Fuscald, N. Oester, J. Belanger, and P. Lackey (Oregon Institute of Technology)



**B1 – Poster Session – 18:00 – 20:00**

- **431** Electrical Explosion Synthesis of Si/C Nanocomposites for Li Secondary Batteries – D. Kim, Y. Ha, C. Cho, H. Choi, S. Choi, and C. Doh (Korea Electrotechnology Research Institute)
- **432** Modifications in Nernst-Planck Equation for Solid State Electrochemistry in the 21<sup>st</sup> Century – T. Miyashita (Miyashita Clinic)
- **433** Composite Cathodes Based on  $\text{Sm}_{0.5}\text{Sr}_{0.5}\text{CoO}_{3-\delta}$  for Anode Supported Solid Oxide Fuel Cells – H. Kim (Yeungnam University) and Y. Park (Research Institute of Industrial Science and Technology)
- **434** Surface Modification of Si/C Composite Materials for Improving Distribution of Si Nanoparticles – H. Seo, K. Kim (Korea University), and C. Yi (Sungshin Women's University)
- **435** Fe-Substituted  $\text{Li}_3\text{V}_2(\text{PO}_4)_3$  as High Rate Cathode Materials for Li-Ion Batteries – S. Wu, M. Chen, W. Pang, and F. Liu (Tatung University)
- **436** Lithium-Sulfur Battery Development – S. Urbonaitė (Paul Scherrer Institute), A. Garsuch (BASF SE), and P. Novák (Paul Scherrer Institute)
- **437** Effect of Synthesis Method on the Activity of Carbon-Supported Copper Catalysts toward  $\text{CO}_2$  Electroreduction – B. Spigarelli, Z. Wang, W. Li (Michigan Technological University), and O. A. Baturina (Naval Research Laboratory)
- **438** The Comparative Performance of Carbon Felt Electrodes for Vanadium-Redox Flow Batteries According to Surface Treatment and Heat Treatment Conditions – T. Jung, S. Kim, H. Jeon, K. Kwon, and H. Lee (Hyundai Heavy Industries)
- **439** Performance Test of a Direct Methanol Fuel Cell and  $\text{LiFePO}_4$  Battery Hybrid Electric Vehicles – B. Lee, D. Peck, S. Kim, S. Lim, and D. Jung (Korea Institute of Energy Research)
- **440** Tape Casting, Lamination and Sintering of Calcium-Doped Lanthanum Chromite for SOFC Interconnects – D. Hernandez Rubio, A. C. Hoffmann (University of Bergen), E. Dorolti (Babes-Bolyai University), and C. Suci (University of Bergen)
- **441** Three-Dimensional Modeling on the effect of Active Cooling for a Lithium-Ion Battery Pack – J. Yi, C. Shin (Ajou University), Y. Hong, and C. Kim (EIG Ltd.)
- **442** A Novel SOFC Anode Material: Cu Doped  $\text{La}_{0.75}\text{Sr}_{0.25}\text{Cr}_{0.5}\text{Mn}_{0.5}\text{O}_{3-\delta}$  – L. Sun, Y. Yin, T. Ze, and Z. Ma (Shanghai Jiao Tong University)
- **443** Performances of Aqueous Lithium-Ion Battery with Hydrogel Electrolyte – K. Nakamoto, S. Park, S. Okada (Kyushu University), and S. Mitsui (Nissan Chemical Industries, Ltd.)
- **444** Synthesis of Highly Redox Stable Double-Perovskite Oxide  $\text{Sr}_2\text{MgMoO}_{6-\delta}$  in Air – J. Yin, Y. Yin, Z. Tong, and Z. Ma (Shanghai Jiao Tong University)
- **445** Atomic Layer Deposition of Platinum Electrodes for LT-SOFCs – Y. Kim, J. An, and F. B. Prinz (Stanford University)
- **446** Physico-Chemical and Electrochemical Properties of Ni Perovskite Solid Oxide Fuel Cell Anode for Glycerol Oxidation – G. Monforte, M. Lo Faro, M. Minutoli, V. Antonucci, and A. Aricò (CNR-ITAE)
- **447** Application of Anion-Exchange Membranes for Vanadium Redox Flow Battery – J. Shim, J. Jeon, S. Park, B. Lee, and K. Shin (Korea Institute of Energy Research)
- **448** Synthesis and Physical Properties of Proton Conductors,  $A\text{-Mg}(\text{PO}_3)_3 \cdot y\text{H}_2\text{O}$  ( $A$ :  $\text{Li}^+$ ,  $\text{Na}^+$ ,  $\text{K}^+$ ,  $\text{Rb}^+$ ,  $\text{Cs}^+$  and  $\text{NH}_4^+$ ) – M. Hirayama, Y. Matsuda (Tokyo Institute of Technology), M. Yonemura (High Energy Accelerator Research Organization), and R. Kanno (Tokyo Institute of Technology)
- **449** Acetylene Black Modified 3D  $\text{SnS}_2$  Nanoflowers with High Electrochemical Performance for Lithium-Ion Battery – M. He, L. Yuan, and Y. Huang (Huazhong University of Science and Technology)
- **450** Electrochemical Properties of NAFION Coated Hydriding Combustion Synthesized Mg Based Alloy – S. Kim, M. Chourashiya, C. Park, and C. Park (Chonnam National University)
- **451** Preparation of  $\text{Ni}(\text{OH})_2$  Nanowall/Ni Electrode and Its Application in Lithium-Ion Battery – T. Li, S. Ni, and X. Yang (Three Gorges University)
- **452** A One-Dimensional Model for Air-Breathing Direct Methanol Fuel Cells – J. Park (Seoul National University), S. Ha (Nanyang Technological University), and S. Cha (Seoul National University)
- **453** Novel Synthesis of  $\text{SnO}_2$ /Graphite Composite as Anode Material for Lithium-Ion Batteries – Y. Zhou, X. Yang, and S. Ni (Three Gorges University)
- **454** Preparation of 3D Porous Silicon Powders with Fluoride-Free Technology – C. Shi, X. Yang, D. Yu, and L. Zhang (Three Gorges University)
- **455** Preparation of Chitosan /GPTMS Anion-Exchange Membranes via the Sol-Gel Routes for Vanadium Redox Flow Battery Applications – Y. Huang, S. Huang, K. Hsueh, and B. Wong (National United University)
- **456** Electrochemical Properties of  $\text{MnO}_2$ /Carbon Composites by Microwave Heating – Y. Chun (Korea Institute of Energy Research)
- **457** Study of the Kinetics of Vanadium (II)/(III) Redox Reaction – H. Yang, K. Hsueh (National United University), C. Hsieh (Institute of Nuclear Energy Research), and J. Hung (National United University)
- **458** Membrane Permeability Measurement of Vanadium Ions – C. Wu (Industrial Technology Research Institute), Y. Huang, Y. Chiu, S. Huang, and K. Hsueh (National United University)
- **459** Function and Performance of the Separator Membrane in Red-Ox Flow Batteries and Why Proton Exchange Based Membrane Might Not Be the Best Choice – K. A. Lewinski (3M)
- **460** A Numerical Study of the Electrochemical Performance with the Electrolytic Flow Conditions in Vanadium Redox Flow Battery – J. Kim (Hyundai Heavy Industries Co. Ltd.) and H. Lee (Hyundai Heavy Industries)

- **461** A Novel High Power – Long Cycle Life Energy Storage System for Large-Scale Applications – H. Jin, D. Ren (National Institute of Clean-and-Low-Carbon Energy), G. H. Brilmyer (Batt-Tek Consulting LLC), and M. T. Nispel (Sierra Power Group)

- 11:40 **524** Tailoring Carbons for Energy Storage Via Hydrogen Evolution and Capture under Anodic Biasing Conditions in Neutral pH Aqueous Electrolytes – S. Chun (Carnegie Mellon University), S. Shanbhag (Aquion Energy), and J. F. Whitacre (Carnegie Mellon University)

**B2**

### Electrochemical Capacitors

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

#### Devices and Applications I – 08:00 – 09:40

Co-Chairs: E. Frackowiak and K. Naoi

- 08:00 **515** Advanced Capacitors for Next Generation and Their R&D of Material in Nippon Chemi-Con – K. Tamamitsu, S. Suematsu (Nippon Chemi-con Corp.), S. Ishimoto, and H. Uchi (Nippon Chemi-Con Corporation)
- 08:40 **516** Electrochemical Capacitor Usable Power for Hybrid Electric Vehicle Applications as Determined from Transient Electrical Response – D. A. Corrigan, C. Fortin, and A. Zabik (Wayne State University)
- 09:00 **517** Characteristics of Electric Double Layer Capacitor Based on an Electrode Utilizing SWCNT on “Three-Dimensional Porous Aluminum” – Improvement of Electric Performance at Low Temperature – D. Iida, T. Noguchi, M. Kuramoto (Meidensha Corporation), K. Okuno, A. Hosoe, M. Majima, and Y. Nakai (Sumitomo Electric Industries Ltd.)
- 09:20 **518** A New Aqueous Hybrid Electrochemical Capacitor with a 4 V Operating Voltage – W. Sugimoto, T. Ban, Y. Shinohara, S. Makino, and W. Shimizu (Shinshu University)

#### Devices and Applications II – 10:00 – 12:00

Co-Chairs: K. B. Kim and J. Miller

- 10:00 **519** The Next Generation “Nanohybrid” and “SuperRedox” Capacitors – K. Naoi (Tokyo University of Agriculture and Technology)
- 10:20 **520** Development and Evaluation of an Asymmetric Capacitor with a Nickel/Carbon Foam Positive Electrode – B. C. Cornilsen, J. Wang, P. Sasthan Kuttipillai, T. N. Rogers, W. Yeo, M. B. Chye, and A. Singh Bhatia (Michigan Technological University)
- 10:40 **521** Asymmetric Supercapacitors Consisting of a Graphene-Based Anode and Oxide-Based Cathodes in Aqueous Electrolytes – C. Hu, C. Liu, C. Chen, T. Wu, and K. Chang (National Tsing Hua University)
- 11:00 **522** Testing of MnO<sub>2</sub> Aqueous Hybrid Supercapacitors under Extreme Climatic Conditions – A. J. Roberts and R. Slade (University of Surrey)
- 11:20 **523** Structured EDLC Electrode with Through-Plane Microchannel – T. Okura, A. Morimoto, G. Inoue, and M. Kawase (Kyoto University)

#### Young Investigators – 14:00 – 16:20

Co-Chairs: P. Simon and Y.-Y. Xia

- 14:00 **525** Understanding the Charging Mechanism of Nanoporous Carbon Electrodes from Molecular Dynamics Simulations – M. Salanne, C. Merlet, B. Rotenberg (Universite Pierre et Marie Curie), P. Madden (University of Oxford), P. Taberna, P. Simon (Université Paul Sabatier), and Y. Gogotsi (Drexel University)
- 14:20 **526** A Powerful Approach for Preparing Single-Phase Unitary/Binary Oxides-Graphene Composites – K. Chang (Taiwan Bluestone Technology Co., Ltd.) and C. Hu (National Tsing Hua University)
- 14:40 **527** Nanoporous Carbon Materials for Electrical Double Layer Capacitors – G. Y. Yushin (Georgia Institute of Technology)
- 15:00 **528** High Voltage Electrochemical Double Layer Capacitors Containing Adiponitrile-Based Electrolytes – A. Balducci, A. Brandt (Westfälische Wilhelms University of Muenster), P. Isken, and A. Lex-Balducci (Westfälische Wilhelms-University Münster)
- 15:20 **529** Dramatic Improvements in Electric Double-Layer Capacitors by Using Polysaccharides – M. Yamagata, S. Ikebe, Y. Kasai, K. Soeda, and M. Ishikawa (Kansai University)
- 15:40 **530** NMR Studies on the Mechanism of Electrochemical Double Layer Capacitors – H. Wang, T. K. Köster (University of Cambridge), N. Trease (Stony Brook University), J. Ségolini, P. Taberna, P. Simon (Université Paul Sabatier), Y. Gogotsi (Drexel University), and C. P. Grey (University of Cambridge)
- 16:00 **531** “Nanohybrid Capacitor” Utilizing Li<sub>4</sub>Ti<sub>5</sub>O<sub>12</sub> Compositing with Single-Walled Carbon Nanotube – J. Miyamoto (Tokyo University of Agriculture and Technology), S. Suematsu, K. Tamamitsu (Nippon Chemi-con Corp.), K. Hata (National Institute of Advanced Industrial Science and Technology), S. Iijima (Advanced Industrial Science and Technology), and K. Naoi (Tokyo University of Agriculture and Technology)

*Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center*

#### B2 – Poster Session – 18:00 – 20:00

- **532** Double Templates Synthesis of Mesoporous Nanowires – J. Lee (Nanyang Technological University)
- **533** Influence of Organic Solvents on Carbon-Layer Structure in Electrical-Double-Layer Capacitors – A. Banerjee, P. Suresh Kumar, and A. K. Shukla (Indian Institute of Science)

- **534** Polypyrrole-Covered MnO<sub>2</sub> as Electrode Material for Hybrid Supercapacitor – A. Bahloul, B. Nessark (Université de Ferhat Abbas), E. Briot, H. Groult, A. Mauger, and C. M. Julien (Université Pierre et Marie Curie)
- **535** 3-D Graphene/Metal Oxide Composite Material for Supercapacitors – S. Guo, W. Wang, C. Ozkan, and M. Ozkan (University of California, Riverside)
- **536** Influence of Electrode Mass on the Electrochemical Performance of Asymmetric Supercapacitors with Nano-Ni(OH)<sub>2</sub> and Activated Carbon Electrodes – Y. Tian, J. Yan, R. Xue, H. Lixing, and B. Yi (Chinese Academy of Sciences)
- **537** A General Model for Porous Layer Pseudo-Capacitive Impedance Spectrum – P. Guillemet, O. Crosnier, and T. Brousse (University of Nantes)
- **538** Promising Bio-Carbon for Oxygen Reduction and Supercapacitor – X. Yang and H. Zhu (Chinese Academy of Sciences)
- **539** Nitrogen-Enriched Metallophthalocyanine/Graphene Oxide Nanocomposites for High-Energy Asymmetric Electrochemical Capacitors in Aqueous Electrolytes – K. I. Ozoemena (Council for Scientific and Industrial Research), J. Lekitima, K. Makgopa (University of Pretoria), C. J. Jafta (CSIR), and S. Chen (University of California)
- **540** Ar<sup>+</sup> Plasma Enhanced Vertically Oriented Graphene Supercapacitors – M. Cai, R. A. Outlaw (College of William and Mary), S. M. Butler, and J. R. Miller (JME Inc.)
- **541** Graphene Nanowall Supercapacitors with Ultra-High Performance – H. Yen (Academia Sinica), Y. Horng (National Taiwan University), M. Hu (Academia Sinica), W. Yang, Y. Tai (National Taiwan University of Science and Technology), L. Chen (National Taiwan University), and K. Chen (Academia Sinica)
- **542** Polyacrylonitrile and 1-Ethyl-3-Methylimidazolium Thiocyanate Based Gel Polymer Electrolyte for Solid-State Supercapacitors with Graphene Electrodes – G. Pandey and A. Rastogi (Binghamton University (SUNY))
- **543** Cathodic Synthesis of Birnessite Films for Pseudocapacitor Application – T. Tanimoto, H. Abe, K. Tomono, and M. Nakayama (Yamaguchi University)
- **544** EQCM Investigation on Electrodeposition and Charge Storage Behavior of Birnessite-Type MnO<sub>2</sub> – M. Shamoto, T. Tanimoto, K. Tomono, and M. Nakayama (Yamaguchi University)
- **545** Study of Storage Capacity in Electrochemical Double Layer Capacitor Using Graphene and Blends of Graphene with Carbon – C. Subramaniam (VIT University), T. Maiyalagan (Nanyang Technological University), G. Velayutham (Anabond Sainergy Fuel Cell India Pvt. Ltd.), and S. Bollepalli (Sainergy Tech Inc.)
- **546** Ordered Mesoporous/Microporous Carbon Sphere Arrays Derived from Chlorination of Mesoporous TiC/C Composite and Their Application for Supercapacitors – D. D. Zhou, H. Liu, Y. Wang, C. Wang, and Y. Xia (Fudan University)
- **547** Ion-Exchange/Activation Combination Method to Synthesize 3D Hierarchical Porous Graphitic Carbon with Interconnected Pore Structure as Electrode Material for Supercapacitors – Y. Li and P. Shen (Sun Yat-Sen University)
- **548** Designing Porous Microstructures of NiCo<sub>2</sub>O<sub>4</sub> Spinel Nanoparticles by Using CTAB-Assisted Dispersion – C. Hsu (National Tsing-Hua University), K. Chang, and C. Hu (National Tsing Hua University)
- **549** Effect of Manufacturing Factors on Electrochemical Performance of Carbon-PTFE Electrode for EDLC – I. Kim, S. Yang, and S. Lee (Korea Electrotechnology Research Institute)
- **550** A New Porous Anode Material Electrochemically Synthesized from Polycyclic Aromatic Hydrocarbons – M. Wagner (Åbo Akademi University), C. Kvarnström (University of Turku), A. Ivaska, and J. Bobacka (Åbo Akademi University)
- **551** NaClO<sub>4</sub> and NaPF<sub>6</sub> as Potential Non-Aqueous Electrolyte Salts for Electrical Double Layer Capacitor Application – A. Laheäär, A. Jänes, and E. Lust (University of Tartu)
- **552** Gel-Based Activated Carbon Electrode for EDLC Supercapacitors – V. Jouille, C. Galindo, M. Paté, P. Le Barny, and M. Pham Thi (Thales Research & Technology)
- **553** Alginate Binder for High Power EDLC – S. Ikebe (Kansai University), S. Yamazaki (DAIKIN INDUSTRIES, Ltd.), M. Yamagata, and M. Ishikawa (Kansai University)
- **554** The effect of Electrolyte on the Hybrid Capacitor of LiMn<sub>2</sub>O<sub>4</sub>/AC and LiCoO<sub>2</sub>/AC Prepared by Chemical Activation – J. Lee and H. Yoon (Chungbuk National University)
- **555** Quinone-Functionalized Carbon Nano-Onion for Pseudocapacitor Applications – D. M. Anjos (Oak Ridge National Laboratory), V. Presser, J. McDonough, Y. Gogotsi (Drexel University), G. M. Brown, and S. Overbury (Oak Ridge National Laboratory)
- **556** Electrochemical Characteristic of CNT Sphere by Aggregation of W/O Emulsion Process – H. Kim (Chungbuk National University), J. Yang (Chunghuk National University), H. Kim, and S. Park (Chungbuk National University)
- **557** Nonaqueous Proton Conducting Gel Electrolyte for Supercapacitors – A. A. Ojrzynska (Warsaw University of Technology), I. Rukowska (University of Warsaw), P. Simon (Université Paul Sabatier), P. J. Kulesza (University of Warsaw), and W. Wieczorek (Warsaw University of Technology)
- **558** The Electrochemical Behavior of CNFs by Liquid Phase Carbonization Using Polyethylene Oxide(PEO) – S. Ahn, J. Yang (Chungbuk National University), H. Kim (PureEchem Co. Ltd.), H. Habazaki (Hokkaido University), and S. Park (Chungbuk National University)
- **559** Activated Mesophase Pitch for High Performance Electric Double Layer Capacitors – C. Huang, M. Hsueh, and H. Teng (National Cheng Kung University)



- **560** Comparative Study of Using Chlorine and Hydrogen Chloride for Synthesis of Titanium Carbide Derived Carbon – I. Tallo, T. Thomberg, A. Jänes, and E. Lust (University of Tartu)
- **561** The Contribution of N-Containing Functional Groups on Graphene for EDLC in Acidic and Alkaline Electrolytes – Y. Lee, K. Chang, and C. Hu (National Tsing Hua University)
- **562** A 3.9 V Lithium/Activated Carbon Hybrid Capacitor Based on an Aqueous Electrolyte – W. Shimizu, S. Makino, and W. Sugimoto (Shinshu University)
- **563** Chemical Vapor Deposition Synthesis of Carbon Coated Graphite for Hybrid Capacitor – Y. Kim (Battery R&D Association of Korea)
- **564** Performance of Supercapacitors Based on Graphene Oxide and Mesoporous Carbon by Screen Printing – I. Carrera Leon, J. Baas López, and D. Pacheco Catalán (Centro de Investigación Científica de Yucatán)
- **565** Potential Control with AC Electrode Capacity for Hybrid Capacitor – J. Yang (Chungbuk National University), Y. Yuk, H. Kim (PureEchem Co. Ltd.), and S. Park (Chungbuk National University)
- **566** Fabrication and Optimization of Nanoparticulate Manganese Dioxide Thin-Film Electrochemical Capacitor Prototypes – S. Pang, B. Wee, and S. Chin (Universiti Malaysia Sarawak)
- **567** Electrochemical Properties of Electrochemical Capacitors Using NiO Electrode – M. Chiku, M. Toda, E. Higuchi, and H. Inoue (Osaka Prefecture University)
- **568** N-Butyl-N-Methylpyrrolidinium-Dicyanamide Ionic Liquid as the Electrolyte for Manganese Oxide Pseudo-Capacitor – H. Cheng, I. Sun, C. Su (National Cheng Kung University), M. Lee (National Central University), W. Tsai (National Cheng Kung University), J. Chang (National Central University), and Y. Fu (National University of Tainan)
- **569** Capacitance Enhancement of Anodic ZrO<sub>2</sub> Films by Simultaneous Incorporation of Silicon and Yttrium Species – M. Ishizuka, E. Tsuji, Y. Aoki, and H. Habazaki (Hokkaido University)
- **570** N-doped Graphite Oxide Synthesized from Photocatalytic Reduction for Electrochemical Capacitors – H. Huang and H. Teng (National Cheng Kung University)
- **571** Organic-Inorganic Hybrid Materials for Supercapacitors – V. Ruiz, J. Suarez-Guevara, and P. Gomez-Romero (CIN2-CSIC)
- **572** Electrochemical Properties of Layered (Ni,Co,Mn) Oxide Prepared by Co-Precipitation Method as Electrodes for Electrochemical Capacitors – M. Yano, S. Suzuki, and M. Miyayama (The University of Tokyo)
- **573** Substrate effects on the Supercapacitive Behavior of Electrodeposited Manganese Oxides – M. Glenn and S. W. Donne (University of Newcastle)
- **574** Li Distribution in Carbon Anode with Li Pre-Doping for Li-Ion Capacitor – T. Toki, M. Yamagata, and M. Ishikawa (Kansai University)
- **575** Study of Polypyrrole-Manganese Oxide Composites as Supercapacitor Electrode Materials – P. Ningsih, C. Z. Holdsworth, and S. W. Donne (University of Newcastle)
- **576** Aqueous Asymmetric Electrochemical Capacitors: From Fundamental Electrode Design to Practical Considerations – J. W. Long, M. B. Sassin (U.S. Naval Research Laboratory), B. Willis, C. Hoag (U. S. Naval Research Laboratory), D. R. Rolison (U.S. Naval Research Laboratory), A. Mansour (Naval Surface Warfare Center), S. G. Greenbaum (Hunter College of NY), J. M. Wallace, and K. Pettigrew (U. S. Naval Research Laboratory)
- **577** Pulse-Electropolymerization of Polypyrrole on Free-Standing Graphene Films for Efficient Flexible Supercapacitors – F. M. Hassan, Z. Chen, A. Davies, J. Choi, and A. Yu (University of Waterloo)
- **578** Optimization of Activated Carbon Materials for Lithium-Ion Capacitor Applications – D. A. Totir, S. Letaj, D. Carruthers, M. Petruska, M. King, and M. Wodjenski (Advanced Technology Materials, Inc.)
- **579** Double Layer Capacitor Performances of Porous Carbon Electrodes Derived from Cyclic Oligosaccharide – M. Tokita, M. Egashira, N. Yoshimoto, and M. Morita (Yamaguchi University)
- **580** Selective Adsorption of Ions into Nanoporous Carbons: A View Beyond Just the Mere Ion Size – S. Sigalov, M. Levi, G. Salitra, D. Aurbach (Bar-Ilan University), A. Jänes, E. Lust (University of Tartu), and I. C. Halalay (General Motors Global R&D)
- **581** An Asymmetric Electrochemical Capacitor with Activated Carbon Electrodes in Organic Electrolyte – X. Tian, S. Dsoke, C. Täubert, and M. Wohlfahrt-Mehrens (ZSW-Center for Solar Energy and Hydrogen Research)
- **582** Addressing the Conductivity Issue in Electrochemical Supercapacitor Electrodes – X. Pétrissans, D. Giaume, J. Badot, and P. Barboux (CNRS)
- **583** Electrochemically Reduced Graphene Oxide Sheets as High Performance Supercapacitors – J. Yang and S. Gunasekaran (The University of Wisconsin-Madison)
- **584** Exploring the Cycle Behavior of Electrodeposited Vanadium Oxide Supercapacitor Electrodes in Various Aqueous Environments – A. M. Engstrom and F. M. Doyle (University of California, Berkeley)
- **585** Fabrication of Graphite Oxide/ PEDOT-PSS/ Carbon Nanotubes Composite Paper Via One Step Solution-Casting Synthesis for High Performance Flexible Electrode – Y. Weng and N. N. Wu (National Taiwan University)
- **586** Synthesis and Characterization of N-Methylacetamide/LiBF<sub>4</sub> Complex as an Ionic Liquid Electrolyte for Supercapacitor – B. Bang and T. Yeu (Chung-Ang University)
- **587** *In Situ* Electrochemical Deposition of MnO<sub>2</sub> on CNTs for Ultracapacitor Applications – S. Raina, S. Hsu, W. Kang, J. Huang, and M. Yilmaz (Vanderbilt University)
- **588** Highly Conductive Activated Carbon for the Application of Supercapacitor – Y. Lin, W. Wang, and C. Cheng (Industrial Technology Research Institute)



- **589** Characterization of  $\text{LiNi}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2/\text{C}$  Composite Positive Electrodes for Non-Aqueous Supercapacitors – B. Bang and T. Yeu (Chung-Ang University) 10:40 **657** Preparation of Reduced Graphene Oxide -Sn Composite Through Electroless Deposition and Its Use as an Anode Material in Lithium-Ion Battery – H. Noguchi, G. Kido, and W. Zhao (Saga University)
- **590** Enhanced Electrochemical Supercapacitors Integrated with Polythiophene Using Oxidative Chemical Vapor Deposition – S. Nejati, C. Tran (Drexel University), T. E. Minford (Drexel University), V. Kalra (Drexel University), and K. K. Lau (Drexel University) 11:00 **658** Improved Electrochemical Performance of Graphite Negative Electrodes by Covalently Bound Surface Coatings – H. Meyer, T. Placke, S. Lux (University of Münster), F. Homeyer, F. Jöge (Leibniz University of Hannover), C. Engelhardt (Friedrich-Alexander-University Erlangen-Nürnberg), M. Binnewies (Leibniz University of Hannover), K. Wirth (Friedrich-Alexander-University Erlangen-Nürnberg), S. Passerini, and M. Winter (University of Münster)
- **591** Comparative Study of Electrode Stabilization Technique for Graphene-Polyaniline Nanocomposite Electrodes Using Dielectrics for Supercapacitor Applications – S. A. Ketkar, M. Ram, A. Kumar, T. Weller, and A. M. Hoff (University of South Florida) 11:20 **659** Anion Intercalation into Graphitic Carbon from Ionic Liquid based Electrolytes for High Performance Dual-Ion Batteries – T. Placke, O. Fromm, R. Klöpsch, G. Schmülling, P. Bieker, S. Lux, H. Meyer, S. Passerini, and M. Winter (University of Münster)
- **592** Pseudo-Capacitive Performance of Sol-Gel Manganese Oxide/Graphene Electrodes with Various Heat-Treatments – M. Lee (National Central University), C. Lin (Taipei Medical University), C. Wu, C. Wang, C. Chen (Feng Chia University), and J. Chang (National Central University) 11:40 **660** Kinetic Behavior of Anion Intercalation into Graphite Electrodes in Organic Solutions – F. Sagane (Shizuoka University), K. Miyazaki, T. Fukutsuka, and T. Abe (Kyoto University)
- **593** Electrochemical Behavior of Electrolytes at Porous Electrode Investigated with Transmission-Line Model – N. Nambu and T. Satoh (Tokyo Polytechnic University) 12:00 **661** Carbon Coated  $\alpha\text{-Fe}_2\text{O}_3$  Nano-Particles as High Performance Anodic Material for Lithium-Ion Batteries – A. Brandt and A. Balducci (Westfälische Wilhelms University of Muenster)

## **B4** Intercalation Compounds for Rechargeable Batteries

Battery

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

**Anode – 08:20 – 12:20**

**Co-Chairs: Pedro Gomez-Romero and Christian Julien**

- 08:20 **652** Rechargeable Batteries: From Hybrid Materials to Hybrid Electrodes and Devices – P. Gomez-Romero (CIN2-CSIC)
- 09:00 **653** Novel Fabrication of Highly Conductive Titania/Carbon Electrodes for Lithium-Ion Batteries and Supercapacitors – M. J. Sussman and G. P. Demopoulos (McGill University)
- 09:20 **654** Improvement of Cycle Performance of Lithium-Ion Batteries at Elevated Temperature of 60°C Using Graphite Coated with Metal Oxide – N. Inoue (Semiconductor Energy Laboratory Co. Ltd.), K. Kimura, S. Kataniwa, J. Momo, T. Moriwaka, M. Takahashi, and S. Yamazaki (Semiconductor Energy Laboratory Co., Ltd.)
- 09:40 Intermission (20 Minutes)
- 10:00 **655** MXenes – A New Family of Two Dimensional Transition Metal Carbides Used as Intercalation Compounds – M. Naguib (Drexel University), J. Come (Universite Paul Sabatier), O. Mashtalir, V. Presser (Drexel University), P. Taberna, P. Simon (Université Paul Sabatier), M. W. Barsoum, and Y. Gogotsi (Drexel University)
- 10:20 **656** Characterization of Graphitic Nano-Onions as Lithium-Ion Anodes – J. D. Cardema, G. Radhakrishnan, and P. M. Adams (The Aerospace Corporation)
- 14:00 **662** Enhanced Electrochemical Ion Insertion/Extraction Reaction in Cyano-Bridged Coordination Polymer Electrodes for Rechargeable Battery – M. Okubo, Y. Mizuno, D. Asakura, T. Kudo, and H. Zhou (National Institute of Advanced Industrial Science and Technology)
- 14:40 **663** Intercalation of  $\alpha\text{-MnO}_2$  as Mg battery cathode – L. Chen, T. S. Arthur, R. Zhang, and F. Mizuno (Toyota Research Institute of North America)
- 15:00 **664** Towards the Development of Calcium-Ion Batteries – J. Rogosic and D. R. Sadoway (Massachusetts Institute of Technology)
- 15:20 **665** Electrochemical Properties of  $\text{Li}_3\text{FeO}_4/\text{C}$  Composite Positive Electrode Materials – T. Okumura, M. Shikano, and H. Kobayashi (National Institute of Advanced Industrial Science and Technology (AIST))
- 15:40 Intermission (20 Minutes)
- 16:00 **666** New Fe-Based Oxyfluorides as Rechargeable Lithium-Ion Battery at High Voltage (Average > 3V vs.  $\text{Li}^+/\text{Li}$ ) – A. Demourgues, N. Penin, A. Wattiaux, D. Carlier-Larregaray, L. Bourgeois, E. Durand, A. Tressaud (ICMCB, University of Bordeaux, CNRS), H. Groult (Université Pierre et Marie Curie), D. Dambournet (Argonne National Laboratory), C. M. Julien (Université Pierre et Marie Curie), and K. Zaghib (Institut de Recherche d'Hydro-Québec)
- 16:40 **667** Splash Combustion Synthesis and Exploration of Lithium Metal Pyrophosphate ( $\text{Li}_{1-x}\text{Mg}_x\text{P}_2\text{O}_7$ ) Cathodes – P. Barpanda, T. Ye, J. Lu, Y. Yamada, S. Chung, S. Nishimura, and A. Yamada (The University of Tokyo)

- 17:00 **668** Oxalic Dihydrazide Assisted Novel Combustion Synthesized Pyrophosphate Compounds for Rechargeable Batteries – N. Kalidoss, K. Nallathamby (Central Electrochemical Research Institute), and M. Minakshi (Murdoch University)
- 17:20 **669**  $\text{LiTi}_2(\text{PO}_4)_3$ /Reduced Graphene Oxide Hybrids for High Performance Cathode Materials in Lithium-Ion Batteries – C. Lim, A. G Kannan, H. Lee, and D. Kim (Korea Advanced Institute of Science and Technology)
- 17:40 **670** An Energy Storage Principle Delivered by Bipolar Porous Polymeric Frameworks – K. Sakaushi (IFW Dresden), G. Nickerl, F. Wisser (TU Dresden), E. Hosono, H. Zhou (National Institute of Advanced Industrial Science and Technology), S. Kaskel (TU Dresden), and J. Eckert (IFW Dresden)
- 677**  $\text{MnO}_2$  Nano-Rods Prepared by Redox Reaction as Cathodes in Lithium Batteries – A. M. Hashem, H. M. Abuzeid, A. Abdel-Latif, H. Abbas (National Research Centre), H. Ehrenberg, S. Indris (Karlsruhe Institute of Technology), A. Mauger, and C. M. Julien (Université Pierre et Marie Curie)
- 678** Orthorhombic  $\text{MoO}_3$  Nanofibers as Cathode Materials for Li Batteries – C. V. Ramana (University of Texas at El Paso), A. M. Hashem (National Research Centre), H. Groult, A. Mauger, and C. M. Julien (Université Pierre et Marie Curie)
- 679** Carbon-Coated Nano-Structured  $\text{MoO}_3$  as Cathode Materials for Lithium Batteries: Synthesis, Structure and Electrochemical Performance – C. V. Ramana (University of Texas at El Paso), H. Groult, A. Mauger, and C. M. Julien (Université Pierre et Marie Curie)

*Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center*

**B4 – Poster Session I – 18:00 – 20:00**

**Co-Chairs: Karim Zaghib and Shirley Meng**

- **671**  $\text{LiNi}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$  Synthesized by Sol-Gel Method: Structure and Electrochemical Properties – A. M. Hashem, A. Abdel-Ghany, H. M. Abuzeid (National Research Centre), H. Ehrenberg (Karlsruhe Institute of Technology), A. Mauger, and C. M. Julien (Université Pierre et Marie Curie)
- **672** Electronic Properties of Olivine Materials for Positive Electrodes in Li-Ion Batteries – C. M. Julien, A. Mauger (Université Pierre et Marie Curie), K. Zaghib (Institut de Recherche d'Hydro-Québec), and H. Groult (Université Pierre et Marie Curie)
- **673**  $\text{LiMn}_x\text{Fe}_{1-y}\text{PO}_4$  Cathode Materials Grown by Hydrothermal Route: Structure and Morphology – M. Mathieu, J. Trottier, P. Hovington, A. Guerfi, K. Zaghib (Institut de Recherche d'Hydro-Québec), M. Trudeau (Institut de Recherches d'Hydro-Québec), A. Mauger, and C. M. Julien (Université Pierre et Marie Curie)
- **674**  $\text{LiMn}_x\text{Fe}_{1-y}\text{PO}_4$  Cathode Materials Grown by Hydrothermal Route: Electrochemical Performance – J. Trottier, M. Mathieu, A. Guerfi, K. Zaghib (Institut de Recherche d'Hydro-Québec), A. Mauger, and C. M. Julien (Université Pierre et Marie Curie)
- **675** Synthesis, Structural and Electrochemical Properties of  $\text{LiNi}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$  Prepared by Sol-Gel Method Using Table Sugar as Chelating Agent – A. M. Hashem, H. M. Abuzeid (National Research Centre), N. Kiziltas, M. Herklotz (IFW Dresden), H. Ehrenberg (Karlsruhe Institute of Technology), A. Mauger, and C. M. Julien (Université Pierre et Marie Curie)
- **676** Surface and Bulk Properties of  $\text{LiFePO}_4$ : The Magnetic Analysis – A. Mauger, H. Groult (Université Pierre et Marie Curie), K. Zaghib (Institut de Recherche d'Hydro-Québec), and C. M. Julien (Université Pierre et Marie Curie)
- **677** Single Crystal  $\text{Li}_{1.2}\text{Mn}_{0.56}\text{Ni}_{0.12}\text{Co}_{0.12}\text{O}_2$  Hexagonal Nanoplates with Lateral {010} Facets Exposed as cathode of Lithium-Ion Batteries with Excellent Cycleability – F. Fu, Y. Deng, X. Li, J. Li, L. Huang, and S. Sun (Xiamen University)
- **681** Synthesis and Electrochemical Characterization of Carbonophosphates; A New Family of Intercalation Compounds Discovered by Ab Initio Computing – I. L. Matts, H. Chen, G. Hautier, and G. Ceder (Massachusetts Institute of Technology)
- **682** Improved Initial Coulombic Efficiency of Spinel Battery Cathode by Fluorine-Doping – J. Kim, C. Nguyen, Y. Bae, K. Lee, J. Song, J. Min (Chungnam National University), H. Ko, T. Kim (POSCO ES Materials), Y. Paik (Korean Basic Science Institute), and S. Song (Chungnam National University)
- **683** Investigation on the (de)Lithiation Mechanism of  $\text{Li}_2\text{MoO}_3$  – J. Lee, S. Kim, J. Kim, and G. Ceder (Massachusetts Institute of Technology)
- **684** Cathode Properties of P-Doped  $\text{Li}_2\text{MnO}_3$  – H. Komaki, A. Kitajo, and S. Okada (Kyushu University)
- **685** Synthesis and Electrochemical Performance of a Lithium-Transition Metal-Fluoride as a New Cathode Material for Lithium-Ion Batteries – N. Twu, L. Liu, and G. Ceder (Massachusetts Institute of Technology)
- **686** The Electrical Properties of Amorphous  $\text{TiO}_2$ -B Prepared from Lepidocrocite Type Precursors as an Anode Material in Lithium-Ion Battery – Y. Furuya, T. Iida, and H. Noguchi (Saga University)
- **687** Structural and Magnetic Studies on Initial Cycling of Li-Excess Type Layered Rock-Salt Oxide Cathode – T. Nakamura, K. Nakao (University of Hyogo), H. Takahara, H. Yashiro (Rigaku Corporation), Y. Oka, and Y. Yamada (University of Hyogo)
- **688** Relation between Synthesis Conditions and Electrochemical Properties of Lithium Excess Li-Ni-Mn-O Compounds – H. Yamada, M. Oyama, H. Nakamura, and H. Noguchi (Saga University)
- **689** Facile Synthesis of  $\text{FeF}_3$  and Its Application to Positive Electrode for Rechargeable Lithium Batteries – S. Myung, S. Kim (Sejong University), and Y. Hitoshi (Iwate University)

- **690** Electrochemical Properties of  $Mg_{0.22}MnO_2$  as a Cathode Material for Mg Rechargeable Batteries – T. Kakibe (University of Hyogo), K. Miyazaki, T. Fukutsuka, T. Abe, and Y. Uchimoto (Kyoto University)
- **691** Micro-Sized  $NaNi_{0.5}Mn_{0.5}O_2$  Layered Materials as a Cathode Material for Rechargeable Na Batteries – M. Jang (Hanyang University), S. Myung (Sejong University), S. Oh, and Y. Sun (Hanyang University)
- **692** Crystal and Electronic Structures of Layered  $Li_2MnO_3$ - $LiMO_2$  Materials during Stepwise Pre-Cycling Treatment – H. Kobayashi, T. Okumura, M. Shikano (National Institute of Advanced Industrial Science and Technology (AIST)), Y. Arachi (Kansai University), and H. Nitani (KEK)
- **693**  $LiCoO_2$  Cathode Nanosheets with Enlarged Surface Area Induced by Hydrothermal Process – K. Fung, C. Ni, C. Liu, and S. Tsai (National Cheng Kung University)
- **694** Diffusion of Lithium-Ion and Polaron in Pyrophosphate  $Li_2FeP_2O_7$ : First-Principles Study – Y. Asari, Y. Suwa, and T. Hamada (Hitachi, Ltd.)
- **695** Crystal Structure and Electrochemical Properties of Ni-Substituted  $Li_2CuO_2$  as a Positive Electrode – T. Ide, T. Nakagawa, Y. Arachi (Kansai University), and Y. Nakata (IwakiMeisei University)
- **696** Synthesis and Electrochemical Property of CuO-Containing  $Li_2MnO_3$  – S. Akiyama, Y. Arachi, K. Hinoshita (Kansai University), and Y. Nakata (IwakiMeisei University)
- **697** Kinetics and Stability Studies on  $Li_{1+x}M_1-xO_2$  Single Crystals – H. Duncan, B. Hai, A. K. Shukla, and G. Chen (Lawrence Berkeley National Laboratory)
- 10:00 **761** Materials Design and Analysis of Electrode/Solid Electrolyte Interface by *In Situ* Methods – Y. Iriyama (Shizuoka University)
- 10:40 **762** Investigation of the Solid Electrolyte Interphase (SEI) with Pre-Lithiated Graphite – N. J. Dudney, L. A. Adamczyk, R. R. Unocic, G. M. Veith, P. Ganesh, and P. R. Kent (Oak Ridge National Laboratory)
- 11:00 **763** Transport Properties and Chemical Stability of LISICON-Based Glass Ceramics in Contact with Lithium – P. Hartmann (Justus-Liebig-University Giessen), M. Reich (SCHOTT AG), T. Leichtweiss (Justus-Liebig-University Giessen), M. Schneider, W. Schmidbauer (SCHOTT AG), and J. Janek (Justus Liebig University Gießen)
- 11:20 **764** Bias Imposed Interface between Solid Li-Ion Conductor  $LiBH_4$  and Li Metal: First Principles Molecular Dynamics Simulations – T. Ikeshoji (Tohoku University), E. Tsuchida, M. Otani (National Institute of Advanced Industrial Science and Technology), S. Takagi, M. Matsuo, and S. Orimo (Tohoku University)
- 11:40 **765** Investigation of the Interface Between  $Li_2S$ - $P_2S_5$  Solid Electrolyte and Li Metal Electrode by Using Electrochemical Methods with Microelectrodes – M. Chiku, W. Tsujiwaki, E. Higuchi, and H. Inoue (Osaka Prefecture University)

**Interfaces and Interphases in Battery Systems VI – 14:00 – 17:00**  
**Co-Chairs: Yasutoshi Iriyama and Nancy Dudney**

- 14:00 **766** Studies on the Formation and Stability of Solid Electrolyte Interphase on the Surface of Anode and Cathode of Lithium-Ion Batteries – X. Yu (Brookhaven National Laboratory), H. Li (Chinese Academy of Sciences), K. Xu (U. S. Army Research Laboratory), K. Nam, H. Lee (Brookhaven National Laboratory), X. Huang, L. Chen (Chinese Academy of Sciences), A. Von Cresce (U. S. Army Research Laboratory), and X. Yang (Brookhaven National Laboratory)
- 14:40 **767** Artificial Solid Electrolyte Interface (SEI) for Improving Cycle-Ability on Lithium-Ion Battery – F. Wang (National Taiwan University of Science and Technology)
- 15:00 **768** Ultrathin Multifunctional Coatings as the Artificial Solid Electrolyte Interphases to Improve Performance of Lithium-Ion Batteries – X. Xiao, D. Ahn (General Motors Global R&D Center), P. Lu (Trison Business Solution Inc.), and M. W. Verbrugge (General Motors Global R&D Center)
- 15:20 **769** Li-Ion Transfer at the Interface between Solid Electrolyte/Ionic Liquid – Y. Ishihara, K. Miyazaki, T. Fukutsuka, T. Abe, and Z. Ogumi (Kyoto University)
- 15:40 Intermission (20 Minutes)
- 16:00 **770** Atomistic Mechanisms of the Phase Boundary Evolution during Initial Lithiation into Crystalline Silicon – S. Kim, D. Datta, M. J. Chon, V. A. Sethuraman, P. R. Guduru, and V. B. Shenoy (Brown University)

**B5 Interfaces and Interphases in Battery Systems**

Battery / Energy Technology  
 Honolulu 1, Tapa Conference Center, Hilton Hawaiian Village

**Interfaces and Interphases in Battery Systems V – 08:00 – 12:00**  
**Co-Chairs: Xiao-Qing Yang and Ryoji Kanno**

- 08:00 **757** *In Situ* Analysis of Interfacial Reactions between Edge Plane Graphite Negative-Electrodes and EC-Based Electrolyte Solutions – T. Doi, Y. Domi, H. Nakagawa, S. Tsubouchi, M. Ochida, T. Yamanaka, T. Abe, and Z. Ogumi (Kyoto University)
- 08:40 **758** Ultrafast Laser Spectroscopy of Electrode/Electrolyte Interfaces – J. S. Syzdek (Lawrence Berkeley National Laboratory), V. Zorba, X. Mao, R. E. Russo, and R. M. Kostecki (Lawrence Berkeley National Laboratory)
- 09:00 **759** Effects of Electrolyte Additives on the Suppression of Mn Deposition on the Edge Plane of HOPG for Lithium-Ion Battery – M. Ochida, S. Tsubouchi, H. Nakagawa, Y. Domi, T. Yamanaka, T. Doi, T. Abe, and Z. Ogumi (Kyoto University)
- 09:20 **760** Studies of Interfacial Processes of Lithium-Ion Batteries by *In Situ* Fourier Transform Infrared Spectroscopy – J. Li, X. Zheng, H. Su, X. Zeng, L. Huang, and S. Sun (Xiamen University)
- 09:40 Intermission (20 Minutes)

- 16:20 **771** *In Situ* Optical Microscopic Observation of Lithium Electrodeposited in Room Temperature Ionic Liquids Containing Quaternary Ammonium Cation – H. Sano (National Institute of Advanced Industrial Science and Technology), H. Sakaebe (National Institute of Advanced Industrial Science and Technology (AIST)), and H. Matsumoto (National Institute of Advanced Industrial Science and Technology)
- 16:40 **772** Analytical Studies of Flow Battery Redox Reaction Electrokinesics on a Thin Fiber Film Rotating Disk Electrode – K. L. Hawthorne, J. S. Wainright, and R. F. Savinell (Case Western Reserve University)

- 09:00 **856** Investigation on Si Anode Materials for Lithium-Ion Batteries Using X-ray Absorption Spectroscopy – X. Yu, K. Nam (Brookhaven National Laboratory), C. Ma (Chinese Academy of Sciences), E. Hu, Y. Zhou (Brookhaven National Laboratory), H. Li (Chinese Academy of Sciences), and X. Yang (Brookhaven National Laboratory)
- 09:20 **857** Negatively and Positively Nanopatterned Silicon for Use in Lithium-ion Batteries – S. Nam (Gwangju Institute of Science and Technology), D. Park, J. Lee, J. Lee (Gwangju Institute of Science & Technology (GIST)), and W. Kim (Gwangju Institute of Science and Technology)

**B6** **Lithium-Ion Batteries**  
Battery / Energy Technology  
Coral 3, Mid-Pacific Conference Center, Hilton Hawaiian Village

**Lithium-Ion Batteries: Cathodes III (Metal Oxide Systems) – 08:00 – 09:40**  
**Co-Chairs: Xiaofeng Zhang and Michael Thackeray**

- 08:00 **848** Preparation and Electrochemical Performances of Sn<sup>4+</sup> Doped V<sub>2</sub>O<sub>5</sub> as Cathode material for Li Ion Battery – Y. Li and G. Cao (University of Washington)
- 08:20 **849** V<sub>2</sub>O<sub>5</sub> Network Structure as Cathode for Lithium Ion Batteries – Y. Xu, M. Dunwell, and H. Luo (New Mexico State University)
- 08:40 **850** Developing 1400 Wh/kg Graphene-V<sub>2</sub>O<sub>5</sub> Aerogel Composites as Cathodes for Li-Ion Batteries – Q. Liu, Y. Liu, and J. Xie (Indiana University Purdue University Indianapolis)
- 09:00 **851** Synthesis of FeOF Using Roll-Quench Method and the Charge-Discharge Mechanism – A. Kitajou, R. Nagano, and S. Okada (Kyushu University)
- 09:20 **852** Investigation of Graphite Foil as Current Collector for Cathodes of Li-Ion Batteries – B. Ziv, O. Haik, E. Zinigrad, M. Levi, D. Aurbach (Bar-Ilan University), and I. C. Halalay (General Motors Global R&D)

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

**Lithium-Ion Batteries: Anodes I (Silicon Based Systems) – 08:00 – 09:40**  
**Co-Chairs: Yoon-Chang Kim and Karim Zaghib**

- 08:00 **853** Electrochemical Properties of C<sub>60</sub> Coated Silicon Nanowires as Anodes in Lithium Secondary Batteries – A. Arie (Parahyangan Catholic University) and J. Lee (Korea Institute of Science and Technology)
- 08:20 **854** *In Situ* TEM Studies of Silicon Nanostructures for Li-Ion Batteries – K. Karki, C. Sun, E. Epstein (University of Maryland), J. Cho, T. Picraux (Los Alamos National Laboratory), C. Wang, Y. Wang, and J. Cumings (University of Maryland)
- 08:40 **855** Silicon Nitride Thin Film Electrode for Lithium-Ion Batteries – N. Suzuki, R. B. Cervera, T. Ohnishi, and K. Takada (National Institute for Materials Science)

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

**Lithium-Ion Batteries: Cathodes III (Metal Oxide Systems) – 10:00 – 12:20**  
**Co-Chairs: Michael Thackeray and Xiaofeng Zhang**

- 10:00 **858** Retardation of Phase Transformation of Li<sub>x</sub>CoO<sub>2</sub> in Fast Discharge – T. Kawaguchi, T. Ichitsubo, E. Matsubara, Y. Uchimoto, and Z. Ogumi (Kyoto University)
- 10:20 **859** Low Temperature Synthesis of Manganospinel Based Cathodes for Li-ion Batteries – X. Hao and B. Bartlett (University of Michigan)
- 10:40 **860** Effects of Heat Treatment on the Electrochemical Performance of LiNi<sub>0.5</sub>Mn<sub>1.5</sub>O<sub>4</sub> Cathode Materials via Spray Pyrolysis Method – J. Shiu, W. Pang, and S. Wu (Tatung University)
- 11:00 **861** Electrochemical Properties of High-Voltage LiNi<sub>0.5</sub>Mn<sub>1.5</sub>O<sub>4</sub> and High-Capacity Li<sub>1.5</sub>Ni<sub>0.25</sub>Mn<sub>0.75</sub>O<sub>2.5</sub> Blends – X. Zhang (Argonne National Laboratory), L. Li (Beijing Institute of Technology), and I. Belharouak (Argonne National Laboratory)
- 11:20 **862** Combined *In Situ* X-ray Absorption Spectroscopy and First-Principle Calculation Studies on Local Structural and Electronic Structural Alternations of LiNi<sub>1/3</sub>Co<sub>1/3</sub>Mn<sub>1/3</sub>O<sub>2</sub> – H. Imai, K. Kubobuchi, M. Mogi, M. Matsumoto (NISSAN ARC Ltd.), M. Nishijima (Nissan Motor Co., Ltd.), T. Yamamoto (Waseda University), T. Matsumoto (NISSAN ARC Ltd.), and Y. Nitta (Nissan Motor Co., Ltd.)
- 11:40 **863** <sup>6</sup>Li NMR Spectroscopic Investigation on Local Structures and Battery Properties of Li<sub>2</sub>MnO<sub>3</sub> Cathode Materials – H. Imai (NISSAN ARC Ltd.), K. Hashi (National Institute for Materials Science), T. Sanada (Nissan Motor Co., Ltd.), K. Kamiguchi (NISSAN ARC Ltd.), A. Ito, M. Watanabe (Nissan Motor Co., Ltd.), K. Kubobuchi, M. Mogi, M. Matsumoto (NISSAN ARC Ltd.), N. Chiba (Nissan Motor Co., Ltd.), S. Ohki, T. Shimizu (National Institute for Materials Science), M. Hatano (Nissan Motor Co., Ltd.), and T. Matsumoto (NISSAN ARC Ltd.)
- 12:00 **864** Impact of the Calendaring Process on the Interfacial Structure and the Related Electrochemical Performance of Secondary Lithium-Ion Battery Electrodes – W. Haselrieder, H. Seeba, and A. Kwade (TU Braunschweig)



**Lithium-Ion Batteries: Anodes I (Silicon Based Systems) – 10:00 – 11:40**  
**Co-Chairs: Karim Zaghib and Yoon-Chang Kim**

- 10:00 **865** Si-C and SiO<sub>x</sub> Versus Lithium Metal Anodes for High-Energy Rechargeable Batteries – A. Guerfi, D. Leblanc, P. Hovington, M. Lagacé, J. Trottier, J. Hamel-Paquet, M. Dontigny, A. Vijh, and K. Zaghib (Institut de Recherche d'Hydro-Québec)
- 10:20 **866** Implementation and Characterization of Silicon Anode with Metal Alloy Inactive Matrix for Lithium-Ion Secondary Batteries – C. Lee, S. Kwon, J. Kim, S. Suh (Samsung SDI), J. Cho, J. Moon (MK Electron Co., Ltd.), J. Choi, S. Kang, and Y. Kim (Samsung SDI)
- 10:40 **867** First Principles Studies of the Electrochemical Lithiation and Delithiation of Crystalline Silicon – M. K. Chan (Argonne National Laboratory), C. Wolverton (Northwestern University), and J. Greeley (Argonne National Laboratory)
- 11:00 **868** Novel Nanostructured Si anode Behavior on Nanorod Array Polymer Substrate – M. Jung (Seoul National University), M. Moon (Korea Institute of Science and Technology), Y. Joo (Seoul National University), and I. Choi (Korea Institute of Science and Technology)
- 11:20 **869** Well Controlled Array of Si Nanopillar with Metal Core as Negative Electrode for Lithium Ion Batteries – T. Oguni, R. Tajima, T. Osada, T. Muraoka, M. Kurata, S. Sasagawa, S. Adachi, T. Takeuchi, T. Kakehata, J. Momo, T. Moriwaka, M. Takahashi, and S. Yamazaki (Semiconductor Energy Laboratory Co., Ltd.)

*Coral 3, Mid-Pacific Conference Center, Hilton Hawaiian Village***Lithium-Ion Batteries: Cathodes IV (Manganese Spinel Systems) – 14:00 – 15:40**  
**Co-Chairs: Ram Katiyar and Mani Nagasubramanian**

- 14:00 **870** Cycling Behavior of a High Voltage Spinel Using an Original Three Electrodes Li<sub>1-x</sub>Ni<sub>0.4</sub>Mn<sub>1.6</sub>O<sub>4</sub>//Li//LiNi<sub>0.4</sub>Mn<sub>1.6</sub>O<sub>4</sub> Symmetric Cell: Application to LiNi<sub>0.4</sub>Mn<sub>1.6</sub>O<sub>4</sub> Electrolyte Interface Degradation Studies – J. Demeaux (CEA/DAM Le Ripault), M. Caravanier (Université F. Rabelais de Tours), H. Galiano (CEA/DAM Le Ripault), B. Montigny, and D. Lemordant (Université F. Rabelais de Tours)
- 14:20 **871** A Study of the High Rate Performance Polypyrrole-TiC Nanocomposite Anode Materials for Lithium-ion Battery – Y. Weng and N. N. Wu (National Taiwan University)
- 14:40 **872** Enhanced High Temperature Stability of LiMn<sub>2</sub>O<sub>4</sub> Cathodes by Prussian Blue Coatings – C. Chen and K. Chiu (Feng Chia University)
- 15:00 **873** Spinel Manganese Based Cathode Materials: A Thermal Stability Study – S. El Khakani and D. MacNeil (Université de Montréal)
- 15:20 **874** Effect of Cr-Oxide Partial Coating on the Electrochemical Behavior of Thin Film High-Voltage Spinel – E. Garcia Tamayo, J. Ros, A. Kaas, R. Fredon (Delft University of Technology), and E. M. Kelder (TUDelft)

**Lithium-Ion Batteries: Anodes I (Silicon Based Systems) – 14:01 – 15:41**  
**Co-Chairs: Robert Huggins and Khalil Amine**

- 14:01 **875** Carbon – Silicon Nanocomposite Anodes for Lithium-Ion Batteries – G. Y. Yushin (Georgia Institute of Technology)
- 14:21 **876** Thin-film Nanoporous Silicon Coated with PEO Polymer Electrolyte for Lithium-Ion Battery Anodes – C. R. Becker, J. Read, J. Wolfenstine, J. Allen, and C. Lundgren (U.S. Army Research Laboratory)
- 14:41 **877** Real-Time Measurements of Stress and Damage Evolution during Initial Electrochemical Lithiation and Delithiation of Crystalline Silicon – M. Chon, V. A. Sethuraman, and P. R. Guduru (Brown University)
- 15:01 **878** High Performance Silicon Freestanding Anodes Fabricated by Low Pressure and Plasma-Enhanced Chemical Vapor Deposition onto Carbon Nanotube Electrodes – M. W. Forney, R. DiLeo, A. Raisanen, M. Ganter, J. Staub, R. Rogers, and B. Landi (Rochester Institute of Technology)
- 15:21 **879** Impact of Electrolytes on Solid Electrolyte Interphase (SEI) Formation and Electrochemical Performance of a Silicon Anode in Lithium-Ion Cells – J. J. Wu (NASA/Glenn Research Center)

*Coral 3, Mid-Pacific Conference Center, Hilton Hawaiian Village***Lithium-Ion Batteries: Cathodes V (General) – 16:00 – 18:00**  
**Co-Chairs: Mani Nagasubramanian and Ram Katiyar**

- 16:00 **880** TEM Study of Surface Region of Sol-Gel Coated Cathode Materials for Li Ion Battery – N. Taguchi, H. Sakaebe, T. Akita, T. Takeuchi, K. Tatsumi (National Institute of Advanced Industrial Science and Technology (AIST)), and Z. Ogumi (Kyoto University)
- 16:20 **881** Electronic and Transport Properties of High-Capacity Silicate Cathode Materials for Li-Ion Batteries – R. Longo Pazos, K. Xiong, and K. Cho (University of Texas at Dallas)
- 16:40 **882** High-Performance Lithium-ion Battery Cathodes Based on Porous FeF<sub>3</sub> Nanowires – L. Li and S. Jin (University of Wisconsin-Madison)
- 17:00 **883** Scale Bridging via Surrogate Modeling for Multi-Scale Analysis of Li-Ion Cathodes – W. Du, N. Xue, A. Sastry, J. Martins (University of Michigan), and W. Shyy (Hong Kong University of Science and Technology)
- 17:20 **884** Metal Oxide/Graphene Hybrid Nanostructured Electrodes for High Performance Lithium Batteries – H. Gullapalli, A. Reddy, and A. Pulickel (Rice University)
- 17:40 **885** Thermal Aging on the Cycleability of Cells Made of {LiMn<sub>0.5</sub>Ni<sub>0.5</sub>Co<sub>0.5</sub>O<sub>2</sub> + LiMn<sub>2</sub>O<sub>4</sub>} Composite Electrodes – B. Lochner, E. Wong, M. Dubarry, C. Truchot, B. Liaw (University of Hawaii at Manoa), K. L. Gering, S. V. Sazhin, D. Jamison, and C. Michelbacher (Idaho National Laboratory)

**Lithium-Ion Batteries: Anodes II (Tin Based Systems) – 16:00 – 18:00**  
**Co-Chairs: Khalil Amine and Robert Huggins**

- 16:00 **886** Electrochemical Characterization of Sn as an Alternative Anode Material in Li-Ion Batteries – D. X. Liu, J. Black, and A. Co (The Ohio State University)
- 16:20 **887** Cu-Sn Thin Films as Anodes for Thin Film Rechargeable Lithium Batteries – B. Polat (ITU), N. Sezgin (Istanbul Technical University), Ö. Keles (ITU), K. Kazmanlı (Istanbul Technical University), A. Abouimrane, and K. Amine (Argonne National Laboratory)
- 16:40 **888** Investigating the Performance of Si- and Sn-Based Anode Materials in Electroveya's Lithium Ion SuperPolymer Cells – L. Davis and R. DasGupta (Electroveya Inc.)
- 17:00 **889** Large Scale Production of Titanate and Tin Oxide Nanowire Powders and Arrays for Anodes – A. K. Thapa, T. Nguyen, V. Vendra, G. Sunkara, and M. K. Sunkara (University of Louisville)
- 17:20 **890** Porous SnO<sub>2</sub> Helical Nanotubes and Sheets for Lithium-Ion Batteries – H. Luo, L. Fei, and Y. Xu (New Mexico State University)
- 17:40 **891** XPS Depth Profiling of Tin Anodes for Lithium Ion Batteries – J. M. Black and A. Co (The Ohio State University)

**B6 – Poster Session – 18:00 – 20:00**  
**Co-Chairs: Marshall Smart and Ratnakumar Bugga**

- **892** Feedback Controlled Multistage Constant Current (FCMCC) Charging Protocol for Improving Performance on Lithium-Ion Battery – H. Wang, Y. Chen, and F. Wang (National Taiwan University of Science and Technology)
- **893** The Effect of Oxy-Nitride Formation in Lithium-Ion Conductivity for LiMe(Ge, Si and Ti)PS – S. Lee, D. J. Kalita, S. Woo, K. Lee, and Y. Yoon (Yonsei University)
- **894** Investigation of High-Temperature Endurance Test for Lithium-Ion Batteries in Vehicles – K. Maeda, K. Komatsu, and M. Takahashi (Japan Automobile Research Institute)
- **895** Electron Energy Loss Structures in the Oxygen K-edge Spectra of Li-Inserted Li<sub>4</sub>Ti<sub>5</sub>O<sub>12</sub> – M. Kitta (National Institute of Advanced Industrial Science and Technology), T. Akita (National Institute of Advanced Industrial Science and Technology (AIST)), S. Tanaka, and M. Kohyama (National Institute of Advanced Industrial Science and Technology)
- **896** Synthesis and Electrochemical Properties of Carbon-Coated Li<sub>2</sub>FeP<sub>2</sub>O<sub>7</sub> for Li-Ion Batteries – M. Saito, S. Yano, A. Tasaka, and M. Inaba (Doshisha University)
- **897** Structure-Related Electrochemistry of Sulfur-Poly(Acrylonitrile) Composite Cathode Materials for Rechargeable Lithium Batteries – J. Fanous, M. Wegner, J. Grimminger, M. Rolff, Å. Andresen (Robert Bosch GmbH), and M. Buchmeiser (University of Stuttgart)

- **898** Electrochemical Properties and Morphology of Li[Fe<sub>1-x</sub>Mn<sub>x</sub>]PO<sub>4</sub> (x = 0, 0.1, 0.3) Cathode Materials by Electrospinning Process – C. Kang, C. Kim, G. Yoo, and J. Son (Korea National University of Transportation)
- **899** Structural-Tunable Graphene Anode via Controlling Oxidation Processes for Li-Ion Batteries Applications – W. Liu (Chung Yuan Christian University), S. Kuo, Y. Chen, and H. Wu (Industrial Technology Research Institute)
- **900** Improvement of Tap Density of TiO<sub>2</sub>(B) Powder as High Potential Negative Electrode – Y. Nakano, M. Takagi, N. Honda, M. Saitou, A. Tasaka, and M. Inaba (Doshisha University)
- **901** The Binary Li<sub>4</sub>Ti<sub>5</sub>O<sub>12</sub>-Li<sub>2</sub>Ti<sub>3</sub>O<sub>7</sub> Nanocomposite as Anode for Improving the SOC Estimation of Li-Ion Batteries – G. Zhu and Y. Xia (Fudan University)
- **902** Electrochemical Test Cell Using Diamond Windows for *In Situ* XRD Measurement – S. Kawasaki, A. Alzubaidi, Y. Ishii, and T. Matsushita (Nagoya Institute of Technology)
- **903** Improvement of Electrochemical Properties of Silicon Negative Electrode Prepared with Polyimide Binder – S. Uchida, M. Mihashi, M. Yamagata, and M. Ishikawa (Kansai University)
- **904** Correlation between Polydopamine Coating Effects and Separator-Types for High Power Lithium Ion Batteries – Y. Lee, M. Seo (Hanbat National University), B. Kim (W-SCOPE KOREA CO., LTD.), M. Ryou, J. Choi (Korea Advanced Institute of Science and Technology), and Y. Lee (Hanbat National University)
- **905** Surface Modification of Li[Ni, Co, Mn]O<sub>2</sub> Cathode Using FeF<sub>3</sub> Coating – C. Kim, S. Kim, and Y. Park (Kyonggi University)
- **906** Electrochemical Properties of Graphite-Silicon Milled Nanocomposite as a Lithium Battery Anode Material – K. Kang, D. Shin, Y. Lee, and K. Kim (Electronics and Telecommunications Research Institute)
- **907** Which One is the More Severe Test Method, Cycling or Storage at High Temperatures? – H. Lee, J. Jeong, B. Son, J. Choi, Y. Kim, and Y. Lee (Hanbat National University)
- **908** Study on Phase Transformation Characteristics of LiFePO<sub>4</sub> during Charge-Discharge Process of Graphite/Lithium Iron Phosphate Battery – Y. Lou (Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Science), Q. Wang (Chinese Academy of Science), J. Zhang, C. Yang, and B. Xia (Shanghai Institute of Microsystem and Information Technology, Chinese Academy of Science)
- **909** Poly(Hydroquinone) Cathodes for a Sustainable Lithium-Ion Battery – K. Takeshi (Sony Corp.), J. Kadokawa (Kagoshima University), and H. Morioka (Sony Corporation)
- **910** TiO<sub>2</sub>/Marimo Carbon Composite as a New Material for Lithium Ion Battery – K. Iwasawa, S. Ueda, M. Eguchi, Y. Kobayashi (Ibaraki University), M. Kobori, M. Nishitani-Gamo (Toyo University), and T. Ando (National Institute for Materials Science)

- **911** Effect of Ionic Liquid Electrolytes on Anode Properties of LaSi<sub>2</sub>/Si Composite Thick-Film Electrodes for Li-Ion Battery – M. Shimizu, H. Usui, and H. Sakaguchi (Tottori University)
- **912** Sandwiched MWCNT@TiO<sub>2</sub>-C Nanocables for Ultrafast Lithium Storage – J. Cheng (Lawrence Berkeley National Laboratory) and J. Kerr (Lawrence Berkeley National Laboratory)
- **913** Modified SiO as a High Performance Anode for Li-Ion Batteries – Y. Hwa (Seoul National University), C. Park (Kumoh National Institute of Technology), and H. Sohn (Seoul National University)
- **914** Simple Preparation of Nanoporous Si/C Composites with Naphthalene for Li-Ion Batteries – B. Yu (Seoul University) and H. Sohn (Seoul National University)
- **915** Enhanced Electrochemical Performance of LiFePO<sub>4</sub> Cathode Material Promoted by CdO and Carbon Co-Coating – G. Peng, X. Yang (Three Gorges University), G. Liang (Sam Houston State University), and L. Zhang (Three Gorges University)
- **916** Sub-Nano Tunnel-Structured Manganese Oxide Exhibiting Extremely Large Reversible Lithium Storage – D. Yonekura, Y. Igarashi, M. Hiraga, N. Ota, J. Miyamoto, and K. Naoi (Tokyo University of Agriculture and Technology)
- **917** Nanohybridization of nc-SnO<sub>2</sub> with Hollow-Structured Carbon for High Performance Li-Ion Battery Anode – K. Kisu, M. Iijima, Y. Nagano, J. Miyamoto, and K. Naoi (Tokyo University of Agriculture and Technology)
- **918** Cycling Stability of Li<sub>2</sub>MnO<sub>3</sub> Composite Materials by Co-Precipitation for Lithium Ion Battery – K. Kim, J. Kang, D. Chang, and K. Kim (Korea Institute of Industrial Technology)
- **919** Electrochemical Performance of Li-Rich Based Cathode Materials for Lithium Ion Battery – K. Kim, J. Kang, S. Boo, and K. Kim (Korea Institute of Industrial Technology)
- **920** High-Rate Capability of Hollow Carbon Microspheres as Anode Materials for Lithium-Ion Batteries – J. Hwang, H. Lim, T. Kang, Y. Sun, and K. Suh (Hanyang University)
- **921** Hollow Fe<sub>3</sub>O<sub>4</sub> Microspheres as Anode Materials for Lithium-Ion Batteries – H. Lim, Y. Sun, and K. Suh (Hanyang University)
- **922** Facile Synthesis of a Unique Interleaved Graphene-Embedded Sulfur Nanocomposite as Cathode of Li-S Batteries with Excellent Lithium Storage Performance – Y. Wang, L. Huang, Y. Xu, J. Li, and S. Sun (Xiamen University)
- **923** *In Situ* Separating Layer Coating upon the Wire-type Electrode for Flexible Lithium Batteries – K. V. Luu (Hanbat National University), Y. Lee (Hanbat National University), S. Song (Hanbat National University), C. Kim (Shine Co., Ltd.), and Y. Lee (Hanbat National University)
- **924** Improvement of High-Capacity Behavior of Layered Li<sub>1.23</sub>Ni<sub>0.13</sub>Co<sub>0.14</sub>Mn<sub>0.56</sub>O<sub>2</sub> Cathodes by Fluorine Substitution for Li-Ion Batteries – J. Min, J. Gim, J. Song, J. Kim, and W. Im (Chonnam National University)
- **925** First-Principles Study of K-edge XANES for Li-Rich Solid-Solution Layered Cathode Material – T. Tamura, R. Kobayashi, S. Ogata (Nagoya Institute of Technology), T. Ohwaki (Nissan Motor Co., Ltd.), A. Ito (Nissan Motor Co., Ltd.), and Y. Ohsawa (Nissan Motor Co., Ltd)
- **926** Novel 3-Dimensional Electrochemical Energy Storage Systems – F. Roumi (Caltech), C. Cid (California Institute of Technology), J. Roumi (Parthian Energy LLC), and M. Hoffmann (California Institute of Technology)
- **927** Highly Interconnected Silicon Nanowires Embedded in Porous Graphite as Anodes in Li-ion Batteries – S. Jeong, J. Lee (UNIST), D. Yoon, H. Hwang, J. Kim, S. Kim, H. Sun (SK Innovation), S. Park (UNIST), and J. Cho (Ulsan National Institute of Science and Technology)
- **928** A Study on Structural and Electrochemical Properties of Overcharged Ni-based Cathode Materials for Li-Ion Batteries – W. Chang, D. Kim, H. Chang, B. Cho (Korea Institute of Science and Technology), J. Lee (Korea Institute of Energy Research), and K. Chung (Korea Institute of Science and Technology)
- **929** Anode Performance of Ni-P-coated Si Thick-film Electrodes for Li-ion Battery – M. Narita, H. Usui, N. Uchida, and H. Sakaguchi (Tottori University)
- **930** Electrochemical Property of Anderson-Type Polyoxometalates as Cathode Material of Lithium Battery – S. Uematsu, E. Ni, and N. Sonoyama (Nagoya Institute of Technology)
- **931** Microstructure Study of Si Thin Film Anode with Different Adhesion Layers for Li-Ion Batteries – M. Oh, Y. Song (Sungkyunkwan University), T. Yoon (Korea Advanced Institute of Science and Technology), C. Woo, J. Jeong (Korea Institute of Machinery and Materials), H. Lee (Sungkyunkwan University), and S. Hyun (Korea Institute of Machinery and Materials)
- **932** Hydrothermal Synthesis of LiCoPO<sub>4</sub> in the Presence of Carboxymethylcellulose – Y. Namiki, H. Munakata, and K. Kanamura (Tokyo Metropolitan University)
- **933** Fabrication of Li<sub>7</sub>La<sub>3</sub>Zr<sub>2</sub>O<sub>12</sub>-Based All-Solid-State Rechargeable Li-Metal Battery – J. Wakasugi, T. Nishioka, H. Munakata, and K. Kanamura (Tokyo Metropolitan University)
- **934** Preparation and Conductivity of Novel Ionic Liquid using Dianionic Hexacoordinated Silicates – M. Nanjo, Y. Nakano, and T. Esaka (Tottori University)
- **935** Structure and Electrochemical Properties of Oxygen-Deficient Li<sub>2</sub>MnO<sub>3-x</sub> – K. Kubota, M. Hirayama, R. Kanno (Tokyo Institute of Technology), M. Yonemura (High Energy Accelerator Research Organization), Y. Imanari, K. Nakane (Sumitomo Chemical Co. Ltd.), M. Cuisinier, N. Dupré (Institut des Matériaux Jean Rouxel (IMN)), and D. Guyomard (IMN – CNRS)
- **936** A Study on the Thermal Behavior of LiMnPO<sub>4</sub> Cathode for Li Secondary Battery by Using Synchrotron Based X-ray Techniques – H. Kim, J. Kim, S. Lee, D. Jang, S. Muhammad, W. Yoon (Sungkyunkwan University), Y. Choi, and K. Park (Samsung Advanced Institute of Technology)



- **937** Analysis of Solid Electrolyte Interphase by Glow Discharge Optical Emission Spectroscopy for Li-Ion Battery Electrodes – H. Takahara (Rigaku Corporation), H. Miyauchi (Mitsui Engineering and Ship-Building Co. Ltd.), H. Kobayashi (National Institute of Advanced Industrial Science and Technology (AIST)), Y. Kobayashi (Central Research Institute of Electric Power Industry), and T. Nakamura (University of Hyogo)
- **938** Investigation of the Irreversible Reaction Mechanism on SiO Anode Material for Li-Ion Batteries – H. Yamamura, K. Nobuhara, S. Nakanishi, and H. Iba (Toyota Motor Corporation)
- **939** SiO<sub>x</sub> Nanoparticles Preparation by an Evaporation and Condensation Process Using Induction Melting – J. Kim (Korea Institute of Energy Research), B. Jang, and J. Lee (Korea Institute of Energy Research)
- **940** Copper Nanofiber-embedded Cobalt Oxide Thin-Film for High Performance Lithium-Ion Batteries – D. Park (Gwangju Institute of Science & Technology (GIST)), S. Nam (Gwangju Institute of Science and Technology), J. Lee, J. Lee (Gwangju Institute of Science & Technology (GIST)), and W. Kim (Gwangju Institute of Science and Technology)
- **941** LiMPO<sub>4</sub> (M = Fe, Mn) for High Energy Rechargeable Lithium Battery by Solid State Reaction – T. Mahara, H. Miyauchi, H. Tomita, and Y. Sakaguchi (Mitsui Engineering and Ship-Building Co. Ltd.)
- **942** Surface Modified High Capacity Li-Excess Transition Metal Oxide by Metal Phosphates – J. Lim, J. Yeon, S. Lee, H. Sun, and H. Lee (SK Innovation)
- **943** Morphological, Structural and Electrochemical Study of Layered-Spinel Mixed Structure of Li-Mn-Ni-O as Cathode for Lithium ion Batteries – Y. Hwang, J. Choi, M. Christy, A. Zahoor (Chonbuk National University), S. Park (Korean Intellectual Property Office), P. Kim, and K. Nahm (Chonbuk National University)
- **944** Density Functional Theory Studies of Lithium Diffusion on the Step Edge of Graphene Sheets – Y. Kubota (The Kansai Electric Power Company)
- **945** Novel Flux Growth of Li<sub>1+x</sub>Mn<sub>2-x</sub>O<sub>4</sub> Crystals and Films for All-Crystal-State Lithium Ion Rechargeable Batteries – H. Wagata, H. Inagaki (Shinshu University), T. Ishizaki (Shibaura Institute of Technology), T. Sakaguchi, K. Kohama, S. Oishi (Toyota Motor Corporation), and K. Teshima (Shinshu University)
- **946** Electrochemical Fabrication of Si Nanoparticles on Carbon Nanofiber for High Capacity Anodes of Lithium Ion Battery – S. Choi, S. Woo (Sungkyunkwan University), J. Park, S. Hwang (Samsung Advanced Institute of Technology), and D. Whang (Sungkyunkwan University)
- **947** Lithium Extraction Reaction for the Thin Films of Titanium Dioxide under UV Irradiation – S. Suzuki and M. Miyayama (The University of Tokyo)
- **948** Structural Analysis and Electrochemical Property of Trance Metal Substituted Calcium Ferrite-Type Li(Mn<sub>x</sub>M<sub>1-x</sub>)<sub>2</sub>O<sub>4</sub> (M= Ni, Ti) – M. Mamiya, K. Kataoka, J. Akimoto (AIST), S. Kikuchi, Y. Terajima, and K. Tokiwa (Tokyo University of Science)
- **949** Graphene Oxide: Corrosion Inhibitor on LIB Cathode Current Collector – R. Prabakar and M. Pyo (Sunchon National University)
- **950** Silicon Nanowires Prepared by Zinc-Thermal Reduction of Silicon Tetrachloride and Their Application to Lithium Ion Batteries – R. Han, M. Yamagata (Kansai University), T. Nohira, R. Hagiwara (Kyoto University), and M. Ishikawa (Kansai University)
- **951** LiNi<sub>0.6</sub>Co<sub>0.2</sub>Mn<sub>0.2</sub>O<sub>2</sub>/LiMn<sub>0.8</sub>Fe<sub>0.2</sub>PO<sub>4</sub> Blends as Cathode Materials for High Energy Density Li Ion Battery – G. Choi, N. Kim, H. Lim, and S. Cho (EIG Ltd.)
- **952** A Study on Synthesis and Properties of Nano-Sized Metal Oxide Coated on Carbonnanotubes – Y. Kim, J. Yoon, A. Choi, S. Choi, K. Palanisamy, and W. Yoon (Sungkyunkwan University)
- **953** Electrochemical Performance of LiNi<sub>0.5</sub>Mn<sub>1.5</sub>O<sub>4</sub> Cathode Material Fabricated from Nanohorn Sphere Structured MnO<sub>2</sub> – S. Lim, W. Ryu, W. Kim, and H. Kwon (Korea Advanced Institute of Science and Technology)
- **954** Electrochemical Characteristics of Structure-modified Soft Carbon as an anode in Lithium Ion Batteries – Y. Jo, E. Lee (Korea Electronics Technology Institute), H. Jeong (Ulsan National Institute of Science and Technology), Z. Lee (UNIST), K. Hong, S. Lee (GS Caltex Corporation), and Y. Kim (Korea Electronics Technology Institute)
- **955** Exploration of Manganese Oxide Based Cathodes for Alkali Metal Ion Batteries – X. Hao and B. Bartlett (University of Michigan)
- **956** Electrochemical Lithiation and Delithiation of Stoichiometric Cu<sub>3</sub>Sn and Cu<sub>6</sub>Sn<sub>5</sub> Prepared Using Reduction-Diffusion Method – N. Fukuda, A. Kitada, K. Murase, T. Ichii, and H. Sugimura (Kyoto University)
- **957** Preparation of LiNi<sub>0.5</sub>Ni<sub>1.5</sub>O<sub>4</sub> Cathode Material through Spray Drying Assisted Annealing Process and Its Electrochemical Performance – J. Li (Shanghai Jiao Tong University), M. Lu (Shanghai Jiao tong university), X. Liao (Shanghai Jiaotong University), and Z. Ma (Shanghai Jiao Tong University)
- **958** Highly Dispersed Sulfur in Porous Aromatic Framework as Cathode for Lithium-Sulfur Batteries – B. Guo, X. Sun, and S. Dai (Oak Ridge National Laboratory)
- **959** In-Plane Ionic Conductivity of Li(3x)La(2/3-x)TiO<sub>3</sub> Thin Films Deposited on Perovskite Substrates – F. Aguesse, T. Rojo (CIC Energigune), and J. A. Kilner (Imperial College London)
- **960** Structural and Electrochemical Studies of Mesoporous Li<sub>4</sub>Ti<sub>5</sub>O<sub>12</sub>-TiO<sub>2</sub> Composite Spheres as Anode Material for Lithium Ion Batteries – S. Ting, C. V. Li, and K. Chan (The University of Hong Kong)
- **961** Method for Mitigating the Effects of Manganese Dissolution in Li-Ion Batteries – N. Levi, M. Levi, D. Aurbach (Bar-Ilan University), Z. Li (Optimal Staffing Solutions), L. Zou (General Motors Company), T. Fuller, and I. C. Halalay (General Motors Global R&D)



- **962** Local Structure Investigations on  $\text{Li}[\text{Li}_{0.2}\text{Mn}_{0.4}\text{Co}_{0.4}]\text{O}_2$  via *In Situ* X-ray Absorption Spectroscopy – R. Kloepsch (University of Muenster), J. Rana (Helmholtz Zentrum Berlin), J. Li (University of Muenster), G. Schumacher (Helmholtz Zentrum Berlin), J. Banhart (Helmholtz-Zentrum Berlin), S. Passerini, and M. Winter (University of Münster)
- **963** Electrochemical Properties of Silicon 1D Nanostructures Prepared by Means of Electrochemical Deposition – D. Kim, H. Seo, and Y. Kang (Korea Research Institute of Chemical Technology)
- **964** Capacity Fading Research on High Voltage Spinel  $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$  Coupled with Graphite – Y. Fu, X. Song, P. Ridgway, G. Liu, and V. Battaglia (Lawrence Berkeley National Laboratory)
- **965** Development of Thin Films Si Based Anode Materials for  $\text{Li}^+$  Ion Batteries Application – S. T. Hossain and S. Mitra (Missouri State University)
- **966** Stabilized Lithium Metal Powder (SLMP<sup>®</sup>) – Performance Improvement of Silicon Based Anodes – B. Fitch, Y. Li, and M. Yakovleva (FMC Lithium)
- **967** Cu-Sn Thin Film Production on Copper Substrate – B. Polat (ITU), N. Sezgin, Ö. Keleş, K. Kazmanlı (Istanbul Technical University), A. Abouimrane, and K. Amine (Argonne National Laboratory)
- **968** Use of Cu-Sn/C Multilayered Thin Film in Lithium Ion Batteries – B. D. Polat, N. Sezgin, Ö. Keleş, K. Kazmanlı (Istanbul Technical University), A. Abouimrane, and K. Amine (Argonne National Laboratory)
- **969** The Synthesis and Electrochemical Characterization of Tin Encapsulated by Highly Graphitic Carbon Nanospheres as Anodes for Li-Ion Batteries – K. A. Hays, M. Li, K. Osea-Kwapong, R. P. Kopreski, N. A. Banek, and M. Wagner (The George Washington University)
- **970** *In Situ* Energy Dispersive X-ray Diffraction Study of Prototype  $\text{LiMnO}_4$  and  $\text{LiFePO}_4$  Based Coin Cell Batteries – G. Liang (Sam Houston State University), M. Croft (Rutgers – The State University of New Jersey), and Z. Zhong (Brookhaven National Laboratory)
- **971** Hollow Carbon Nanosphere with Germanium Nanoparticles Anode Material for Li-ion Battery – M. Li, K. Hays, R. P. Kopreski, N. Banek, and M. Wagner (The George Washington University)
- **972** The Synthesis and Electrochemical Characterization of Silicon Encapsulated by Highly Graphitic Carbon Nanospheres as Anodes for Li-ion Batteries – R. P. Kopreski, K. Hays, M. Li, N. A. Banek, and M. Wagner (The George Washington University)
- **973** Preparation of Manganese Oxide Cathodes for Lithium Secondary Batteries – J. Moon, H. Munakata, and K. Kanamura (Tokyo Metropolitan University)
- **974** Structural and Optical Properties Study of Porous Silicon Membrane Filled with Lithium Bromide – M. Jaouadi, M. Khardani, W. Dimassi, and H. Ezzaouia (CRTEn)
- **975** Synthesis of Coherent  $\text{SnO}_2$ /Carbon Cryogel Nanocomposites at Large-Scale for Efficient Lithium Ion Storage – M. Zhang, L. Shen, E. Uchaker (University of Washington), T. Wang (Hunan University), and G. Cao (University of Washington)
- **976** Mesoporous Thin Films: Model Structures to Assess the Role of Porosity in Composite Electrodes – N. Krins, R. Buonsanti, A. K. Shukla, G. Chen, B. Helms, D. Milliron, and T. J. Richardson (Lawrence Berkeley National Laboratory)
- **977** Effects of Maleic Anhydride Electrolyte Additive on Silicon Anode for Lithium-Ion Battery – M. Suguro, M. Yamashiro, K. Nakahara, and K. Nakano (NEC Corporation)
- **978** Cycle Life Characterization of Lithium-Ion Batteries with Artificial Solid-Electrolyte Interphase Coating on Both Electrodes – Y. Eun, S. Woo (Sejong University), D. Kim (Hanyang University), and W. Lee (Sejong University)
- **979** Long-term Cycling of High Energy Li-Ion Battery with NCM Electrode and High Voltage Electrolyte – W. Zhang (Lawrence Berkeley National Lab), G. Liu, and V. Battaglia (Lawrence Berkeley National Laboratory)
- **980** Electrochemical Properties of Delithiated  $\text{Li}_2\text{MnO}_3$ - $\text{LiMO}_2$  – S. Yamahara, A. Mineshige, Y. Daiko, and T. Yazawa (University of Hyogo)
- **981** Direct Observation of Battery Reaction Inhomogeneity in Operating Electrode – H. Murayama, T. Fujimoto, T. Kawaguchi, Y. Orikasa, H. Arai, E. Matsubara, Y. Uchimoto, and Z. Ogumi (Kyoto University)
- **982** The Effects of the Slurry Mixing Procedure on Silicon Based Composite Electrodes for Li-Ion Batteries – M. Wu (Lawrence Berkeley National Laboratory), K. Eberman (3M Co.), and G. Liu (Lawrence Berkeley National Laboratory)
- **983**  $\text{LiFePO}_4$  Cathode Materials prepared by Spray Pyrolysis and Its Electrical Characteristics as a Cathode Material – C. Lee, S. Eun, and S. Kim (Hanbat National University)
- **984** Fabrication of NCM ( $\text{LiNi}_x\text{Co}_y\text{Mn}_z\text{O}_2$ ) Cathode Materials Prepared by Spray Pyrolysis – J. Park, C. Lee, and S. Kim (Hanbat National University)
- **985** Synthesis and Performance of Anode Material  $\text{Li}_4\text{Ti}_5\text{O}_{12}$  by Sol-Gel Method for Lithium Ion Batteries – B. Na and S. Kim (Chungbuk National University)
- **986** Encapsulation of Rechargeable Solid-State Lithium Batteries – J. Ribeiro, R. Sousa, J. Sousa, B. Pereira, M. Silva, L. Goncalves (University of Minho), M. M. Silva (Universidade do Minho), and J. Correia (University of Minho)
- **987** Influence of  $\text{Fe}^{3+}$  Ions Content for Electrochemical Properties of Nano-Sized Phospho-Olivine as Cathode Material for Li-Ion Batteries – D. Baster, W. Zajac, and J. Molenda (AGH University of Science and Technology)

**Metal-Air Batteries**

Battery / Energy Technology / Fullerenes, Nanotubes, and Carbon Nanostructures

*Nautilus 1, Mid-Pacific Conference Center,  
Hilton Hawaiian Village***Anode – 08:00 – 12:00****Co-Chairs: Jordi Cabana and Jie Xiao**

- 08:00 **1153** (Invited) Protective Layers for the Lithium Electrode Based on Ceramic Phases – J. Cabana (Lawrence Berkeley National Laboratory)
- 08:40 **1154** (Invited) Factors Affecting the Cycle Life of a Nonaqueous Li-Air Cell with a Protected Anode – D. Im, D. Lee, T. Kim, V. Roev, S. Ma (Samsung Electronics Co.), and S. Doo (Samsung Electronics)
- 09:20 **1155** Lithium Dendrite Formation between PEO<sub>8</sub>LiTFSI and Lithium Metal – H. Wang, N. Imanishi, Y. Takeda, and O. Yamamoto (Mie University)
- 09:40 Intermission (20 Minutes)
- 10:00 **1156** (Invited) Ultra-High Energy Density Lithium-Air Batteries Based on Protected Lithium Electrodes (PLEs) – S. J. Visco, E. Nimon, B. Katz, M. Chu, and L. De Jonghe (PolyPlus Battery Company)
- 10:40 **1157** Ionic Conductivity of Garnet-Type Li<sub>7-x</sub>La<sub>3</sub>Zr<sub>2</sub>O<sub>12-0.5x</sub> Solid Electrolyte for Lithium Metal Electrode – Y. Nakata, K. Ishiguro, N. Imanishi, Y. Takeda, and O. Yamamoto (Mie University)
- 11:00 **1158** Nickel Foam, a Probable Current Collector in Rechargeable Li-Air Batteries – X. Liu and D. Wang (Chinese Academy of Science)
- 11:20 **1159** Degradation Products on Li-Negative Electrode and the Carbon Cathode in Li-O<sub>2</sub> Batteries – R. Younesi, M. Hahlin, and K. Edström (Uppsala University)
- 11:40 **1160** Metal-Free “Li-Ion” Air Battery Realized by Controlling Solvation State in Electrolyte – Y. Yamada, M. Yaegashi, K. Furukawa, F. Li (The University of Tokyo), H. Zhou (National Institute of Advanced Industrial Science and Technology), and A. Yamada (The University of Tokyo)

**Fundamental Investigation – 13:20 – 17:00****Co-Chairs: Nobuyuki Imanishi and Yi-Chun Lu**

- 13:20 **1161** (Invited) Investigation of Rechargeable Li-Air Battery – D. Zheng, Q. Wang, D. Qu (University Of Massachusetts Boston), and X. Yang (Brookhaven National Laboratory)
- 14:00 **1162** Effect of Substitution of Cobalt by Manganese on the Properties of Calcium-Doped Lanthanum Cobalt Oxide for Oxygen Reduction Reaction in Alkaline Medium – S. Malkhandi, P. Trinh, A. Manohar, G. Prakash, S. Narayanan (University of Southern California), and A. Manivannan (U.S. Department of Energy)
- 14:20 **1163** Towards Understanding the Mechanism of the Electrochemical Oxygen Reduction: DFT Modeling and Spectroelectrochemical Validation – P. Biedermann, S. Nayak, and A. Erbe (Max-Planck-Institut für Eisenforschung GmbH)

- 14:40 **1164** Predictive Modeling of Size-Dependent Dendritic Growth in Dilute-Electrolyte Lithium Metal Batteries with Potentiostatic Cycling – A. Aryanfar, M. Hoffmann, and A. Colussi (California Institute of Technology)
- 15:00 **1165** Computational Investigations of the Electronic Transport in Lithium-Air Battery Materials – T. Vegge, J. Garcia-Lastra, J. Myrdal, and K. Thygesen (Technical University of Denmark)
- 15:20 **1166** A Transient Model of an Aqueous Li/Air Battery Forming LiOH (aq) and LiOH•H<sub>2</sub>O – P. Albertus (Robert Bosch Research and Technology Center), V. Viswanathan (Stanford University), and J. Christensen (Robert Bosch Research and Technology Center)
- 15:40 **1167** Oxygen Reduction Catalyst Selection for Lithium Air Batteries via Rotating Ring Disc Electrode Voltammetry and *In Situ* X-ray Absorption Spectroscopy – M. Trahan, S. Mukerjee, and K. Abraham (Northeastern University)
- 16:00 **1168** Probing Reaction Mechanisms of Li-O<sub>2</sub> Batteries via *In Situ* Ambient Pressure X-ray Photoelectron Spectroscopy – Y. Lu, E. J. Crumlin (Massachusetts Institute of Technology), G. M. Veith (Oak Ridge National Laboratory), J. R. Harding, E. Mutoro (Massachusetts Institute of Technology), L. Baggetto, N. J. Dudney (Oak Ridge National Laboratory), Z. Liu (Lawrence Berkeley National Laboratory), and Y. Shao-Horn (Massachusetts Institute of Technology)
- 16:20 **1169** Electrochemistry and Transport Limitations of Non-Aqueous Li-Air Batteries from First-Principles – V. Viswanathan, J. S. Hummelshøj, A. C. Luntz, and J. K. Nørskov (Stanford University)
- 16:40 **1170** Electrochemical Strain Spectroscopy: Monitoring Partially Reversible Electrochemical Processes *In Situ* on Li-Air Battery Electrolytes – T. M. Arruda, A. Kumar, S. Jesse, and S. V. Kalinin (Oak Ridge National Laboratory)

**Non-Aqueous Electrolytes for Lithium Batteries**

Battery / Energy Technology / Physical and Analytical Electrochemistry

*South Pacific 3, Mid-Pacific Conference Center,  
Hilton Hawaiian Village***Liquid Electrolytes, Ionic Liquid 3 – 08:00 – 09:40****Co-Chairs: Dr. Trulove and Dr. Henderson**

- 08:00 **1223** Ionic Liquid-Lithium Salt-Glyme Mixtures: Understanding the Thermophysical and Transport Properties of Ternary Mixtures – J. E. Weaver, E. T. Fox, E. Parrish, W. A. Henderson (North Carolina State University), and R. A. Mantz (U.S. Army Research Office)
- 08:20 **1224** Electrochemical Performance of Vitreous Eutectic Electrolytes for Li-Ion Batteries – Y. Shilina, M. Levi, D. Aurbach (Bar-Ilan University), O. Geiculescu, D. DesMarteau (Clemson University), and I. C. Halalay (General Motors Global R&D)
- 08:40 **1225** Electrolyte Performance of LiFTA-CsFTA Molten Salt for Lithium Secondary Battery – K. Kubota (Advanced Industrial Science and Technology) and H. Matsumoto (National Institute of Advanced Industrial Science and Technology)

- 09:00 **1226** Ionic Liquid-In-Salt: Characterization of Electrolytes for High Temperature Lithium Batteries – M. J. Marczewski, Y. Choi, J. Scheers, A. Matic, P. Jacobsson, and P. Johansson (Chalmers University of Technology)
- 09:20 **1227** Joint Theoretical and Experimental Study of Novel Electrolytes Based on Eutectic Mixtures of DMMSA with LiFSI and LiTFSI Salts – D. Bedrov, L. Xing, J. Hooper (The University of Utah), Y. Shilina, M. Levi, D. Aurbach (Bar-Ilan University), O. Geiculescu, D. DesMarteau (Clemson University), and I. C. Halalay (General Motors Global R&D)

**Liquid Electrolytes, Organic 1 – 10:00 – 12:00**  
**Co-Chairs: Dr. Jow and Dr. Trulove**

- 10:00 **1228** Development of Electrolytes for Stable Operation and Highly Safe Lithium-Ion Batteries – H. Tokuda (Mitsubishi Chemical Corporation)
- 10:40 **1229** Concentrated Electrolytes: Improving Oxidative Stability for Use in High Voltage Li-Ion Batteries – D. W. McOwen, J. L. Allen, D. M. Seo, and W. A. Henderson (North Carolina State University)
- 11:00 **1230** Polyfluorinated Electrolyte Solutions and Additives for High Voltage Non-Flammable Lithium Batteries – H. Sun and Q. Wei (University of South Dakota)
- 11:20 **1231** Effect of Electrolyte and Additives on Performance of  $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$  – M. Xu, D. Lu (The University of Rhode Island), A. Garsuch (BASF SE), and B. L. Lucht (The University of Rhode Island)
- 11:40 **1232** Electrochemical Stability of an Electrolyte of  $\text{LiPF}_6$  in Carbonate Ester Containing Trialkoxyboroxine with  $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$  Cathode – Y. Tanaka, K. Yamashita, S. Onoda, Y. Iriyama, and T. Fujinami (Shizuoka University)

**Liquid Electrolytes, Organic 2 – 14:00 – 15:40**  
**Co-Chairs: Dr. Lucht and Dr. Zhang**

- 14:00 **1233** Tailored Redox Shuttle Additives for Overcharge Protection of Lithium-Ion Batteries – Z. Zhang, L. Zhang, W. Weng, and K. Amine (Argonne National Laboratory)
- 14:40 **1234** Perfluorinated Phosphazene Based Additives for Improvement of Safety and Battery Lifetimes in Lithium-Ion Batteries – M. K. Harrup, K. L. Gering, H. W. Rollins, S. V. Sazhin, M. T. Benson, D. Jamison, and C. Michelbacher (Idaho National Laboratory)
- 15:00 **1235** Wide Operating Temperature Range Electrolytes for High Voltage and High Specific Energy Li-Ion Cells – M. C. Smart, C. Hwang, F. C. Krause, J. Soler, W. C. West, B. Ratnakumar (California Institute of Technology), and K. Amine (Argonne National Laboratory)
- 15:20 **1236** Initial Decomposition of  $\text{LiPF}_6$ -Based Lithium Battery Electrolytes with Additives – S. Wilken, M. Treskow, J. Scheers, P. Johansson, and P. Jacobsson (Chalmers University of Technology)

**Liquid Electrolytes, Organic 3 – 16:00 – 17:40**  
**Co-Chairs: Dr. Zhang and Dr. Lucht**

- 16:00 **1237** Structure of the Graphite Anode Solid Electrolyte Interphase in Lithium-Ion Batteries – B. L. Lucht, M. Nie (The University of Rhode Island), D. P. Abraham (Argonne National Laboratory), Y. Chen, and A. Bose (The University of Rhode Island)
- 16:40 **1238** The Electrochemical Performance Improvement of Water as an Additive to Graphene-Based Anode Materials – C. Cheng (National Taiwan University of Science and Technology), W. Liu (Chung Yuan Christian University), and F. Wang (National Taiwan University of Science and Technology)
- 17:00 **1239** Highly Quantitative Electrochemical Characterization of Non-Aqueous Electrolytes and Solid Electrolyte Interphases – S. V. Sazhin, K. L. Gering, M. K. Harrup, and H. W. Rollins (Idaho National Laboratory)
- 17:20 **1240** A Study of the Solid/Liquid  $\text{Li}^+$ -Electrolytes Interface – C. O’Laoire, J. S. Szydek (Lawrence Berkeley National Laboratory), and R. M. Kostecki (Lawrence Berkeley National Laboratory)

*Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center*

**B8 – Poster Session – Electrolytes – 18:00 – 20:00**  
**Co-Chairs: Dr. Jow, Dr. Lucht, and Dr. Trulove**

- **1241** Formulation and Properties of Vitreous Eutectic Electrolytes for Li-Ion Batteries – O. Geiculescu, D. DesMarteau, S. Creager (Clemson University), D. Hirschberg, O. Haik, Y. Shilina, E. Zinigrad, M. Levi, D. Aurbach (Bar-Ilan University), and I. C. Halalay (General Motors Global R&D)
- **1242** Synthesis and Electrochemical Performance of Fluorinated Orthoborate Salts as Additives for Li-Ion Battery Electrolytes – O. Geiculescu, D. DesMarteau, S. Creager (Clemson University), V. Borgel, M. Levi, D. Aurbach (Bar-Ilan University), and I. C. Halalay (General Motors Global R&D)
- **1243** Enhanced the Safety of the Lithium-Ion Batteries by the Electrolyte Additive – T. Yeh, J. Chen, S. Liao (Industrial Technology Research Institute), M. Shen, and C. Liu (Formosa Plastics Corporation)
- **1244** Effects of  $\text{LiNO}_3$  Additive on the Electrochemical Properties of Lithium-Sulfur Batteries – H. Kim (Korea Institute of Science and Technology)

**Polymer Electrolyte Fuel Cells 12 (PEFC 12)**

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

*Tapa 1, Tapa Conference Center, Hilton Hawaiian Village*

**A.2.1 Visualization – 08:00 – 12:00**

**Co-Chairs: Daniel Hussey and Ugur Pasaogullari**

- 08:00 **1486** *In Situ* Water Distribution Visualization in MEA by Soft X-ray Radiography – S. Tsushima, P. Deevanhxay, T. Sasabe, and S. Hirai (Tokyo Institute of Technology)
- 08:40 **1487** Visualization of Liquid Water Accumulation in PEMFCs Operating at Different Temperatures by Soft X-ray Radiography – P. Deevanhxay, T. Sasabe, S. Tsushima, and S. Hirai (Tokyo Institute of Technology)
- 09:00 **1488** Visualized Liquid Water Evolution in a PEM fuel cell using Synchrotron Radiography – J. Hinebaugh, J. Lee, and A. Bazylak (University of Toronto)
- 09:20 **1489** Three-Dimensional Studies on Compressed Gas Diffusion Layers and the Water Distribution in Operating Fuel Cells Using Synchrotron X-ray Imaging – C. Tötze (Technische Universität Berlin), I. Manke, T. Arlt, H. Markötter, A. Hilger, F. Wieder (Helmholtz-Zentrum Berlin für Materialien und Energie), J. Bohner (Forschungszentrum Jülich), W. Lehnert (Forschungszentrum Jülich GmbH), G. Gaiselmann (Universität Ulm), V. Schmidt (Ulm University), J. Haußmann, J. Scholta (Zentrum für Sonnenenergie- und Wasserstoff-Forschung Baden Württemberg), H. Riesemeier, A. Kupsch (Bundesanstalt für Materialforschung und -prüfung), and J. Banhart (Helmholtz-Zentrum Berlin)
- 09:40 Intermission (20 Minutes)
- 10:00 **1490** Neutron Imaging PEMFCs with ~1 µm Spatial Resolution – D. S. Hussey, D. Jacobson (National Institute of Standards and Technology), B. Khaykovich (Massachusetts Institute of Technology), M. V. Gubarev (NASA), D. Spornjak, J. D. Fairweather, R. Mukundan, R. Lujan, and R. L. Borup (Los Alamos National Laboratory)
- 10:20 **1491** 3D-Visualization of Cathode Catalyst Layer in MEA of Polymer Electrolyte Membrane Fuel Cell by X-ray Computed Laminography XAFS – T. Saida (National Institute of Natural Sciences Institute for Molecular Science), O. Sekizawa (The University of Electro-Communications, Tokyo), N. Ishiguro (National Institute of Natural Sciences Institute for Molecular Science), K. Uesugi, M. Hoshino (Japan Synchrotron Radiation Research Institute, SPring-8), T. Uruga (JASRI/SPring-8), S. Ohkoshi (Department of Chemistry, The University of Tokyo), T. Yokoyama (National Institute of Natural Sciences Institute for Molecular Science), and M. Tada (Institute for Molecular Science)
- 10:40 **1492** Electron Tomography Based 3D Reconstruction of Fuel Cell Catalysts and Catalyst Layers – J. Jankovic (Automotive Fuel Cell Cooperation Corp.), D. Susac (AFCC), T. Soboleva, and J. Stumper (Automotive Fuel Cell Cooperation Corp.)

- 11:00 **1493** 3D Chemical Mapping of PEM Fuel Cell Cathodes by Scanning Transmission Soft X-ray Spectro-Tomography – V. Berejnov (McMaster University), D. Susac (AFCC), J. Stumper (Automotive Fuel Cell Cooperation Corp.), and A. P. Hitchcock (McMaster University)
- 11:20 **1494** Heterogeneous Porosity Distribution Under Compression of Gas Diffusion Layer Using Synchrotron X-Ray Tomography – J. Je, S. Doh (Pohang University of Science and Technology), J. Kim (The Korea Atomic Energy Research Institute), and M. Kim (Pohang University of Science and Technology)
- 11:40 **1495** Effects of Channel Structure and Wettability on Liquid Water Transport in Cathode of PEFC – Y. Ishizaki (Kyoto Institute of Technology), R. Taniguchi (Daikin Industries, LTD.), K. Nishida (Kyoto Institute of Technology), S. Tsushima, and S. Hirai (Tokyo Institute of Technology)

*Tapa 3, Tapa Conference Center, Hilton Hawaiian Village*

**B-2.1 Stack Structure/Components (1) – 08:00 – 12:00**

**Co-Chairs: Yuichio Tabuchi and Tom Fuller**

- 08:00 **1496** Higher Current Density Operation in PEMFC for Automobile applications – Y. Tabuchi, T. Shiomi, Y. Fukuyama, K. Sato, and N. Kubo (Nissan Motor Co., Ltd)
- 08:40 **1497** Missions and Progressions of NEDO's Cell Evaluation Project – M. Hori (Daido University), K. Kobayashi (Fuel Cell Research Center, DAIDO University), Y. Oono, and A. Daimaru (Daido University)
- 09:00 **1498** A 2 kW Power System Based on an Alkaline Membrane Fuel Cell Stack Developed at Celler Technologies – S. Gottesfeld (Cellera Technologies)
- 09:20 **1499** Investigation on Effect of PTFE Treatment on GDL Micro-structure by High-resolution X-ray CT – T. Sasabe (Tohoku University), G. Inoue (Kyoto University), S. Tsushima, S. Hirai (Tokyo Institute of Technology), T. Tokumasu (Tohoku University), and U. Pasaogullari (University of Connecticut)
- 09:40 Intermission (20 Minutes)
- 10:00 **1500** Dynamic Analysis and Diagnostics of a High Temperature PEM Fuel Cell Stack – Y. Zhu, W. Zhu, and B. J. Tatarchuk (Auburn University)
- 10:20 **1501** Fabrication and Optimization Membrane Electrode Assembly with Support-Less Platinum Catalysts for Space Applications – X. Huang (USC), W. A. Rigdon (University of South Carolina), K. Billings, and T. I. Valdez (California Institute of Technology)
- 10:40 **1502** Novel Metallic Glass Micro Fuel Cell Architecture – R. C. Sekol, G. Kumar, M. Carmo, S. Mukherjee, F. Gittleston, N. Hardesty-Dycke, J. Schroers, and A. D. Taylor (Yale University)



- 11:00 **1503** Screening Balance of Plant Materials to Understand their effect on Fuel Cell Performance – H. N. Dinh (National Renewable Energy Laboratory), M. Das (University of South Carolina), K. Neyerlin (National Renewable Energy Laboratory), M. S. Opu (University of South Carolina), H. Wang, C. S. Macomber (National Renewable Energy Laboratory), M. Ohashi, and J. Van Zee (University of South Carolina)
- 11:20 **1504** Investigating the Performance of Catalyst Layer Micro-Structures with Different Platinum Loadings – M. Khakbaz Baboli, D. B. Harvey, and J. G. Pharoah (Queen's University)
- 11:40 **1505** Development of Ultra-Low Pt Alloy Cathode Catalyst for PEM Fuel Cells – B. N. Popov, T. Xie, T. Kim, W. Jung, A. Kriston, P. Ganesan (University of South Carolina), and H. Kim (Yonsei University)

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**C-2.1 High Temperature PEMFC Membranes 1 – 08:00 – 12:00**  
**Co-Chairs: Deborah Jones and Akihiro Ohira**

- 08:00 **1506** Synthesis and Properties of High Temperature Proton Exchange Membranes Based on Polybenzimidazoles Containing Hydroxypyridine – L. Zhou and R. He (Northeastern University)
- 08:20 **1507** Polymer Electrolyte Membranes for Fuel Cells of Graft-type sulfonated Polybenzimidazoles – J. Park (The University of Tokyo), M. Asano, Y. Maekawa (Japan Atomic Energy Agency), and K. Kudo (The University of Tokyo)
- 08:40 **1508** Performance of the HT-PEM Membrane Electrode Assembly – H. Hjuler, T. Steenberg, C. Terkelsen, T. Holst, H. Garcia (Danish Power Systems), and K. Cooper (Scribner, Inc.)
- 09:00 **1509** Performance Analysis of a HT-PEM Fuel Cell under Mechanical Compression Control – A. Diedrichs and P. Wagner (NEXT ENERGY – EWE-Research Centre for Energy Technology)
- 09:20 **1510** Thermogravimetric and Spectroscopic Investigation of the Interaction between Polybenzimidazole and Phosphoric Acid – A. Majerus, F. Conti, C. Korte, W. Lehnert, and D. Stolten (Forschungszentrum Jülich GmbH)
- 09:40 Intermission (20 Minutes)
- 10:00 **1511** Sulfonated-Nanocomposites Incorporated Polybenzimidazole Based Polymer Electrolyte Membranes for Fuel Cells – K. A. Stewart and H. Pal Singh Missan (University of the West Indies)
- 10:20 **1512** Novel Polybenzimidazole-Phosphoric Acid Membranes for Fuel Cell Applications – G. W. Yeager (General Electric), L. Krishnan, E. Thomas, and T. Zhang (GE Global Research)
- 10:40 **1513** A Novel, Easy to Synthesize, Anhydrous Derivative of Phosphoric Acid for Use as Electrolyte in H<sub>2</sub>/O<sub>2</sub> Fuel Cells – Y. Ansari, T. Tucker, and A. Angell (Arizona State University)
- 11:00 **1514** Non-Humidified Fuel Cells Using a Protic Ionic Liquid as Electrolyte – T. Yasuda, Y. Honda, R. Tatara, K. Dokko, and M. Watanabe (Yokohama National University)

- 11:20 **1515** A Non-humidified Fuel Cell Using Fluorohydrogenate Ionic Liquid-Polymer Composite Membrane Prepared by Living Radical Polymerization – P. Kiatkittikul, J. Yamaguchi, T. Nohira, R. Hagiwara, Y. Tsujii (Kyoto University), and T. Sato (Tsuruoka National College of Technology)
- 11:40 **1516** Intermediate-Temperature Fuel Cells Using an Anhydrous Proton Conductor A<sup>III</sup><sub>0.5</sub>B<sup>V</sup><sub>0.5</sub>P<sub>2</sub>O<sub>7</sub> – P. Heo (Samsung Advanced Institute of Technology), Y. Shen (Nagoya University), M. Nagao (California Institute of Technology), K. Kim, C. Pak, K. Choi, H. Chang (Samsung Advanced Institute of Technology), and T. Hibino (Nagoya University)

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**D-2.1 Pt-Based Cathode Catalysts 1 – 08:00 – 12:00**  
**Co-Chairs: Tatsuya Hatanaka and Rohit Makharia**

- 08:00 **1517** U.S. Department of Energy Polymer Electrolyte Membrane Fuel Cell Catalyst Development Activities – T. G. Benjamin (Argonne National Laboratory), K. Epping-Martin, N. L. Garland, D. L. Ho (U.S. Department of Energy), J. P. Kopasz (Argonne National Laboratory), D. C. Papageorgopoulos (U.S. Department of Energy), and W. F. Podolski (Argonne National Laboratory)
- 08:20 **1518** Performance and Durability Benchmark of Advanced Cathode Catalysts, and Development Target for Platinum Reduction in PEM Fuel Cell Vehicles – R. Makharia, T. Greszler, and N. Subramanian (General Motors)
- 08:40 **1519** Theoretical Study on Particle Size effect of Oxygen Reduction Reaction on Pt Catalyst – Y. Kawamura (Toyota Motor Corporation) and R. Jinnouchi (Toyota Central R&D Laboratory)
- 09:00 **1520** The Particle Size Effect on the Oxygen Reduction Reaction Activity of Pt Catalysts: Influence of Electrolyte and Relation to Single Crystal Models – M. Nesselberger (University of Copenhagen)
- 09:20 **1521** Synthesis of Platinum Catalyst Clusters and Electrochemical Investigation of Stability – R. A. Hackendorn and A. V. Virkar (The University of Utah)
- 09:40 Intermission (20 Minutes)
- 10:00 **1522** Pt Nanoparticles Dispersion Influence on the Fuel Cell Performance – M. Darab (NTNU), J. Gómez de la Fuente, M. Skinlo Thomassen (SINTEF), and S. Sunde (Norwegian University of Science and Technology)
- 10:20 **1523** Electrocatalytic Behavior of Tailored Shape Platinum Nanoparticles – S. Baranton, P. Urchaga, C. Coutanceau (Université de Poitiers), and G. Jerkiewicz (Queen's University)
- 10:40 **1524** First-Principles Analysis of the Electrocatalytic Activity of Pt(100) Surface for Oxygen Reduction Reaction – B. Han (Daegu Gyeongbuk Institute of Science and Technology (DGIST)), V. Viswanathan (Stanford University), and H. Pitsch (Stanford University)

- 11:00 **1525** Analysis of Pt Oxide Formation on Working Cathode of PEFC by Operando-XAFS – T. Hatanaka, K. Hiroshima, Y. Nishimura, T. Nonaka, K. Dohmae (Toyota Central R&D Labs. Inc.), R. Jinnouchi (Toyota Central R&D Laboratory), and Y. Morimoto (Toyota Central R&D Labs. Inc.)
- 11:40 **1526** The effect of Platinum Oxide Growth on Platinum Stability in PEMFCs – E. L. Redmond, P. Trogadas, F. M. Alamgir, and T. F. Fuller (Georgia Institute of Technology)

*Honolulu 3, Tapa Conference Center, Hilton Hawaiian Village*

**E-2.1 Small Organic Molecule Oxidation in Acid – 08:00 – 12:00**  
**Co-Chairs: Bruno Pollet and Christophe Coutanceau**

- 08:00 **1527** A Ternary Catalyst for Dimethyl Ether Electrooxidation – Q. Li, G. Wu, C. Johnston, and P. Zelenay (Los Alamos National Laboratory)
- 08:20 **1528** Pt Decorated Amorphous RuIr Alloys as High Efficiency Electrocatalyst for the Methanol Oxidation Reaction – B. G. Pollet (HySA Systems Competence Centre)
- 08:40 **1529** Ethanol Oxidation Reaction on Tandem-type Pt/Rh/SnO<sub>x</sub> Electrocatalysts – H. Inoue, A. Haze, M. Chiku, and E. Higuchi (Osaka Prefecture University)
- 09:00 **1530** Development of High Performance Direct Formic Acid Fuel Cell Using Hyper Branched Polymer as a Catalyst Stabilizer – T. Tsujiguchi, M. Kojima, T. Iwakami, N. Nakagawa (Gunma University), and K. Kojima (Nissan Chemical Industries, Ltd.)
- 09:20 **1531** Carbon-TiO<sub>2</sub> Composite Nanofibers as a Promising Support for PtRu Anode Catalyst of DMFC – M. A. Abdelkareem, Y. Ito, T. Tsujiguchi, and N. Nakagawa (Gunma University)
- 09:40 Intermission (20 Minutes)
- 10:00 **1532** O<sub>2</sub>-Enhanced Methanol Oxidation at Pt-Ru-C Ternary Sputtered Electrode – S. Shironita, M. Ueda, and M. Umeda (Nagaoka University of Technology)
- 10:20 **1533** Enhancement of Catalytic Properties for the Electrooxidation of Polyols on Bi-Modified Pt and Pd Nanoparticles – C. Coutanceau, S. Baranton, M. Simoes, and L. Demarconnay (Université de Poitiers)
- 10:40 **1534** Electrochemical Behavior and Morphology of Nano Catalyst for Fuel Cell: The effect of Ultrasonic and Microwave Techniques – V. Tran, T. Doan, N. Duong, M. Le, and T. Nguyen (Vietnam National University)
- 11:00 **1535** Novel 3-D Graphite Oxide-Nanoribbon Supported Metal Catalysts for Methanol Oxidation Reaction – H. Wang, B. A. Kakade, T. Tamaki, H. Ohashi, and T. Yamaguchi (Tokyo Institute of Technology)
- 11:20 **1536** Reaction Analysis of Alcohol Electro-oxidation at Intermediate Temperatures – J. Otomo, I. Shimada, F. Kosaka, K. Ishiyama, and Y. Oshima (The University of Tokyo)
- 11:40 **1537** The Impact of Formaldehyde and Formic Acid on Methanol Electrooxidation at Pt-film Electrode: A Combined ATR-FTIRS/DEMS Study – R. Reichert, J. Schnaidt, Z. Jusys, and R. Behm (Ulm University)

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**A-2.2 Diagnostics – 14:00 – 18:00**  
**Co-Chairs: Xinyu Huang and Jian Xie**

- 14:00 **1538** Application of Impedance Spectroscopy to Characterize PEM Fuel Cells – M. E. Orszem (University of Florida)
- 14:40 **1539** Performance Characterization of PEM Fuel Cell Stacks Using AC Impedance Spectroscopy – J. O. Park, J. Yi, J. Kim, T. Song, and J. Ko (Samsung Advanced Institute of Technology)
- 15:00 **1540** Study on Protocols for Evaluating Reactant Gas Transport in Cathode Catalyst Layers of PEFC – H. Yasuda, K. Kobayashi, A. Daimaru, and M. Hori (Daido University)
- 15:20 **1541** An Oxygen Flux Interrupt Method and *In Situ* Micro-Sensor for Characterizing Oxygen Transport in PEMFCs – W. K. Epting and S. Litster (Carnegie Mellon University)
- 15:40 **1542** Measurements of Water Vapor and Current Distributions and Prediction of Water Crossover in PEMFC under Low-Humidity Conditions – K. Nishida, M. Asa (Kyoto Institute of Technology), S. Tsushima, and S. Hirai (Tokyo Institute of Technology)
- 16:00 Intermission (20 Minutes)
- 16:20 **1543** In-plane Liquid Water Distribution at the Interface Between the Gas Diffusion Layer and Catalyst Layer in the Cathode of a Polymer Electrolyte Fuel Cell with a Hybrid Pattern Flow Field – H. Nakajima, T. Kitahara, Y. Takazono, S. Miyahara, and A. Shimizu (Kyushu University)
- 16:40 **1544** Segmented PEMFC with Sub-millimeter Resolution – U. Shrivastava, A. Sarkar, and K. Tajiri (Michigan Technological University)
- 17:00 **1545** Using a Novel Current Distribution Board to Understand Local Water Transport in PEMFCs – V. Lilavivat, S. Shimpalee, J. Van Zee (University of South Carolina), C. Mittelsteadt, and H. Xu (Giner Inc.)
- 17:20 **1546** Design of An Optical Fiber Sensor for *In Situ* Measurement of Temperature and Water Droplet Detection in a PEM Fuel Cell – K. Inman and X. Wang (Oakland University)
- 17:40 **1547** Calculating Hydrogen Mass Transport Coefficients in a PEMFC at Different Operating Conditions Using a Hydrogen Pump Configuration – M. Angelo, K. Bethune, and R. Rocheleau (University of Hawaii)

*Tapa 3, Tapa Conference Center, Hilton Hawaiian Village*

**B-2.2 Stack Structure/Components (2) – 14:00 – 15:20**  
**Co-Chairs: Doug Hansen and Kazuhiko Shinohara**

- 14:00 **1548** Manufacturing All-Polymer Laminar Flow-Based Fuel Cells – A. Hollinger (UIUC) and P. J. Kenis (University of Illinois at Urbana-Champaign)
- 14:20 **1549** Fabricating and Measuring Low-Platinum Content HOR/HER Gas Diffusion Electrodes – Y. Zhang, J. Wang (Brookhaven National Laboratory), Y. Hsieh (National Chiao Tung University), and R. R. Adzic (Brookhaven National Laboratory)

- 14:40 **1550** Fabrication of Bipolar Plates Based on Graphite Sheet via Stamping Method – T. Park, I. Chang, Y. Lee, and S. Cha (Seoul National University)
- 15:00 **1551** A Novel Lightweight Polymer Electrolyte Fuel Cell Stack for Robot Systems – S. Hwang, J. Jang, G. Choi, S. Lee, O. Kwon, D. Lee, A. Bates, R. M. Ench (Daegu Gyeongbuk Institute of Science & Technology), and S. Park (University of Louisville)

Honolulu 2, Tapa Conference Center, Hilton Hawaiian Village

**C-2.2 Perfluorosulfonic Acid Membranes 2 – 14:00 – 17:40**  
**Co-Chairs: Hideki Nakagawa and Mark Edmundson**

- 14:00 **1552** Copolymeric Short-Long Side Chain PFSA/PTFE Composite Membranes with High Ion Exchange Capacities for Fuel Cell Applications – Y. Zhang and Y. Zhu (Shanghai Jiao Tong University)
- 14:40 **1553** Effect of Thermal Treatment on the Properties of Ultra-Thin Nafion Film – D. K. Paul (Queen's University & Queen's – RMC Fuel Cell Research Centre) and K. Karan (Queen's University)
- 15:00 **1554** Role of Chemical-Mechanical Energies in Understanding Structure and Properties of Aged and Degraded Membranes – A. Kusoglu and A. Weber (Lawrence Berkeley National Laboratory)
- 15:20 **1555** Numerical Validation of Water Transport in Polymer Electrolyte Membranes – R. S. Fu, N. Khajeh-Hosseini-Dalasm, and U. Pasaogullari (University of Connecticut)
- 15:40 **1556** On the Diffusion Coefficient of Water in Polymer Electrolyte Membranes – T. Berning, A. Olesen, and S. K. Kær (Aalborg University)
- 16:00 Intermission (20 Minutes)
- 16:20 **1557** A Study on Structural Property of Ionomer as A Model for Catalyst Layer – A. Ohira (AIST), S. Kuroda (Fuel Cell Cutting-Edge Center, Technology Research Association), M. Yamaguchi, M. Barique, and H. Mohamed (uel Cell Cutting-Edge Center, Technology Research Association)
- 17:00 **1558** Accelerated Testing of Carbon Corrosion and Membrane Degradation in PEM Fuel Cells – R. Mukundan (Los Alamos National Laboratory), G. James, D. Ayotte (Ballard Power Systems), J. Davey, D. Langlois, D. Spornjak, D. Torrace (Los Alamos National Laboratory), S. Balasubramanian, A. Weber (Lawrence Berkeley National Laboratory), K. L. More (Oak Ridge National Laboratory), and R. L. Borup (Los Alamos National Laboratory)
- 17:20 **1559** Degradation of Perfluorosulfonic Acid Membrane Water Permeance via Formation of Sulfonic Acid Anhydrides – S. Clapham, F. D. Coms, T. Fuller, and L. Zou (General Motors Company)

Tapa 2, Tapa Conference Center, Hilton Hawaiian Village

**D-2.2 Pt-Based Cathode Catalysts 2 – 14:00 – 18:00**  
**Co-Chairs: Bryan Pivovar and Peter Strasser**

- 14:00 **1560** High-Fidelity Simulations of Nano-Structured Thin Film (NSTF) Catalysts – S. Kim, Z. Zhou (Michigan Technological University), and K. Moriyama (Honda R&D)
- 14:20 **1561** DFT Study of Pt Alloy and Pt Thin Film Catalysts for the Cathode Oxygen Reduction Reaction in PEM Fuel Cells – W. Goddard III, Y. Sha, T. Yu, H. Tsai, B. V. Merinov (California Institute of Technology), and P. Shirvanian (Ford Motor Co.)
- 14:40 **1562** Development of Alternated Catalyst Layer Structure for PEM Fuel Cells – W. MEI, T. Fukazawa, Y. Nakano, Y. Akasaka, and K. Naito (Toshiba Coporate R&D Center)
- 15:00 **1563** Theoretical Study of the Structure, Stability and Oxygen Reduction Activity of Ultrathin Platinum Nanotubes – I. Matanovic, F. H. Garzon (Los Alamos National Laboratory), P. R. Kent (Oak Ridge National Laboratory), and N. J. Henson (Los Alamos National Laboratory)
- 15:20 **1564** Oxygen Reduction Activity of Vapor-Grown Platinum Nanotubes – A. B. Papandrew, R. Atkinson, G. A. Goenaga, D. L. Wilson (The University of Tennessee), S. S. Kocha, K. Neyerlin, J. W. Zack, B. S. Pivovar (National Renewable Energy Laboratory), and T. A. Zawodzinski Jr. (The University of Tennessee)
- 15:40 **1565** Activity and Durability of Pt Extended Network Electrocatalyst Structures Made from Spontaneous Galvanic Displacement – K. Neyerlin, B. A. Larsen, S. S. Kocha, and B. S. Pivovar (National Renewable Energy Laboratory)
- 16:00 Intermission (20 Minutes)
- 16:20 **1566** Important Role of Cerium Oxide in Oxygen Reduction Reaction at Pt-CeOx Nanocomposite Electrocatalyst Studied by *In Situ* Electrochemical XAFS – T. Masuda (NIMS), H. Fukumitsu, K. Fugane, H. Togasaki (National Institute for Materials Science), D. Matsumura, K. Tamura, Y. Nishihata (Japan Atomic Energy Agency), H. Yoshikawa, K. Kobayashi, T. Mori (National Institute for Materials Science), and K. Uosaki (NIMS)
- 16:40 **1567** Effect of Silicotungstic acid on Cathode Performance in Proton Exchange Membrane Fuel Cells – P. Baker, H. R. Kunz, and L. Bonville (University of Connecticut)
- 17:00 **1568** Analyzing the effect of Ultra-Low Pt Loading on Mass and Specific Activity of PEM Fuel Cells – A. Kriston, T. Xie, T. Kim, W. Jung, P. Genesan, and B. N. Popov (University of South Carolina)
- 17:20 **1569** Impact of Platinum Loading and Catalyst Layer Structure on PEMFC Performance – J. Owejan (General Motors Electrochemical Energy Research Laboratory), J. Owejan, and W. Gu (General Motors)
- 17:40 **1570** Multi-Step Oxygen Reduction Reaction (ORR) Kinetics on Pt including Water Activation – B. Jayasankar, K. Karan, and D. B. Harvey (Queen's University)

**E-2.2 Materials and Fuels for Alkaline Systems – 14:00 – 18:00**

**Co-Chairs: Zenonas Jusys and Előd Gyenge**

- 14:00 **1571** Borohydride Electrooxidation: New Insights Based on an Old Paradigm – S. Sun, Z. Jusys, and R. Behm (Ulm University)
- 14:40 **1572** Hydrazine Electrooxidation of Ni-La Catalysts for Anion Exchange Membrane Fuel Cells – T. Sakamoto, K. Asazawa (Daihatsu Motor Co. Ltd.), U. Martinez, B. Halevi, P. Atanassov (The University of New Mexico), K. Yamaguchi, N. Mizuno (University of Tokyo), D. Matsumura, Y. Nishihata (Japan Atomic Energy Agency), and H. Tanaka (Daihatsu Motor Co. Ltd.)
- 15:00 **1573** Effect of Carbonate Ion Species on Power Generation Characteristics of Anion Exchange Membrane Fuel Cell – S. Suzuki, H. Muroyama, T. Matsui, and K. Eguchi (Kyoto University)
- 15:20 **1574** Investigations of the Anodic Oxidation of Ethanol under Forced Convection and Ambient Conditions – J. O. Meier, C. Cremers (Fraunhofer ICT), U. Stimming (Technische Universität München), and J. Tübke (Fraunhofer ICT)
- 15:40 **1575** Development of a Swiss-Roll Mixed-Reactant Feed Direct Borohydride Fuel Cell – A. Aziznia, C. W. Oloman, and E. L. Gyenge (The University of British Columbia)
- 16:00 Intermission (20 Minutes)
- 16:20 **1576** Direct Borohydride Fuel Cells: A Progress Review from Electrocatalysis to Novel Mixed Reactant Fuel Cell Design – E. L. Gyenge (The University of British Columbia)
- 17:00 **1577** Improvement of Properties of Anion Exchange Membranes for Fuel Cell Applications by Controlling Water State – H. Jung, H. Ohashi, T. Tamaki, and T. Yamaguchi (Tokyo Institute of Technology)
- 17:20 **1578** Boron and Phosphorus Co-Doped Graphene as Metal-Free Catalysts for Oxygen Reduction Reaction in Alkaline Medium – G. Jo and S. Sangaraju (Daegu Gyeongbuk Institute of Science & Technology)
- 17:40 **1579** Hydroxide Based Decomposition of Functionalized Benzyltrimethylammonium Cations – C. S. Macomber (National Renewable Energy Laboratory), H. Long, E. Gjersing, C. Entrakul (National Renewable Energy Lab), C. Lyza, Y. Yang, D. Knauss (Colorado School of Mines), and B. S. Pivovar (National Renewable Energy Laboratory)



**Renewable Fuels from Sunlight and Electricity**

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

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

**Photoelectrochemical Cells and Biological Devices – 08:00 – 09:50**

**Co-Chairs: Pawel Kulesza and Jae-Joon Lee**

- 08:00 **1749** Photocatalytic Hydrogen Production from Sunlight via Tuning the Band Gaps Using Impurities-Doping Techniques – H. Yun, S. Yu, and J. Yi (Seoul National University)
- 08:30 **1750** Fueling Vehicles with Sun and Water – K. E. Ayers, E. B. Anderson, K. Dreier (Proton OnSite), and K. W. Harrison (National Renewable Energy Laboratory)
- 09:00 **1751** Photobiological H<sub>2</sub> Production: Theoretical Maximum Light Conversion Efficiency and Strategies to Achieve it – M. L. Ghirardi (National Renewable Energy Laboratory)
- 09:30 **1752** Vectorial Enzyme Activation at Illuminated Semiconductor-Enzyme-Electrolyte Junctions – K. Skorupska, H. Lewerenz (Helmholtz Zentrum Berlin), and P. J. Kulesza (University of Warsaw)

**Photoelectrochemical Cells and Photocatalysts – 10:00 – 12:20**

**Co-Chairs: Nick Wu and Hyunwoong Park**

- 10:00 **1753** ITO Nanowire-Based Photoelectrodes for Extremely Fast Charge Collection – J. Noh (KRICT-EPFL Global Research Laboratory), J. Kim (Korea Institute of Science), G. Han (Sungkyunkwan University), H. Shin (Kookmin University), and H. Jung (Sungkyunkwan University)
- 10:20 **1754** Straightforward Measurement of Photoelectrode Minority Carrier Diffusion Length – A. J. Leenheer, R. A. Pala, and H. A. Atwater (California Institute of Technology)
- 10:40 **1755** Silicon Based Tandem Cells: A Novel Photocathode for Efficient PEC Water Splitting – E. Murugasan, W. Calvet, B. Kaiser, and W. Jaegermann (Technical University Darmstadt)
- 11:00 **1756** Enhancement of Photoactivity in Hematite Film with Controlled Morphology and Texture from Direct Spray Pyrolysis for Solar Water Splitting – T. Yang, H. Kang, J. Lee, B. Koo, K. Nam, and Y. Joo (Seoul National University)
- 11:20 **1757** Photoelectrochemical Hydrogen Production: Insights on Disrupting the Stability/Efficiency Trade-Off – T. Schiros (Columbia University), J. Leisch, H. Ohldag (Stanford Synchrotron Radiation Light Source), H. Ogasawara (Stanford Synchrotron Radiation Lightsource), M. Toney, A. Nilsson (Stanford Synchrotron Radiation Light Source), T. G. Deutsch (National Renewable Energy Laboratory), W. Choi (Lawrence Livermore National Laboratory), M. Mayer (University of California, Berkeley), and J. Turner (National Renewable Energy Laboratory)



- 11:40 **1758** Photoelectrosynthetic Hydrogen Evolution from Free-Standing Silicon Microwire Arrays – S. Ardo, E. L. Warren, S. Park, B. S. Brunschwig, H. A. Atwater, and N. S. Lewis (California Institute of Technology)
- 12:00 **1759** Visible-Light-Absorbing Polyoxometalates as Building Blocks for All-Inorganic Photosynthetic Assemblies – R. Nakamura, T. Takashima, A. Yamaguchi, and K. Hashimoto (The University of Tokyo)

**Keynote Speech on Electrochemical Devices and Fuels – 14:00 – 16:00**  
**Co-Chairs: Xiao-Dong Zhou and Nick Wu**

- 14:00 **1760** Reversible Fuel Cells for Power Generation and Fuel Production – A. V. Virkar (The University of Utah)
- 14:40 **1761** Integrative Multiphysics Development of Material Systems for a Renewable Future: The HeteroFoaM Story – K. Reifsnider (University South Carolina), Y. Du (University of South Carolina), W. K. Chiu (University of Connecticut), and K. Brinkman (Savannah River National Laboratories)
- 15:20 **1762** Solid Oxide Fuel Cell Systems for Small Scale Power Generation – S. C. Singhal (China University of Mining and Technology) and X. Zhou (University of South Carolina)

**Keynote/Invited Speech on Electrochemical Devices and Fuels – 16:20 – 17:40**  
**Co-Chair: Wilson Chiu**

- 16:20 **1763** Design and Preparation of Pt Nanocatalysts of High Surface Energy for Efficient Energy Conversion of Small Organic Molecule Fuels in Direct Fuel Cells – S. Sun, R. Huang, S. Chen, Z. Liu, Z. Zhou, L. Huang, N. Tian, Y. Jiang, and Y. Cai (Xiamen University)
- 17:00 **1764** Reversible Solid Oxide Fuel Cells: Status and Technology Development Challenges – N. Q. Minh (University of California, San Diego)

*Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center*

**B10 – Poster Session – Renewable Energy and Fuels – 18:00 – 20:00**  
**Co-Chairs: Nick Wu and Xiao-Dong Zhou**

- **1765** Microscopic Properties of III-V Semiconductor Photocathodes at the Interface with Water – B. C. Wood, W. Choi, E. Schwegler, and T. Ogitsu (Lawrence Livermore National Laboratory)
- **1766** Structural and Photoelectrochemical Evaluation of Nano-Textured Sn-Doped AgInS<sub>2</sub> Films Prepared by Spray Pyrolysis – Q. Cheng and C. K. Chan (Arizona State University)
- **1767** Photoelectrochemical Hydrogen Production from Silicon Nanostructures – S. Hwang, J. Kye (Myongji University), and I. Oh (Kumoh National Institute of Technology)
- **1768** Lowering Overpotential of Electrochemical Reduction of CO<sub>2</sub> – W. Shin, D. Saravanakumar, and J. Song (Sogang University)

- **1769** Synthesis and Electrochemical Properties of Platinum-Based Films Used as Cathode Materials in the Dye-Sensitized Solar Cells – P. Hien, L. M. Phung, N. T. Hoang, and N. T. Thoa (Vietnam National University)
- **1770** The Properties According to Pore Former with SOFC Unit Cell Using Decalomania Method – M. Lee, B. Kim, B. Choi, and S. Kim (Korea Institute of Ceramic Engineering and Technology)
- **1771** Solar Hydrogen Generation at Pre-Structured Silicon Photocathodes Activated by Bimetallic Nanoparticles – M. Lublow (Fritz-Haber-Institute of the Max-Planck-Society), C. Merschjann, and T. Schedel-Niedrig (Helmholtz-Centre-Berlin for Materials and Energy)
- **1772** Understanding the Reaction Mechanism in the Sugar-Air Flow Battery – S. Li (University of Hawaii at Manoa), D. Scott (Brigham Young University – Hawaii), and B. Liaw (University of Hawaii at Manoa)
- **1773** Catalytic Reduction of Carbon Dioxide to Carbon Monoxide Using the Rhenium(I) Complex (5,5'-Bisphenylethynyl-2,2'-Bipyridyl)Re(CO)<sub>3</sub>Cl – E. Portenkirchner, K. Oppelt, C. Ulbricht, D. A. Egbe, H. Neugebauer, G. Knör, and N. Sariciftci (Johannes Kepler University Linz)
- **1774** New Polyethylene Based Anion Exchange Membranes (PE-AEMs) with High Ionic Conductivity – M. Zhang, H. Kim, E. Chalkova, F. Mark, S. N. Lvov, and T. Chung (The Pennsylvania State University)
- **1775** Ruthenium-Based Materials for Oxygen and Hydrogen Evolution Catalysis in Photoelectrochemical Applications – Y. Chang, J. M. Kaneshiro, and N. M. Gaillard (University of Hawaii at Manoa)
- **1776** Membranes for Solar Water Splitting Devices – S. Ardo (California Institute of Technology), M. McDonald (University of Manitoba), S. Park, M. DiFranco (California Institute of Technology), M. Freund (University of Manitoba), and N. S. Lewis (California Institute of Technology)
- **1777** A Non-Combustible Process for Generating Energy from Bio-Waste – A. Kumar, V. Kamavaram, V. Veedu, and K. Cheung (Oceanit Laboratories Inc)
- **1778** Electrochemistry of Molybdenum and Its Oxides for CIGS Solar Cells – V. S. Saji, S. Lee, Y. Yeon, and C. Lee (Korea University)
- **1779** Interhalogen-Based Binary-Redox Couples for High-Voltage Solar Cells – N. C. Deb Nath, S. Sarker, H. Lee, and J. Lee (Konkuk University)
- **1780** Development of an Artificial Co-Enzyme for Formate Dehydrogenase with the Function of CO<sub>2</sub> Reduction – S. Ikeyma and Y. Amao (Oita University Dannoharu)
- **1781** Photoelectrochemical Dehydrogenation of Ammonia Borane with Pt/n-Si – H. Inoue, C. Matsuda, M. Shimada, M. Chiku, and E. Higuchi (Osaka Prefecture University)
- **1782** The Activity of Ash-free Coal in Direct Carbon Fuel Cells – H. Ju, J. Kim (Gwangju Institute of Science and Technology), J. Lee (Gwangju Institute of Science & Technology (GIST)), S. Lee, R. Song (Korea Institute of Energy Research), and J. Lee (Gwangju Institute of Science & Technology (GIST))

Wednesday, October 10

- **1783** *In Situ* FTIR Analysis of CO<sub>2</sub> Electrochemical Reduction at Copper Electrodes – M. Ren, E. Andrews, and J. Flake (LSU)
- **1784** Theoretical Characterization of Ammonia Oxidation Intermediates and Products on Platinum Clusters – D. A. Daramola and G. G. Botte (Ohio University)
- **1785** Evaluation of Current Efficiency of SOEC Using Precise On-Line Gas Analysis – Y. Tanaka (National Institute of Advanced Industrial Science and Technology), S. Nakamura (Tokyo University of Science), K. Sato, K. Nozaki, T. Kato, and A. Yamamoto (National Institute of Advanced Industrial Science and Technology)
- **1786** Metal Tungstates as Oxygen Evolution Catalysts – H. Jia (Toyota Research Institute of North America), T. Sekito (Toyota Motor Corporation), J. Stark, L. Zhou, and L. Chen (Toyota Research Institute of North America)
- **1787** Modified Fe<sub>2</sub>O<sub>3</sub> Photoanodes Prepared by Pulse Electrodeposition – W. J. Lee, P. Shinde, and G. Go (Korea Electrotechnology Research Institute)
- **1788** Polycrystalline Cu(In, Ga)Se<sub>2</sub> Thin Films and PV Devices Sputtered from a Binary Target without Additional Selenization – P. Liu (National Chiao Tung University), B. B. Jheng, and M. Wu (National Tsing Hua University)
- **1789** Theoretical Investigations of Transition Metal Nano-Clusters for Electrochemical NH<sub>3</sub> Production – J. G. Howalt and T. Vegge (Technical University of Denmark)
- **1790** Choline Chloride Enhancement of Carbon Dioxide Reduction on Platinum Catalysts – W. Zhu, B. Rosen, A. Salehi-Khojin, and R. Masel (Dioxide Materials Inc.)
- **1791** Structure Sensitivity of CO<sub>2</sub> Conversion on EMIM-BF<sub>4</sub> Silver Co-Catalyst System – A. Salehi-khojin, B. Rosen, W. Zhu, and R. Masel (Dioxide Materials Inc.)
- **1792** Basic Study of Alkaline Water Electrolysis – A. Manabe (Chlorine Engineers Corp. Ltd.), T. Hashimoto, M. Kashiwase (Chlorine Engineers Corp., Ltd.), M. Kurosaki, T. Hayashida, K. Hirao (Permelec Electrode Ltd.), I. Shimomura, and I. Nagashima (Kawasaki Heavy Industries, Ltd.)
- **1793** CO<sub>2</sub> Reduction at Glassy Carbon Electrode in the Presence of Pyridine – J. Agullo, M. Morin, and D. Bélanger (Université du Québec à Montréal)
- **1794** Cu Monolayer on Au/C and Pt/C for the Electrochemical Reduction of CO<sub>2</sub> to Hydrocarbons – I. L. Escalante-Garcia, J. S. Wainright, and R. F. Savinell (Case Western Reserve University)
- **1795** Ti-Doped Hematite Nanostructures for Solar Water Splitting with High Efficiency – J. Deng, J. Zhong, A. Pu, D. Zhang, and X. Sun (Soochow University)
- **1796** Electrochemical Synthesis of Disordered Three-Dimensional Cuprous Oxide (Cu<sub>2</sub>O) Film and Its Photoelectrochemical Properties – S. Yoon (Hanyang University), M. Kim, J. Lim, K. Lee (Korea Institute of Materials Science), and B. Yoo (Hanyang University)
- **1797** Impact of Nitrogen Treatment on the Electronic and Chemical Structure of GaInP<sub>2</sub> Thin-Film Surfaces – M. G. Weir, K. E. George (University of Nevada), T. G. Deutsch, A. Welch (National Renewable Energy Laboratory), R. G. Wilks (Helmholtz Zentrum Berlin), D. C. Hanks, M. Blum (University of Nevada), W. Yang (Lawrence Berkeley National Laboratory), M. Bär (Helmholtz Zentrum Berlin), L. Weinhardt (University of Nevada), J. A. Turner (National Renewable Energy Laboratory), and C. Heske (University of Nevada)
- **1798** A Ceramic-Anode Supported Low Temperature Solid Oxide Fuel Cell – H. Ding, J. Ge, and X. Xue (University of South Carolina)
- **1799** Electrochemical Decomposition of Urea with Ni-Based Catalysts – W. Yan, D. Wang, and G. G. Botte (Ohio University)
- **1800** Transport Phenomena in Acid-Alkaline Membrane Bi-Cell Configurations for Portable Power Sources – K. N. Grew and D. Chu (U.S. Army Research Laboratory)
- **1801** Effect of Photodeposited Metal Catalysts on Oxygen Evolution at Well-Defined TiO<sub>2</sub> (110) Surfaces – M. A. Rigsby, G. E. Alliger, and G. M. Brown (Oak Ridge National Laboratory)
- **1802** Renewable Fuels for SOFCs: Fuel Flexibility by Gradual Internal Reforming – S. Georges, N. Bailly, M. Steil (LEPMI), F. Fonseca, S. D. Nobrega (IPEN), J. Viricelle, A. Hadjar (EMSE), and P. Gélin (IRCELYON)
- **1803** The Co2p Oxidation State in Co-PI Catalysts – M. Richter and D. Schmeißer (Brandenburg University of Technology)
- **1804** Quasi Fermi Energy Tuning of Carbon Nanotubes for Solar Cells – N. C. Deb Nath, S. Sarker, H. Lee, and J. Lee (Konkuk University)
- **1805** Photocatalytic Reduction of CO<sub>2</sub> Using Shape Controlled Anatase TiO<sub>2</sub> with Co-Catalyst Loading – D. Saruwatari (Kyusyu Institute of Technology), N. Murakami, and T. Ohno (Kyushu Institute of Technology)
- **1806** CO<sub>2</sub> Reduction on Tin Oxide-Based Catalysts – Y. Chen and M. Kanan (Stanford University)
- **1807** Fabrication and Characterization of Metal/Ceramic Composite Electrodes for New Electrochemical Cells – A. Lapina, C. Chatzichristodoulou, P. Holtappels, and M. Mogensen (Technical University of Denmark)
- **1808** Photoelectrochemical Activity of Hematite Nanowire Arrays Synthesized Using Plasmas – H. B. Russell (University of Louisville), U. Cvelbar (Josef Stefan Institute), J. B. Jasinski (University of Louisville), T. G. Deutsch (National Renewable Energy Laboratory), and M. K. Sunkara (University of Louisville)

**Sodium Batteries**

Battery / Energy Technology / High Temperature Materials  
*Lehua, Kalia Conference Center, Hilton Hawaiian Village*

**Na Batteries – 08:00 – 10:00****Co-Chair: Christopher Johnson**

- 08:00 Introductory Remarks (10 Minutes)
- 08:10 **1831** Sodium Ion Batteries for Grid Applications – M. M. Doeff, M. Shirpour, and J. Cabana (Lawrence Berkeley National Laboratory)
- 08:40 **1832** Towards the Development of the Na-Ion Technology: In Search of Suitable Electrodes and Electrolytes – A. Ponrouch, P. Senguttuvan, E. Marchante (ICMAB-CSIC), M. Courty, J. Tarascon (LRCS), and M. Palacin (ICMAB-CSIC)
- 09:10 **1833** Understanding the Difference in Intercalation Behavior between Layered Na- and Li-Transition Metal Oxides – S. Kim, X. Ma, S. Ong, and G. Ceder (Massachusetts Institute of Technology)
- 09:40 Intermission (20 Minutes)

**Na-Ion Batteries – Cathodes I – 10:00 – 12:30****Co-Chairs: Marca Doeff and M. Rosa Palacin**

- 10:00 **1834** P2-type  $\text{Na}_{2/3}[\text{Fe}_{1/2}\text{Mn}_{1/2}]\text{O}_2$  Made from Earth-Abundant Elements for High-Energy Na-Ion Batteries – N. Yabuuchi, M. Kajiyama, Y. Yamada, and S. Komaba (Tokyo University of Science)
- 10:30 **1835** Structure and Electrochemistry of  $\text{Na}_x\text{Fe}_y\text{Mn}_{1-x}\text{O}_2$  Na-Ion Cathode Materials – J. S. Thorne, R. A. Dunlap, and M. N. Obrovac (Dalhousie University)
- 10:50 **1836** Layered  $\text{Na}_{1-x}\text{Li}_x\text{Ni}_{0.5}\text{Mn}_{0.5}\text{O}_2$  Electrodes with O3- and P2- Composite Structure for Na-Ion Batteries – E. Lee, D. Kim, M. Slater, S. Rood, V. Maroni, D. Bass (Argonne National Laboratory), S. Hackney (Michigan Technological University), and C. S. Johnson (Argonne National Laboratory)
- 11:10 Intermission (20 Minutes)
- 11:30 **1837** A Study of the Reactivity of De-Intercalated  $\text{NaNi}_{0.5}\text{Mn}_{0.5}\text{O}_2$  with Non-Aqueous Solvent and Electrolyte by Accelerating Rate Calorimetry – X. Xia and J. Dahn (Dalhousie University)
- 11:50 **1838** Cathode Properties of Disodium Rhodizonate for Sodium Secondary Battery – K. Chihara, N. Chujo, A. Kitajou, E. Kobayashi, and S. Okada (Kyushu University)
- 12:10 **1839** Electrochemical Behavior of Olivine  $\text{FePO}_4$  Cathode Material for Na-Ion Batteries – P. Kubiak, M. Casas-Cabanas, V. Roddatis, J. Carretero-Gonzalez, D. Saurel, and T. Rojo (CIC Energigune)

**Na-Ion Batteries – Cathodes II – 14:00 – 17:40****Co-Chairs: Mark Obrovac and Shinichi Komaba**

- 14:00 **1840** First Principles Investigations of the Electrochemical Properties of Sodium-Ion Cathode Materials – A. J. Toumar, W. D. Richards, S. Kim, X. Ma, X. Li, S. Ong, and G. Ceder (Massachusetts Institute of Technology)

- 14:20 **1841** Development of High Capacity Positive Electrode Material for Sodium Ion Battery – R. Kataoka, T. Mukai, K. Nakatani, A. Yoshizawa (National Institute of Advanced Industry of Science and Technology), and T. Sakai (National Institute of Advanced Industrial Science and Technology (AIST))
- 14:40 **1842** Na-Ion Intercalation Cathode with High Rate and Excellent Structural Stability – D. Lee, J. Xu, and Y. Meng (University of California San Diego)
- 15:00 **1843** Nanostructured Na-Ion Full-Cells – S. Tepavcevic, H. Xiong, C. J. Johnson, and T. Rajh (Argonne National Laboratory)
- 15:20 Intermission (20 Minutes)
- 15:40 **1844** Sodium Manganese Oxide Thin Film Cathodes: Characterization of a Na-Ion Intercalation Model System – L. Baggetto, C. A. Bridges, R. R. Unocic (Oak Ridge National Laboratory), F. Delnick (Sandia National Laboratory), N. J. Dudney, and G. M. Veith (Oak Ridge National Laboratory)
- 16:00 **1845** Phase Change of  $\text{NaFeO}_2$  during Electrochemical Na Intercalation and Deintercalation: An *In Situ* X-ray Diffraction Study – N. Takeichi (National Institute of Advanced Industrial Science and Technology), K. Kuratani (National Institute of Advanced Industrial Science and Technology (AIST)), M. Yao, M. Tabuchi (National Institute of Advanced Industrial Science and Technology), and T. Kiyobayashi (National Institute of Advanced Industrial Science and Technology (AIST))
- 16:20 **1846** Microstructure Evolution with Electrochemical Desodiation Process in  $\text{Na}_x\text{MnO}_2$  – X. Li, X. Ma, A. J. Toumar, S. Ong, and C. Gerbrand (Massachusetts Institute of Technology)
- 16:40 Intermission (20 Minutes)
- 17:00 **1847** Novel Cathode Materials of Sodium-Containing Metal Phosphates as Highly Voltage Sodium-Ion Batteries – M. Nose, H. Nakayama, K. Nobuhara, S. Nakanishi, and H. Iba (Toyota Motor Corporation)
- 17:20 **1848** Structural Investigation of  $\text{NaCrO}_2$  as a Positive Electrode for Rechargeable Sodium Battery Using Molten  $\text{NaFSA-KFSA}$  – C. Chen, K. Matsumoto, T. Nohira, R. Hagiwara (Kyoto University), K. Numata, E. Itani (Sumitomo Electric Industries, Ltd.), A. Fukunaga (Kyoto University), S. Sakai, K. Nitta, and S. Inazawa (Sumitomo Electric Industries, Ltd.)

*Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center***B11 – Poster Session – 18:00 – 20:00****Co-Chair: Christopher Johnson**

- 1849** Electrochemical Properties of Sn-Based Electrodes for Na-Ion Batteries – Y. Matsuura, T. Ishikawa, W. Murata, N. Yabuuchi (Tokyo University of Science), S. Kuze (Sumitomo Chemical Co., Ltd.), and S. Komaba (Tokyo University of Science)
- 1850** Na Insertion Mechanism in Alpha  $\text{NaFeO}_2$  as Positive Electrode Materials for Na-Ion Batteries – H. Yoshida, N. Yabuuchi, and S. Komaba (Tokyo University of Science)

- **1851** Synthesis, Characterizations and Electrochemical Studies of  $\text{Na}_2\text{Ti}_6\text{O}_{13}$  for Sodium Ion Batteries – N. Trinh (Université du Québec à Montréal), O. Crosnier (University of Nantes), S. Schougaard (Université du Québec à Montréal), and T. Brousse (University of Nantes)

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

High Temperature Materials

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

### **SOFC Electrolytes – 08:00 – 10:00**

**Co-Chairs: Tatsumi Ishihara and Srikant Gopalan**

- 08:00 **1913** Open-Circuit Voltage Anomalies in Dense Bilayered Electrolytes: Explanation and Implications – K. Duncan (University of the West Indies) and E. D. Wachsman (University of Maryland)
- 08:20 **1914** Conductivity of New Electrolyte Material  $\text{Pr}_{1-x}\text{M}_{1+x}\text{InO}_4$  (M=Ba,Sr) with Related Perovskite Structure for Solid Oxide Fuel Cells – X. Li, H. Shimada, and M. Ihara (Tokyo Institute of Technology)
- 08:40 **1915** Fabrication and Characterization of Nanosized  $(\text{DyO}_{1.5})_x(\text{WO}_3)_y(\text{BiO}_{1.5})_{1-x-y}$  for Lower Temperature SOFC Application – A. A. Lidie, K. Lee, and E. D. Wachsman (University of Maryland)
- 09:00 **1916** Investigation of Electrolyte and Electrode Effects on GDC Electrolyte by Electrochemical Impedance Spectroscopy – L. Zhang, F. Liu, and A. V. Virkar (The University of Utah)
- 09:20 **1917** Mapping Thermodynamics and Kinetics of Oxygen Vacancies in Fuel Cell Electrolytes on the Nanoscale – S. Jesse, A. Kumar, M. D. Biegalski (Oak Ridge National Laboratory), A. Morozovska, E. Eliseev (National Academy of Science of Ukraine), F. Ciucci (The Hong Kong University of Science and Technology), and S. Kalinin (Oak Ridge National Laboratory)
- 09:40 Intermission (20 Minutes)

### **SOFC Anodes – 10:00 – 12:00**

**Co-Chairs: Elisabeth Djurado and Kazunari Sasaki**

- 10:00 **1918** Effect of Sulfur Poisoning on Exchange Current Density of SOFC Anodes – T. Hosoi, T. Yonekura, T. Yoshizumi (Kyushu University), Y. Tachikawa, S. Taniguchi (International Research Center for Hydrogen Energy), Y. Shiratori, and K. Sasaki (Kyushu University)
- 10:20 **1919** Thin Film Ceria Based Anodes for a Single Direct Carbon Fuel Cell – M. G. Werhahn, O. Schneider, and U. Stimming (Technische Universität München)
- 10:40 **1920** Anode Materials and Design for Lower Temperature, Hydrocarbon-Fueled Solid Oxide Fuel Cells – C. Gore, K. Lee, H. Yoon, and E. D. Wachsman (University of Maryland)
- 11:00 **1921** Degradation Induced by Sintering of Ni-YSZ Anode in SOFCs – Y. Lee, H. Muroyama, T. Matsui, and K. Eguchi (Kyoto University)

- 11:20 **1922** Electrical Performance of La-Substituted  $\text{SrTiO}_3$  Anode Material with Deficient in A-Site – G. Chen, H. Kishimoto, K. Yamaji, K. Kuramoto, and T. Horita (National Institute of Advanced Industrial Science and Technology)
- 11:40 **1923** Infiltrated Ni-ScYSZ Fuel-Electrodes with Improved Carbon and Sulfur Tolerance – C. Graves, S. Ricote, and T. Ramos (Technical University of Denmark)

### **SOFC Cathodes – 14:00 – 18:20**

**Co-Chairs: Olga Marina and Fanglin Chen**

- 14:00 **1924** Synergy Effects of  $\text{Pr}_2\text{NiO}_4$  and  $\text{Ba}(\text{La})\text{CoO}_3$  on Cathodic Activity for Intermediate Temperature Solid Oxide Fuel Cells – T. Ishihara, J. Xie, Y. Ju, and S. Ida (Kyushu University)
- 14:40 **1925** Electrochemical Study on LSCF Cathode Reaction as a Function of Microstructure, Temperature and Oxygen Partial Pressure – D. Marinha, L. Dessemond, and E. Djurado (CNRS-Grenoble INP-UDS-UJF)
- 15:00 **1926** Effects of Strontium Dopant Concentration on the Oxygen Reduction Reaction Rate Limiting Steps in  $\text{La}_x\text{Sr}_{1-x}\text{Co}_{0.2}\text{Fe}_{3.8}$  Cathodes – A. Dynkin, S. Basu, U. B. Pal, and S. Gopalan (Boston University)
- 15:20 **1927** Control of Activity and Stability by Tailoring Microstructure of Electrocatalyst-Modified Composite Cathode of SOFC – S. Lee, P. Ohodnicki, and K. Gerdes (U.S. Department of Energy)
- 15:40 **1928** Characterization and Modeling of Infiltrated SOFC Cathode – X. Liu, Y. Li, M. Gong (West Virginia University), K. Gerdes (U.S. Department of Energy), R. Gemmen (National Energy Technology Lab), R. Pakalapati, I. Celik (West Virginia University), and T. Horita (National Institute of Advanced Industrial Science and Technology)
- 16:00 Intermission (20 Minutes)
- 16:20 **1929** Ab Initio Based Modeling of  $\text{LaMnO}_{3\pm\delta}$  Defect Chemistry for Solid Oxide Fuel Cell Cathodes – Y. Lee (Massachusetts Institute of Technology) and D. Morgan (University of Wisconsin-Madison)
- 16:40 **1930** A-Site Diffusion in  $\text{La}_{1-x}\text{Sr}_x\text{MnO}_3$ : Ab Initio and Kinetic Monte Carlo Calculations – B. Puchala (University of Wisconsin-Madison), Y. Lee (Massachusetts Institute of Technology), and D. Morgan (University of Wisconsin-Madison)
- 17:00 **1931** Influence of Water Vapor on Sulfur Distribution Within  $\text{La}_{0.6}\text{Sr}_{0.4}\text{Co}_{0.2}\text{Fe}_{0.8}\text{O}_3$  Cathode – F. Wang, K. Yamaji, D. Cho, T. Shimonosono, M. Nishi, H. Kishimoto, M. Brito, T. Horita, and H. Yokokawa (National Institute of Advanced Industrial Science and Technology)
- 17:20 **1932** Electrochemical Operation of  $\text{La}(\text{Ni,Fe})\text{O}_3$  under Cr-Poisoning Conditions – M. K. Stodolny (Energy Research Centre of the Netherlands), B. A. Boukamp, D. H. Blank (University of Twente), and F. P. Van Berkel (Energy Research Centre of the Netherlands)
- 17:40 **1933** Nonlinear Electrochemistry Impedance Spectroscopy and Its Applications – N. Xu, J. Riley, and J. A. Kilner (Imperial College London)



18:00 **1934** Ultra Small Angle X-ray Scattering Studies of Solid Oxide Fuel Cell Cathode Powders – K. Chang, B. Ingram, M. Hopper, J. Ilavsky, and H. You (Argonne National Laboratory)

*Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center*

**B12 – Poster Session – 18:00 – 20:00**

**Co-Chairs: Eric Wachsman, John Kilner, Enrico Traversa, and Shu Yamaguchi**

- **1935** *In Situ* Examination of Oxygen Kinetics in  $\text{La}_{1-x}\text{Sr}_x\text{CoO}_{3-\delta}$  Thin Films at Intermediate and Low Temperatures by X-ray Diffraction – M. D. Biegalski and S. V. Kalinin (Oak Ridge National Laboratory)
- **1936** Preparation of  $\text{A}_2\text{BB}'\text{O}_6$  Oxides by Pechini Method for Solid Oxide Fuel Cells – S. Kim, A. Dorai, D. Seo, I. Han, J. Yu, S. Kim, J. Joo, and S. Woo (Korea Institute of Energy Research)
- **1937** Crystal Structure and Electrical Properties of Al-Doped Lanthanum Silicate Solid Electrolytes – T. Funahashi, A. Mineshige, H. Mieda, Y. Daiko (University of Hyogo), H. Yoshioka (Hyogo Prefectural Institute of Technology), and T. Yazawa (University of Hyogo)
- **1938** Power Generation of Rechargeable Direct Carbon Fuel Cells with Batch-type Charging System – H. Tanaka, A. Yabuki, X. Li, and M. Ihara (Tokyo Institute of Technology)
- **1939** A Comparative Study on Microstructural Change of LSM/SDC and LSCF/SDC Interfaces – M. Komoto, H. Muroyama, T. Matsui, and K. Eguchi (Kyoto University)
- **1940** Study of  $\text{La}_{0.1}\text{Sr}_{0.9}\text{Co}_{0.8}\text{Fe}_{0.2}\text{O}_{3-\delta}$  for Ceria-Based IT-SOFC Cathode – M. Choi, H. Im, K. Lee, and S. Song (Chonnam National University)
- **1941** Evaluation of Y and Fe Co-Doped  $\text{SrTiO}_3$  as Anode Material for SOFC – H. Im, M. Choi, S. Jeon, and S. Song (Chonnam National University)
- **1942** Resistivity and Interfacial Properties of CGO-YSZ Bilayers in Solid Oxide Fuel Cells – J. Hjelm, P. Hjalmarsen, K. Brodersen, and S. Foghmoes (Technical University of Denmark)
- **1943** Cathode Performance and Deposited Cr under Cr Poisoning Condition in the  $(\text{La}_{0.6}\text{Sr}_{0.4})(\text{Co}_{0.2}\text{Fe}_{0.8})\text{O}_3$  Cathode – D. Cho, T. Horita, M. Brito, K. Yamaji, H. Kishimoto, M. Nish, T. Shimonosono, F. Wang, and H. Yokokawa (National Institute of Advanced Industrial Science and Technology)
- **1944** Performance Degradation and Microstructural Change of Ni-YSZ Anode upon Thermal and Redox Cycles – M. Kubota, H. Muroyama, T. Matsui, and K. Eguchi (Kyoto University)
- **1945** Electrochemical Studies of LSCF Powder Prepared using Pechini Process for IT-SOFC Unit Cell – H. Jeon, H. Kim, T. Kim, and H. Kim\* (Korea Institute of Industrial Technology)
- **1946** Correlation between Protonic Conductivity and Structure of Phosphate Glasses for Intermediate Temperature Fuel Cells – H. Sumi, Y. Fujishiro (National Institute of Advanced Industrial Science and Technology), T. Oine, and T. Kasuga (Nagoya Institute of Technology)
- **1947** Proton Conduction in  $\text{CsH}(\text{PO}_3\text{H})$  under Dry or Humid Conditions – M. Nagao, A. Ikeda, and S. M. Haile (California Institute of Technology)
- **1948** Structure and Electrochemical Property of Various Valence Metal Ion Co-doped Scandia Stabilized Zirconia – N. Sonoyama, M. Ikeda, Y. Ota (Nagoya Institute of Technology), N. Imanishi, A. Hirano, Y. Takeda, and O. Yamamoto (Mie University)
- **1949** Fabrication of a Micro-tubular Bi-Layered Membrane by Electrophoretic Deposition – K. Lee, J. Seo, J. Yoon, and H. Hwang (Inha University)
- **1950** Analysis of Electrical Conduction Mechanism of  $\text{LaNi}_{1-x}\text{M}_x\text{O}_{3-\delta}$  (M = Fe, Mn) – E. Niwa, H. Maeda, C. Uematsu, and T. Hashimoto (Nihon University)
- **1951** Oxygen Transport Properties of Al doped  $\text{La}_2\text{NiO}_{4+\delta}$  – S. Jeon, M. Choi, H. Im, and S. Song (Chonnam National University)
- **1952** Transport Properties of the Proton Conducting  $\text{BaCe}_{0.45}\text{Zr}_{0.4}\text{Y}_{0.15}\text{O}_{3-\delta}$  – D. Lim, M. Choi, H. Im, K. Lee, and S. Song (Chonnam National University)
- **1953** Performance of  $\text{BaCe}_{0.85}\text{Y}_{0.15}\text{O}_{3-\delta}$  Electrolyte for the Proton Conducting Ceramic Fuel Cells – K. Lee, M. Choi, D. Lim, and S. Song (Chonnam National University)
- **1954** Molecular Dynamics Simulation on Oxygen Ion Diffusion in  $\text{LaInO}_{3-\delta}$  Perovskite Structure Doped with Ba and Sr – S. Jeong, K. Hwang (Korea Institute of Ceramic Engineering and Technology), M. Yoon, and H. Hwang (Inha University)
- **1955** Hydrothermal Synthesis and 3D-Arrangement of  $\text{CeO}_2$  Nanocrystals – K. Kobayashi, M. Haneda, and M. Ozawa (Nagoya Institute of Technology)
- **1956** Thin Film Electrodes for Li-Ion Batteries: Improved Electrochemical Properties and Mechanism Study – Z. Cui, P. Yu, and X. Guo (Chinese Academy of Sciences)
- **1957** A Novel All-Solid-State Lithium-Ion Battery with *In Situ* Formed Negative Electrode Material – Y. Amiki, F. Sagane, and Y. Iriyama (Shizuoka University)
- **1958** Ionic and Electronic Conductivity in Telluride Glass Systems: Interfacial Materials for All-Solid-State Devices – I. Alekseev (St. Petersburg University), E. Bychkov, D. Le Coq, M. Kassem, M. Fourmentin (University of Littoral), and T. Usuki (Yamagata University)
- **1959** Mechanistic Study of the Electrochemical Promotion of Catalysis Using Isotopic Exchange – M. Tsampas, F. Sapountzi, A. Boréave, and P. Vernoux (CNRS)
- **1960** Defect Chemistry and Transport Properties in  $\text{MnO}_2$  Nanowires – B. C. Solomon, J. Wu (University of South Carolina), E. Thomsen (Pacific Northwest National Laboratory), J. Yang (Beijing University), and X. Zhou (University of South Carolina)

**C1 – Poster Session – 18:00 – 20:00**

- **1983** The Electrolytic Dissociation of 1,3-Cyclobutanedicarboxylic Acids – E. Kvaratskhelia and R. Kvaratskhelia (Iv. Javakhishvili Tbilisi State University)
- **1984** Propagation and Collision of Nonlinear Electrical Responses in *Aloe Vera* L. and *Arabidopsis Thaliana* – L. O’Neal, M. I. Volkova (Oakwood University), V. S. Markin (The University of Texas), and A. G. Volkov (Oakwood University)
- **1985** Effect of Surfactants on the Voltammetric Response and Determination of an Antihypertensive Drug Phentolamine at Boron Doped Diamond Electrode – R. Shrivastav (Dayalbagh Educational Institute), S. Satsangee (USIC), and R. Jain (Jiwaji University)
- **1986** Potential-Induced Conformational Changes in Self-Assembled Monolayers of L-Cysteine at p-GaAs(100) Electrodes – M. Enache (Institute of Physical Chemistry “Ilie Murgulescu”), L. Preda, V. Lazarescu (Institute of Physical Chemistry Ilie Murgulescu), C. Negrila, and M. Lazarescu (National Institute of Material Physics)
- **1987** Effect of Humidity of Atmosphere on Characteristics of Cathodic Film Formed on Ti in Ca<sup>2+</sup>/Ethanol Solution – T. Haruna and A. Nonaka (Kansai University)
- **1988** Evolution of Cathode Surface Hydrophobicity in Microbial Fuel Cell Using Sessile Drop Technique – C. Santoro, M. Cremins, A. Mackay, U. Pasaogullari (University of Connecticut), M. Guilizzoni, A. Casalegno (Politecnico di Milano), and B. Li (University of Connecticut)
- **1989** Electrodeposition of Poly (Ethylene glycol) for Constructing the Artificial Scaffold onto Titanium – S. Migita (Tokyo Medical and Dental University), S. Okada (Kyushu University), Y. Tsutsumi, H. Doi, N. Nomura, and T. Hanawa (Tokyo Medical and Dental University)
- **1990** Monitoring of the Processes of Proliferation and Differentiation of Immunocytes by the Impedance Measurement Method – S. Kasai, K. Shoji, M. Tada, H. Kiri, R. Ishii, and H. Kodama (Tohoku Institute of Technology)
- **1991** Photocurrent Characteristics of Thin Films Produced from Aqueous Colloidal Dispersion of Indolino[60]Fullerene by Using Electrospray Deposition Method – H. Matsutaka, Y. Shigemitsu (FLOX Corporation), T. Orii, T. Aoyama, H. Takaku (RIKEN), and Y. Tajima (FLOX Corporation)
- **1992** Electrochemical Characteristics of Vinylferrocene-Terminated Si(111) Prepared in Diethyl Ether and Dibutyl Ether Grafting Media – M. U. Herrera, T. Ichii, K. Murase, and H. Sugimura (Kyoto University)
- **1993** A Green Electrochemical Method to Remove Protein Surface Fouling and Industrial Dye Wastes – J. Yang and S. Gunasekaran (The University of Wisconsin-Madison)

- **1994** Effects of Cathodic Platinum Loadings and Organic Substrate Concentrations on the Performance of Single Chamber Microbial Fuel Cells Fed with Raw Wastewater – C. Santoro, B. Li (University of Connecticut), U. Karra (University of Connecticut), A. G. Agrios (University of Connecticut), G. Squadrito (CNR-ITAE), and P. Cristiani (RSE- Ricerca sul Sistema Elettrico S.p.A.)
- **1995** Electrosynthesis of Polypyrrole in Low-Viscosity Ionic Liquids – K. Tsunashima, T. Matsubayashi (Wakayama National College of Technology), Y. Ono (University of Toyama), and M. Matsumiya (Yokohama National University)
- **1996** Disc-Like and Bent-Shape Semiconducting Liquid Crystals for Organic Electronics – F. Ely, M. O. Da Silva (CTI Renato Archer), R. Cristiano (Federal University of Paraiba), A. Vieira, and H. Gallardo (Federal University of Santa Catarina)
- **1997** Irreversible Thermodynamics Microbial Fuel Cell Anode Model – J. E. Velez (Universidad Nacional de Colombia) and C. Sanchez (Universidad Nacional de Colombia)
- **1998** Graphene Nanohybrids based on Genetically Engineered Protein for Agrichemical Biosensing – N. Heo (KAIST), S. Lee, K. Lee (NNFC), and T. Park (KAIST)

**D1 – Poster Session – 18:00 – 20:00**

Co-Chair: S. Fujimoto

- **2095** Corrosion Protection of Steel by Conducting Polypyrrole Film Doped with Poly-acids of Mo and W – M. Sasaki, A. Hyono, M. Ueda, and T. Ohtsuka (Hokkaido University)
- **2096** Corrosion under Water-Repellent Coating – H. Saito (Kanazawa University)
- **2097** Monolayer and Bilayer Conducting Polymer Coatings for Corrosion Protection of Copper in Various Aggressive Media – F. Branzoi (Institute of Physical Chemistry), V. Branzoi, and Z. Pahom (University of Politehnica Bucharest)
- **2098** Local Bond Structure of BaZrO<sub>3</sub> Doped with Various Dopant Probed by Raman Spectroscopy – D. Kim, E. Patrik, S. Miyoshi, T. Tsuchiya (The University of Tokyo), and S. Yamaguchi (The University of Tokyo)
- **2099** Analysis of Nickel Electrodeposition Process by Using Quartz Crystal Microbalance – M. Shiina, T. Tanabe, and K. Noda (Shibaura Institute of Technology)
- **2100** Analysis of Corrosion Behavior of Zn Thin Film by Using QCM – R. Inoue, T. Tanabe, and K. Noda (Shibaura Institute of Technology)
- **2101** Passivation of AA5083 Aluminium Alloy by Anodic Pre-Treatments in Ionic Liquids – P. Huang, P. Howlett (Deakin University), D. MacFarlane (Monash University), and M. Forsyth (Deakin University)

- **2102** Passivity and Local Activation of Aluminum in Borate Buffer Solution under Action of Bromide-Ions Additives – A. Chikova, T. A. Minakova, and S. A. Kaluzhina (Voronezh State University)
- **2103** Material Performance of Alloys in NaNO<sub>3</sub>/KNO<sub>3</sub> at 600°C – A. M. Kruiuzenga and D. Gill (Sandia National Laboratories)
- **2104** Determination of Current Efficiency of Anodic Film Formation in the Molten Melt by ICP-AES – S. Han (Korea Institute of Industrial Technology) and H. Kim (KITECH)
- **2105** Electron Beam Induced Texture Change of the Anodic Films Formed in the Molten Melt – S. Han and H. Kim (Korea Institute of Industrial Technology)
- **2106** Evaluation of Zinc Rich Paint (ZRP) Efficiency on Mild Steel in Seashore Environment – A. H. Sofian and K. Noda (Shibaura Institute of Technology)
- **2107** Evaluation of Degradation of High Performance Organic Coatings under Outdoor Salt Spray Test – D. Ito (Yokohama National University), Y. Akira (Port and Airport Research Institute), Y. Miyata, T. Yokoyama, and S. Okazaki (Yokohama National University)
- **2108** A Novel Nanomaterial Hybrid Corrosion Resistant Coating for Marine Applications – V. Kamavaram, G. Arumugam, V. Veedu, and K. Cheung (Oceanit Laboratories Inc)
- **2109** Electrochemical and Microstructural Characterization of Cr(VI) Free Passivation Layers Applied on Electrogalvanized Steel – V. E. Hernandez, M. P. Segundo (University of São Paulo), C. R. Tomachuk (Nuclear and Energetic Research Institute), and H. G. De Melo (University of Mons)
- **2110** Evaluation of Corrosion Protection of Zinc Rich Paint Coated Steel – A. Tanaka, A. H. Sofian, and K. Noda (Shibaura Institute of Technology)
- **2111** Evaluation of Corrosion Protection Property on Galvanized Steels in Atmospheric Environment – K. Ito and K. Noda (Shibaura Institute of Technology)
- **2112** Effect of Alloy Element in Low Alloy Steels on Corrosion Behavior – A. Sunahara, T. Ohmori, K. Noda (Shibaura Institute of Technology), H. Katayama, and H. Masuda (National Institute for Materials Science)
- **2113** Potential Measurement of High Corrosion Resistance Metals Surface in Atmospheric Environment – Y. Hirohata, K. Noda (Shibaura Institute of Technology), H. Katayama, and H. Masuda (National Institute for Materials Science)
- **2114** Corrosion Inhibition of Carbon Steel in Cooling Water Systems by New Organic Polymers as Green Inhibitors – F. Branzoi (Institute of Physical Chemistry), V. Branzoi (University of Politehnica Bucharest), M. Iordoc (ICPE-Advanced Researches), and Z. Pahom (University of Politehnica Bucharest)
- **2115** *In Situ* Electrochemical Detection of Molybdate in an Absorption Refrigerator – Y. Hitoshi, Y. Hatakeyama (Iwate University), H. Inabe, K. Sekiguchi (Hitachi Building Systems Co., Ltd.), T. Hishinuma, M. Itoh, and N. Ohnaka (Hitachi Kyowa Engineering Co., Ltd)
- **2116** Sodium Nitrite-Based Corrosion Inhibitor for Reinforcing Steel in Simulated Concrete Pore Solutions – R. Du, Y. Guo, Y. Zhu, W. Chen, X. Wang, and C. Lin (Xiamen University)
- **2117** Effect of Stress on Oxide Film Growth on SUS 316L Stainless Steel under High Pressure-High Temperature Water – Y. Hamaguchi and T. Ohtsuka (Hokkaido University)
- **2118** The effect on Impurities of the Properties of Passive Oxides on Stainless Steels – M. Abe, A. Hyono, M. Ueda, T. Ohtsuka (Hokkaido University), and T. Ishii (JFE Steel Co.)
- **2119** Synthesis and Characterization of Modified Nano-TiO<sub>2</sub> Films for Corrosion Protection of Stainless Steel – Y. Zhu, J. Zhang, R. Du, H. Qi, L. Xu, and C. Lin (Xiamen University)
- **2120** Effects of Tritiated Water on Passivation Behavior of SUS304 Stainless Steel – M. Oyaidzu, K. Isobe, and T. Yamanishi (Japan Atomic Energy Agency)
- **2121** Localized Corrosion Behavior of Austenitic Stainless Steel Containing Martensitic Phases in NaCl Solution – S. Abe (Shibaura Institute of Technology), T. Saito (Osaka University), K. Noda (Shibaura Institute of Technology), and Y. Watanabe (Nagoya Institute of Technology)
- **2122** Analysis of Localized Corrosion Behavior of Stainless Steel in Atmospheric Environment – Y. Nakajima (Shibaura Institute of Technology), T. Saito (Osaka University), and K. Noda (Shibaura Institute of Technology)
- **2123** Analysis of Passivation Behavior of Stainless Steel in Na<sub>2</sub>SO<sub>4</sub> Solutions – A. Moriyasu (Shibaura Institute of Technology), T. Saito (Osaka University), and K. Noda (Shibaura Institute of Technology)
- **2124** Low Temperature Deposition of SiO<sub>2</sub> Matrix onto the Surface of Stainless Steel as Protective Coating – T. M. Abdel-Fattah (Christopher Newport University) and H. Elsayed-Ali (Old Dominion University)
- **2125** The Electrochemical Properties of the Main Constituent Phases in Magnesium Alloys – Y. Chou, H. Yang, S. Pan, S. Chung, and W. Tsai (National Cheng Kung University)
- **2126** Corrosion Resistance of Mg(OH)<sub>2</sub>/Mg-Al LDH Film Formed on Magnesium alloy by Steam Coating Method – T. Ishziaki (Shibaura Institute of Technology) and K. Teshima (Shinshu University)
- **2127** Characterization of a New Polypropylene+Graphite+Zinc Ternary Composite – J. Agrisuelas, J. García-Jareño, M. Llop, M. Piedras, and F. Vicente (University of Valencia)
- **2128** Non-Destructive Evaluation for Corroded Metal Surface Using Terahertz Wave – H. Kariya, A. Sato, T. Tanabe, K. Saito (Tohoku University), K. Nishihara, A. Taniyama (Sumitomo Metals Co., Ltd.), and Y. Oyama (Tohoku University)
- **2129** The Influences of Roughness of Ti Substrate and Thickness of IrO<sub>2</sub> Intermediate Layer on Oxygen Evolution Anode Performance in Seawater Electrolysis – Z. Kato (Tohoku Institute of Technology), K. Izumiya, N. Kumagai (Daiki Ataka Engineering Co. Ltd.), and K. Hashimoto (Tohoku Institute of Technology)

- **2130** Electrochemical Impedance Spectroscopy to Characterize Different Materials in Soybean Biodiesel Medium – A. H. Akita, C. Fugivara (Instituto de Química – Univ. Estadual Paulista – UNESP), I. Aoki (Escola Politécnica – Univ. de São Paulo – USP), and A. Benedetti (Instituto de Química – Univ. Estadual Paulista – UNESP)
- **2131** Graphite Layer on Metal Plates for PEMFC Applications – W. Wang and C. Lan (Industrial Technology Research Institute)
- **2132** Surface Morphology Changes during Dealloying – F. U. Renner, G. Anka, and A. Pareek (Max-Planck-Institut für Eisenforschung)
- **2133** Using LEIS to Evaluate Local Electrochemical Activity of Al 7475 T761/Cu Model Electrodes – J. Ferrari (University of São Paulo), H. G. De Melo (University of Mons), N. Pébère (CIRIMAT UMR CNRS), B. Tribollet, and V. Vivier (CNRS)
- **2134** Triboelectrochemical Characterization of Copper Surface – S. Joo and H. Liang (Texas A&M University)
- **2135** Application to Non-Destructive Inspection of Copper Corrosion via Coherent Terahertz Light Sources – K. Saito, T. Yamagata, H. Kariya, T. Tanabe, and Y. Oyama (Tohoku University)
- **2136** Effect of Alloying Elements on Corrosion Behavior of Zr-Based Binary Alloys in Simulated Body Fluid – Y. Tsutsumi, S. Yalatu, S. Migita, H. Doi, N. Nomura (Tokyo Medical and Dental University), K. Noda (Shibaura Institute of Technology), and T. Hanawa (Tokyo Medical and Dental University)
- **2137** Corrosion Behavior of Nanocrystalline Hydroxyapatite Coating on New Ti Alloy Surface in Ringer Solution – M. Popa, J. Calderon Moreno, C. Vasilescu, and S. Drob (Institute of Physical Chemistry “Ilie Murgulescu”)
- **2138** Corrosion Study of Ni-Ti Orthodontic Archwires: An *In Vitro* Study – K. M. Britto, D. A. Macedo, R. M. Nascimento, A. E. Martinelli, and H. S. Júnior (Federal University of Rio Grande do Norte)
- **2139** A Three-Electrode Implantable Micro-Chip for Obtaining Real Time Corrosion Rates during Small Animal Testing – B. A. Shaw, E. Sikora, M. W. Horn, H. A. Basantani, A. Hartsock, D. R. Cook, B. J. Gluckman, and B. A. Bimber (The Pennsylvania State University)
- **2140** *In Vitro* Galvanic Corrosion of Metallic Biomaterials – N. Shida, S. Miyabe, and S. Fujimoto (Osaka University)
- **2141** Analysis of Electrochemical Impedance Spectroscopy Results and Ion Release *In Vitro* of Si<sup>+</sup> Ion Implanted Medical 316 LVM Steel – J. C. Galván (Centro Nacional de Investigaciones Metalúrgicas), M. Larrea, M. Multigner (CENIM – CSIC), I. Braceras (Inasmet-Tecnalia), L. Saldaña, N. Vilaboa (Unidad de Investigación, Hospital Universitario La Paz), and J. González-Carrasco (CENIM – CSIC)
- **2142** Electrochemical Behavior of Ti-6Al-7Nb in Simulated Physiological Body Fluid Environment – N. A. Al-Mobarak, A. Al-Swayih (Princess Nora Bint Abdul Rahman University), and F. Al-Rashoud (AlKharge University)
- **2143** Evaluation of Corrosion Resistance of Co-Cr Alloy in NaCl Solution – R. Suzuki, K. Noda (Shibaura Institute of Technology), Y. Tsutsumi, and T. Hanawa (Tokyo Medical and Dental University)

**D2** **Materials Degradation in Energy Systems: Corrosion and Hydrogen-Material Interactions**  
Corrosion / Battery / Energy Technology  
306A, Level 3, Hawaii Convention Center

**Fuel Cell Degradation – 08:00 – 11:00**  
**Co-Chairs: N. Missert and S. Fujimoto**

- 08:00 **2148** Degradation Mechanisms in PEM Fuel Cells – R. L. Borup (Los Alamos National Laboratory), R. K. Ahluwalia (Argonne National Laboratory), K. L. More (Oak Ridge National Laboratory), C. Johnston, and R. Mukundan (Los Alamos National Laboratory)
- 08:30 **2149** Regarding the Enhanced Durability of Platinum Monolayer Electrocatalysts for the Oxygen Reduction Reaction – K. Sasaki (Brookhaven National Laboratory), H. Naohara (Toyota Motor Corporation), K. A. Kuttiviel, Y. Choi, D. Su, P. Liu, and R. R. Adzic (Brookhaven National Laboratory)
- 09:00 **2150** Dissolution Mechanism of Platinum in Simulated PEFC Conditions – Y. Sugawara (Tohoku University), T. Okayasu, A. P. Yadav, A. Nishikata, and T. Tsuru (Tokyo Institute of Technology)
- 09:20 **2151** Selective Dissolution of Binary Pt Alloys in Sulfuric Acid Solution – Y. Hoshi (Tokyo University of Science), R. Ozawa, T. Yoshida, E. Tada, A. Nishikata, and T. Tsuru (Tokyo Institute of Technology)
- 09:40 Intermission (20 Minutes)
- 10:00 **2152** Influence of Cathode Polarization on the Chromium Poisoning of SOFC Cathode Materials LSM, LSCF and LNF – E. Park (Kyushu University), S. Taniguchi, Y. Tachikawa (International Research Center for Hydrogen Energy), Y. Shiratori, and K. Sasaki (Kyushu University)
- 10:20 **2153** Micro Modeling Study of Cathode/Electrolyte Interfacial Stresses for Solid Oxide Fuel Cells – X. Jin, J. Shi, and X. Xue (University of South Carolina)
- 10:40 **2154** High Temperature Oxidation of Ferritic Steels for Solid Oxide Electrolysis Stacks – S. Molin, M. Chen, J. J. Bentzen, and P. Hendriksen (Technical University of Denmark)

**Corrosion Issues in Nuclear Energy – 11:00 – 12:00**  
**Co-Chair: S. Fujimoto**

- 11:00 **2155** On the Shape of Stress Corrosion Cracks in Water-Cooled Nuclear Power Reactor Piping – D. Kramer, S. Lee, and D. D. Macdonald (The Pennsylvania State University)
- 11:20 **2156** Electrochemical Impedance Modeling of the Passivity of Iron in Simulated Concrete Pore Water – D. D. Macdonald, S. Sharifiasl (The Pennsylvania State University), and G. R. Engelhardt (OLI Systems, Inc.)



11:40 **2157** Comparative Study of Oxide Film Formation as a Function of Potential on High-Purity Co and Stellite-6 – M. Behazin, X. Zhang, M. Biesinger, J. J. Noël, and J. Wren (Western University)

**Degradation Issues and Mitigation in Batteries, Photoanodes, and Solar Panels – 14:00 – 15:40**  
Co-Chair: N. Missert

14:00 **2158** Materials and Interfaces Degradation in High-Energy Cathodes for Li-ion Batteries – R. M. Kostecki, I. T. Lucas, N. S. Norberg (Lawrence Berkeley National Laboratory), and J. S. Szyszek (Lawrence Berkeley National Laboratory)

14:30 **2159** Corrosion Behavior of Nitride Coatings for Anodic Protection in Liquid Metal Batteries – S. Phadke and D. R. Sadoway (Massachusetts Institute of Technology)

14:50 **2160** Metal-Oxide-Semiconductor Nanocomposites for Photoelectrochemical Water Splitting – P. C. McIntyre (Stanford University)

15:20 **2161** Materials Degradation in Solar Panels – H. G. Wheat (The University of Texas at Austin)

**Degradation During Production, Transportation, and Storage of Fuels – 16:00 – 17:50**  
Co-Chair: J. Noel

16:00 **2162** Degradation of Electrocatalysts Used in the Reduction of CO<sub>2</sub> – A Review – N. Sridhar (Det Norske Veritas (USA) Inc.), A. S. Agarwal, S. Guan, and E. Rode (Det Norske Veritas (USA), Inc.)

16:30 **2163** Computational Study on Nickel Catalyst Degradation Mechanism by Carbon Deposit in Hydrogen Production – T. Ogura, H. Tsukikawa, and M. Tajima (Kyushu University)

16:50 **2164** Electrochemistry of Ferroelectric PbZr<sub>0.52</sub>Ti<sub>0.48</sub>O<sub>3</sub> Thin Films in Sulfuric Acid – L. J. Small (Rensselaer Polytechnic Institute), C. Apblett, J. Ihlefeld, G. Brennecke (Sandia National Laboratories), and D. Duquette (Rensselaer Polytechnic Institute)

17:10 **2165** Electrochemical Mechanism and Model of H<sub>2</sub>S Corrosion of Carbon Steel – Y. Zheng, B. Brown, and S. Nescic (Ohio University)

17:30 **2166** Corrosivity Comparison between Petroleum and Blended Hydro-Refined Diesel and Jet Fuels – J. S. Lee, R. Ray, and B. Little (Naval Research Laboratory)

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

Corrosion

301B, Level 3, Hawaii Convention Center

**Corrosion – 08:00 – 10:00**

Co-Chairs: Mark Orazem and Behzad Bavarian

08:00 **2236** Electrochemical Corrosion Measurements in Supercritical CO<sub>2</sub> – Water Systems with and without Membrane Coating – J. Beck, M. Fedkin, and S. N. Lvov (The Pennsylvania State University)

08:15 **2237** Enhanced Corrosion Resistance of Interstitially Hardened 316L Stainless Steel: Gas Phase Nitridation under Paraequilibrium Conditions – N. R. Tailleart, F. Martin (US Naval Research Laboratory), R. Rayne, P. M. Natishan (US Naval Research Laboratory), H. Kahn, and A. Heuer (Case Western Reserve University)

08:30 **2238** Corrosion Maps for Aluminium Alloys: Defining the Property Space and the Role of Microstructure and Chemistry in Corrosion – N. L. Sukiman, R. K. Gupta (Monash University), R. G. Buchheit (Ohio State University), and N. Birbilis (Monash University)

08:45 **2239** Corrosion Protection by Trivalent Chromium Process (TCP) Coatings on Aluminum Alloys – L. Li and G. Swain (Michigan State University)

09:00 **2240** Corrosion Resistance of Nanoporous Superhydrophobic Surfaces of Anodic Aluminum Oxide – C. Jeong, W. Xu, K. Du, and C. Choi (Stevens Institute of Technology)

09:15 **2241** Enhanced Corrosion Resistance of Stainless Steels Interstitially Hardened with Carbon or Nitrogen under Paraequilibrium Conditions – P. M. Natishan (US Naval Research Laboratory), N. R. Tailleart, F. Martin (US Naval Research Laboratory), R. Bayles (Naval Research Laboratory), R. Rayne (US Naval Research Laboratory), H. Kahn, and A. Heuer (Case Western Reserve University)

09:30 **2242** Effect of Acetic Acid on the Cathodic Reaction of Carbon Steel Corrosion – T. Tran, B. Brown, and S. Nescic (Ohio University)

09:45 Intermission (15 Minutes)

**Corrosion – 10:00 – 12:00**

Co-Chairs: Phillippe Marcus and Simon Hall

10:00 **2243** Corrosion of Nickel and Iron Based Superalloys in High Temperature Gas Environments – H. Chang and T. Yeh (National Tsing Hua University)

10:30 **2244** Investigation of the Corrosion Behavior of Zinc Magnesium Aluminium Alloys with a Novel Quaternary Addition Using SVET and Time-Lapse Microscopy – J. H. Malone, S. Mehraban, J. H. Sullivan, J. Elvins, and D. Penney (Swansea University)

10:45 **2245** Redox Transformations in the Oxide Films on Ni-Cr-Mo Alloys and Their Influence on Corrosion Susceptibility – X. Zhang, A. Mishra, D. Zagidulin, J. J. Noël (Western University), and D. W. Shoesmith (University of Western Ontario)

11:00 **2246** Transition Metal Inhibition of Titanium Corrosion: Electrochemical Behavior of Titanium in Alkaline Electrolyte – W. B. Utomo and S. W. Donne (University of Newcastle)

11:15 **2247** Overview of the Mg Corrosion Mechanism – A. Atrens (The University of Queensland)

11:30 **2248** Investigation of Zinc Dimercaptothiadiazole as a Corrosion Inhibitor for Steel – R. L. Mercado, J. Fury, M. B. Kiely (Crosslink), D. Buhrmaster (University of Dayton Research Institute), C. E. Miller (U.S. Army Research Laboratory), and P. Zarras (NAWCWD)

11:45 **2249** *In Situ* Electrochemical Measurement of Acid Dew Point Corrosion of Carbon Steel – T. Zhang (Harbin Engineering University)

**Electrochemistry – 13:30 – 16:00**  
**Co-Chairs: Tom Devine and Wen-Ta Tsai**

- 13:30 **2250** Incorporation of Modifiers to Improve the Anticorrosion Behavior of Organic-Inorganic Hybrid Coatings Applied to High Strength Al Alloys – R. P. Hernandez, B. M. Vasconcelos, V. R. Capelossi (University of São Paulo), M. Olivier, and H. G. De Melo (University of Mons)
- 13:45 **2251** Effect of Halogen Ions and Inhibitors on Corrosion Behavior of 13 Cr Stainless Steel in Packer Fluid – M. Sakairi, R. Fujita, A. Kageyama (Hokkaido University), M. Kimura, and Y. Miyata (JFE Steel Corporation)
- 14:00 **2252** Hydration and Structural Transformations during Titanium Anodization under Alkaline Conditions – P. Acevedo Peña (Universidad Autónoma Metropolitana), J. G. Vazquez Arenas (University of Waterloo), R. Cabrera Sierra (Instituto Politécnico Nacional), and I. Gonzalez Martinez (Universidad Autónoma Metropolitana)
- 14:30 **2253** The Palladium Hydrogen System; Corrosion Monitoring and Energy Production – M. C. McKubre, J. Bao, S. Crouch-Baker, P. Jayaweera, A. Sanjurjo, and F. Tanzella (SRI International)
- 14:45 **2254** A 12 V / Kilo-Farad Range Lead-Carbon Hybrid Ultracapacitor and Their Envisaged Applications – A. K. Shukla, A. Banerjee, A. Jalajakshi, and M. K. Ravikumar (Indian Institute of Science)
- 15:00 **2255** *In Situ* Monitoring of Phosphate Inhibitor Surface Deposition in the Cathodic Region during Corrosion of a Zinc Magnesium Aluminium Alloy Using Time-Lapse Microscopy and Energy Dispersive X-ray Spectroscopy – S. Mehraban, J. H. Sullivan, and J. Elvins (Swansea University)
- 15:15 **2256** An Investigation into the Individual and Synergistic effects of Organically Coated Steel Systems Using the Scanning Vibrating Electrode Technique (SVET) – A. W. Littlehales (University of Wales Swansea), J. H. Sullivan, D. A. Worsley, and J. Elvins (Swansea University)
- 15:30 **2257** Inhibition of Corrosion-Driven Organic Coating Delamination on Hot Dip Galvanized Steel by Phenyl Phosphonic Acid – C. F. Glover and G. Williams (Swansea University)
- 15:45 Intermission (15 Minutes)

**Electrochemistry – 16:00 – 19:00**  
**Co-Chairs: M. Urquidi-Macdonald and T.-K. Yeh**

- 16:00 **2258** Self-organized Anodic Structures – P. Schmuki (University of Erlangen-Nuremberg)
- 16:15 **2259** Development of Zn-Mn Alloy Based Sacrificial Coatings – S. Ganesan, P. Ganesan, and B. N. Popov (University of South Carolina)
- 16:30 **2260** Study of the Inhibition of Mild Steel Corrosion by Molybdate and Nitrite Anions – A. Al-Refaie (Saudi Basic Industries Corporation)

- 16:45 **2261** Oxygen Sensors for Accelerator Driven System (ADS) Reactors – A. Verdagner, S. Colominas (Universitat Ramon Llull), and J. Abellà (IQS Universitat Ramon Llull)
- 17:00 **2262** Prussian Blue Films in Ammonium Aqueous Solution – J. Agrisuelas, C. Delgado, J. García-Jareño, and F. Vicente (University of Valencia)
- 17:15 **2263** Towards Tritium Electrochemical Sensors: Synthesis and Characterization of Proton Conducting Ceramic Elements – L. Llivina, S. Colominas, and J. Abellà (Institut Quimic de Sarria – Universitat Ramon Llull)
- 17:30 **2264** *In Situ* Coupling Current Studies in AA5083 and AA2024 – K. Williams (The Pennsylvania State University), R. Bayles (Naval Research Laboratory), and D. D. Macdonald (The Pennsylvania State University)
- 17:45 **2265** On the Corrosion of Iron in Physically-Constrained Locations – D. D. Macdonald (The Pennsylvania State University) and G. R. Engelhardt (OLI Systems, Inc.)
- 18:00 **2266** Mechanisms of Depassivation – D. D. Macdonald (The Pennsylvania State University)
- 18:15 **2267** Two Manifestations of the Passivity of the Metal in Aqueous Solution – H. Hua (China Aerospace Engineering Consultation Center) and H. Hua (Chinese Academy of Science)
- 18:30 **2268** Could this Fuel Replace Gasoline – J. O. Bockris (Gainesville)

**D4 High Resolution Characterization of Corrosion Processes 3**  
Corrosion  
*Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center*

**D4 – Poster Session – 18:00 – 20:00**  
**Co-Chair: K. Zavadil**

- **2269** Kelvin Probe Force Microscopic Study on Galvanic Action between MnS Inclusions and Stainless Steel Matrix – Y. Sugawara, I. Muto, and N. Hara (Tohoku University)
- **2270** Analysis of Pit Corrosion Using Temporal Series of Micrographs Coupled with Electrochemical Methods to Estimate the Three-Dimensional Evolution of Pits – A. M. Zimer, E. Rios, M. A. De Carra, L. H. Mascaró (Universidade Federal de São Carlos), and E. C. Pereira (Universidade Federal de Sao Carlos)

**D5 High Temperature Corrosion Materials Chemistry 10**  
High Temperature Materials / Corrosion  
*318A, Level 3, Hawaii Convention Center*

**Thermodynamic/Kinetic Modeling and Experiment – 08:20 – 12:00**  
**Co-Chairs: J. Fergus and E. Opila**

- 08:20 **2325** Thermodynamic Modeling of Chromate Salt Mixtures in High-Temperature Corrosion of Superheater Materials – D. K. Lindberg, J. Lehmusto, and M. Hupa (Åbo Akademi University)

- 08:40 **2326** Investigation of the effect the Polarizability of Dipoles on the Local Microstructures of Molten Slags Using Density Functional Theory Molecular Dynamics – A. A. Gray-Weale (University of Melbourne), J. Krahl, A. Jacob (TU Freiberg), and P. J. Masset (ATZ Entwicklungszentrum)
- 09:00 **2327** Thermodynamic Modeling for Liquid Phase Sintering and Joining of Silicon Carbide – H. J. Seifert (Karlsruhe Institute of Technology)
- 09:40 Intermission (20 Minutes)
- 10:00 **2328** Multiscale Analysis on Gas Phase and Surface Chemistry of SiC-CVD Process – Y. Fukushima (The University of Tokyo), K. Hotozuka (IHI Corporation), Y. Funato, N. Sato, T. Momose, and Y. Shimogaki (The University of Tokyo)
- 10:20 **2329** Study of  $\text{La}_2\text{Zr}_2\text{O}_7$  and  $\text{La}_2\text{Hf}_2\text{O}_7$  Melting by Thermal Analysis and X-ray Diffraction – S. V. Ushakov, P. Saradhi, A. Navrotsky (University of California at Davis), R. J. Weber, and C. J. Benmore (Argonne National Laboratory)
- 10:40 **2330** *In Situ* Investigation of a High Temperature Phase Transformation Using Laser Heating and Synchrotron Diffraction – P. Saradhi, S. V. Ushakov, A. Navrotsky (University of California at Davis), R. J. Weber, and C. J. Benmore (Argonne National Laboratory)
- 11:00 **2331** Hydration and Dehydration Behavior of Amorphous Tantalum Oxide with Various Oxygen Contents – T. Ozato, T. Tsuchiya, S. Miyoshi, and S. Yamaguchi (The University of Tokyo)
- 11:20 **2332** Determination of Vapor Pressures of Fe-Oxides in Humid Atmospheres – T. Markus, W. Quadackers, and L. Singheiser (Forschungszentrum Jülich GmbH)
- 11:40 **2333** Reaction Syntheses with Carbon Materials Chemistry: Intragranular Nanocomposites and ‘Carbon Copies’ – D. W. Lipke (Air Force Research Laboratory) and K. H. Sandhage (Georgia Institute of Technology)
- 15:20 **2338** Oxygen Gas Sealing between YSZ and Fe-Cr Alloy by Liquid-Phase-Oxidation Joining via  $\text{ZrO}_2$ -Dispersed Al Interlayer – Y. Hashimoto and T. Akashi (Hosei University)
- 15:40 Intermission (20 Minutes)
- 16:00 **2339** Microstructures and Phase Evolution in NiAl-Based Overlay Coatings – M. L. Weaver and J. P. Alfano (The University of Alabama)
- 16:20 **2340** Transition Metal Spinel Oxide Coatings for Solid Oxide Fuel Cell Interconnects – J. W. Fergus, C. Dileep Kumar, Y. Liu, W. Tilson, A. Dekich, and H. Wang (Auburn University)
- 16:40 **2341** Microstructural Investigation of Co- and RE-Nanocoatings on FeCr Steels – S. Canovic, J. Froitzheim, R. Sachitanand, M. Nikumaa, L. Johansson, and J. Svensson (Chalmers University of Technology)
- 17:00 **2342** Protection of Ferritic Steels by Nano-Structured Coatings: Supercritical Steam Turbines Applications – M. Mato, M. Hierro, S. Castañeda, G. Alcalá, I. Lasanta, M. Tejero (Universidad Complutense de Madrid), J. Sánchez (CSIC), M. Brizuela (TECNALIA-Inasmet), and F. J. Pérez (Universidad Complutense de Madrid)
- 17:20 **2343** Improvement of the Resistance of Titanium Aluminides to Environmental Embrittlement – P. J. Masset (ATZ Entwicklungszentrum), F. Bleicher (TU Wien), L. Bortolotto (Dechema Forschungsinstitut), G. Geiger (TU Wien), A. Kolitsch (Helmholtz-Zentrum Dresden-Rossendorf), C. Langlade (TU Belfort-Montbéliard), J. Paul (Helmholtz-Zentrum-Geestacht), B. Pelic (TU Freiberg), F. Pyczak (Helmholtz-Zentrum-Geestacht), D. Rafaja (TU Freiberg), P. Schumacher (Österreichisches Gießerei-Institut), M. Schütze (Dechema Forschungsinstitut), G. Wolf (ATZ Entwicklungszentrum), and R. Yankov (Helmholtz-Zentrum Dresden-Rossendorf)

**High Temperature Coatings – 14:00 – 17:40**  
**Co-Chairs: T. Markus and E. Wuchina**

- 14:00 **2334** Thermochemical Interactions of Rare Earth Based TBCs with Molten CMAS Deposits – E. M. Zaleski, C. Ensslen, and C. G. Levi (University of California, Santa Barbara)
- 14:20 **2335** Ceramic Dusting Corrosion of Yttria Stabilized Zirconia in Ultra-High Temperature Reverse-Flow Pyrolysis Reactors – C. Chun, S. Desai (ExxonMobil Corporate Strategic Research), and T. A. Ramanarayanan (Princeton University)
- 14:40 **2336** Chemical Densification of Oxide Based Coatings for High Temperature Wear and Corrosion Resistance – P. J. Masset, M. Faulstich (ATZ Entwicklungszentrum), K. Fehr (Ludwig-Maximilians-Universität München), C. Weih, G. Wolf (ATZ Entwicklungszentrum), and Y. Ye (Ludwig-Maximilians-Universität München)
- 15:00 **2337** Relationship between Electrical Properties and Stress Field in Solid Electrolyte Thin Films – F. Iguchi, Y. Osawa, and H. Yugami (Tohoku University)



**Light Alloys 4**

Corrosion

319A, Level 3, Hawaii Convention Center

**Co-Chairs: B. Shaw and R. Buchheit**

- 08:20 **2344** High Resolution SEM Investigation of Intercrystalline Corrosion on 6000-Series Aluminum Alloy with Low Copper Content – K. Shimizu (Keio University) and K. Nisancioglu (Norwegian University of Science and Technology)
- 08:40 **2345** Effect of Additive Elements on Corrosion Behavior for Aluminum in Weak Alkaline Solution at High Temperature – Y. Honkawa, T. Yaegashi, and Y. Kojima (Furukawa-Sky Aluminum Corp.)
- 09:00 **2346** Combined Role of Trace Elements Pb and Sn in Low Temperature Activation of Aluminum – K. Kurt, J. C. Walmsley (Norwegian University of Science and Technology), S. Diplas (SINTEF), and K. Nisancioglu (Norwegian University of Science and Technology)
- 09:20 **2347** Interactions of Sulfide with Aluminum Alloys – J. S. Lee, R. Ray, and B. Little (Naval Research Laboratory)

09:40 **2348** The Role of Environmental Aspects and Atmospheric Contaminants on the Corrosion of 2024, 6061 and 7075 Aluminum Alloys – Y. Yoon and D. C. Hansen (University of Dayton Research Institute)

**Co-Chairs: S. Virtanen and S. Fujimoto**

10:20 **2349** Pitting Corrosion of Aluminum Alloy in Chloride Environment – Y. Oya and Y. Kojima (Furukawa-Sky Aluminum Corp.)

10:40 **2350** Effect of Surface Topography, Cleaning, and Conversion Coatings in the Adhesion Strength of Organic Polymers to AA2024-T3 using the Blister Test – B. C. Rincon Troconis and G. Frankel (The Ohio State University)

11:00 **2351** Self-Healing Nature of Molybdate Conversion Coatings for Aluminum Alloys – D. Rodriguez, R. Misra, and D. Chidambaram (University of Nevada Reno)

11:20 **2352** Organic-Inorganic Sol-Gel Coatings Modified with TiO<sub>2</sub> Nanoparticles for Corrosion Protection of a Powder Metallurgical Aluminum Alloy – A. Jiménez-Morales, F. García-Galván, D. Carbonell, D. Montoya (Universidad Carlos III de Madrid), and J. C. Galván (Centro Nacional de Investigaciones Metalúrgicas)

11:40 **2353** The Role of Environmental and Atmospheric Conditions on the Corrosion of AA 2024-T3 with Various Pre-Treatments and Coating Systems – L. Petry (University of Dayton Research Institute) and D. C. Hansen (University of Dayton Research Institute)

**Co-Chairs: K. Nisancioglu and Y. Kojima**

14:00 **2354** Corrosion Control Studies of Aluminum-Composite Interfaces in Diverse Micro-Climates – R. Srinivasan and L. H. Hihara (University of Hawaii)

14:20 **2355** Metal Dissolution and Repassivation Behavior of Ti6Al4V Alloy during Rapid Straining in Simulated Body Fluid – K. Doi, S. Miyabe, and S. Fujimoto (Osaka University)

14:40 **2356** Investigation of the Corrosion of Magnesium and Titanium in Simulated Body Fluids – R. Feser, M. Ceylan (University of Applied Sciences South Westfalia), and S. Virtanen (University of Erlangen)

15:00 **2357** Magnesium and Mg Alloys “Biocorrosion” in Protein Containing Body Fluids – P. Schmutz (EMPA Swiss Federal Laboratories for Materials Science and Technology), N. Ott, R. Grisch (EMPA), and P. Uggowitzer (ETHZ, Swiss Federal Institute of Technology)

15:20 **2358** Influence of Chemistry, Microstructure and Texture on the Durability of Mg-Alloys: An overview – K. Gusieva, C. H. Davis, and N. Birbilis (Monash University)

**Co-Chairs: D. Hansen and N. Birbilis**

16:00 **2359** A Cumulative Approach to Tracking the Corrosion of Mg Alloys on the Microscale – R. M. Asmussen, P. Jakupi, and D. W. Shoemith (University of Western Ontario)

16:20 **2360** Local, Time-Resolved and Element-Specific Investigations of Corrosion Processes for the Development of Biodegradable Mg Alloys – N. Ott (EMPA), P. Schmutz (EMPA Swiss Federal Laboratories for Materials Science and Technology), C. Ludwig, and A. Ulrich (EMPA)

16:40 **2361** Improvement in Corrosion Characteristics of AZ31 Mg Alloy by Square Pulse Anodizing between Transpassive and Active Regions – Y. Choi, S. Salman, K. Kuroda, and M. Okido (Nagoya University)

17:00 **2362** The Development of Ionic Liquid Generated Conversion Coatings for Magnesium Alloys – P. Howlett (Deakin University), J. Latham, D. MacFarlane (Monash University), and M. Forsyth (Deakin University)

17:20 **2363** Corrosion Inhibition of Mg Alloys by Inorganic and Organic Inhibitors – J. Hu, D. Huang (Huazhong University of Science and Technology), G. Song (GM Global R&D), and X. Guo (Huazhong University of Science and Technology)

17:40 **2364** Biocompatible Coatings for Mg Alloys for Tailored Degradation Behavior – S. Virtanen (University of Erlangen)



### **Pits and Pores 5:**

#### **A Symposium in Honor of David Lockwood**

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

### **Membranes & Sensing – 08:00 – 10:00**

**Co-Chairs: I. Balberg and K. Rumpf**

08:00 **2405** Solid-State Nanopores: Electronic Tools for Single-Molecule Analysis – V. Tabard-Cossa (University of Ottawa)

08:30 **2406** Transport in Surface Passivated Porous Silicon Membranes – A. Kovacs, W. Kronast, A. Filbert, and U. Mescheder (Furtwangen University)

08:50 **2407** New Cheap Composite Membranes Using Nanoporous Anodic Aluminum Oxide Films – M. Kim, T. N. Nguyen, J. Ahn (Korea Electrotechnology Research Institute), J. Kaewsuk (Korean Electrotechnology Research Institute), J. Kim, and D. Jeong (Korea Electrotechnology Research Institute)

09:10 **2408** Importance of Pore Morphology for Super-Liquid Repellency of Solid Surfaces – H. Habazaki, T. Fujii, and E. Tsuji (Hokkaido University)

09:40 Intermission (20 Minutes)

### **Oxide Formation & Ordered Nanostructures – 10:00 – 12:20**

**Co-Chairs: S. Ono and T. Djenizian**

10:00 **2409** Morphological Instability Leading to Formation of Porous Anodic Oxide Films – K. R. Hebert and A. Macrostie (Iowa State University)

10:20 **2410** A Continuum Model of Anodic Pore Growth in Alumina – S. J. DeWitt (University of Michigan – Ann Arbor) and K. Thornton (University of Michigan)



- 10:40 **2411** Controlled Fabrication of Ordered 3D Porous Alumina Nanostructures with Designed Cell Ratios by Stepwise Anodization – S. Chu, Y. Hitoshi (Iwate University), K. Wada, S. Inoue, and H. Segawa (National Institute for Materials Science)
- 11:00 **2412** Self-Ordered Sub-10 nm Nanoporous Anodic Alumina Membranes: A New Tool for Nanotechnology – E. Moyen, L. Assaud, K. Pitzschel, L. Masson, M. Hanbücken, and L. Santinacci (CNRS – Aix-Marseille University)
- 11:20 **2413** Electrochemical Formation of Ordered Pore Arrays on Metallic Substrates – H. Tsuchiya (Osaka University), M. Kim, Y. Terada (Division of Materials and Manufacturing Science, Graduate School of Engineering, Osaka University), and S. Fujimoto (Osaka University)
- 11:40 **2414** New Cheap Anodic Aluminum Oxide Composite Membranes by Lithography Technique – J. Kaewsuk (Korean Electrotechnology Research Institute), J. Kim, M. Kim, T. N. Nguyen, J. Ahn, and D. Jeong (Korea Electrotechnology Research Institute)
- 12:00 **2415** Dependence of the Reactivity of Silicon Dioxide Layers on the Porous Structure – F. N. Dultsev (Institute of Semiconductor Physics SB RAS)

#### Device Applications – 14:00 – 16:00

Co-Chairs: V. Tabard-Cossa and C. Lévy-Clément

- 14:00 **2416** Nanostructure Modified Porous Interfaces for Enhanced Sensing and Directed Microcatalysis – J. Gole and W. Laminack (Georgia Institute of Technology)
- 14:30 **2417** Miniaturization of Hydrogen Gas Sensors by Using Anodization Processes of Titanium – Y. Kimura, S. Kimura, R. Kojima, and M. Niwano (Tohoku University)
- 14:50 **2418** Photoelectric-conversion Devices Based on InP Porous Structure – T. Sato, R. Jinbo, and Z. Yatabe (Hokkaido University)
- 15:10 **2419** Multi-Functionality of Nanosilicon and Its Device Applications – N. Koshida (Tokyo University of Agriculture and Technology)
- 15:40 Intermission (20 Minutes)

#### Pore Formation and Characterization – 16:00 – 17:40

Co-Chairs: L. Santinacci and K. Kolasinski

- 16:00 **2420** The Effect of Temperature and Electrolyte Concentration on Porous Layers Formed on InP in KOH – N. Quill, R. Lynch, C. O'Dwyer (University of Limerick), and D. Buckley (Materials & Surface Science Institute, University of Limerick)
- 16:20 **2421** Current-Line Oriented Pore Formation in n-InP Anodized in KOH – N. Quill, R. Lynch, C. O'Dwyer (University of Limerick), and D. Buckley (Materials & Surface Science Institute, University of Limerick)
- 16:40 **2422** Fabrication of a Single-Crystalline Porous InP Membrane by Electrochemical and Photoelectrochemical Etching – M. Gerngross, J. Carstensen, and H. Föll (Christian-Albrechts-University of Kiel)

- 17:00 **2423** SVET Analysis of Timplate Flow Melted Using Resistance Heating and Induction Vs Novel Near Infrared Heat Treatment – I. Mabbett, D. J. Warren, S. Geary, J. H. Sullivan, D. Penney, T. M. Watson, and D. A. Worsley (Swansea University)
- 17:20 **2424** Imaging Metastable Pits on Austenitic Stainless Steel *In Situ* at the Open-Circuit Corrosion Potential Using Scanning Electrochemical Microscopy – R. M. Souto, J. Izquierdo, and S. González (University of La Laguna)



#### Solid State Topics General Session

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

#### Solid State Topics Afternoon Session – 14:00 – 17:20

Co-Chairs: R. Todi and O. M. Leonte

- 14:00 **2438** Characteristics of Zinc Oxide Films Grown on Sapphire Substrates Using High-Energy H<sub>2</sub>O Generated by a Catalytic Reaction on Platinum Nanoparticles – K. Yasui, H. Miura, S. Satomoto, and T. Kato (Nagaoka University of Technology)
- 14:20 **2439** Dielectric Constant Studies of BCN Thin Films – K. B. Sundaram and V. Todi (University of Central Florida)
- 14:40 **2440** Effect of Wet Surface Treatments on Amorphous Silicon Anneal and Gate Breakdown – C. S. Tiwari, T. Guo, C. Breyfogle, J. Zhang, H. Mitro, L. Olmer, V. Kumar, D. Pohlman, and M. Rutte (Micron Technology Inc.)
- 15:00 **2441** Ultrasonic Spray-Assisted Vapor-Deposition Method as a Cost-Effective and Environmental-Friendly Technology for Semiconductor and Dielectric Materials for Devices – S. Fujita, S. Katori, J. Piao, T. Ikenoue, and K. Kaneko (Kyoto University)
- 15:20 **2442** UV-Visible Faraday Rotators Based on Rare-Earth Fluoride Single Crystals: LiREF<sub>4</sub> (RE=Tb, Dy, Ho, Er and Yb), PrF<sub>3</sub> and CeF<sub>3</sub> – V. Vasylyev, E. G. Villora (National Institute for Materials Science), Y. Sugahara (Waseda University), and K. Shimamura (National Institute for Materials Science)
- 15:40 Intermission (20 Minutes)
- 16:00 **2443** The Characterization Study of Polycrystalline Silicon Grain Growth with Electron Backscatter Diffraction Patterns and Crystallinity – S. Yang, J. Chang, J. Lim, J. Shin, Y. Yoo, J. Kim, B. Chung, H. Choi, K. Hwang, and H. Kang (Samsung Electronics Co., Ltd.)
- 16:20 **2444** Electrical Breakdown of Anodic Aluminum Oxide Films for Electrowetting Systems – M. Mibus, E. Nein, A. Sapkota, C. Knospe, M. Reed, and G. Zangari (University of Virginia)
- 16:40 **2445** Ultrafast Carrier Dynamics in Green-Sensitive Organic Photodiodes – S. Sul, K. Lee, D. Leem, K. Kim, and H. Han (Samsung Advanced Institute of Technology)
- 17:00 **2446** Single Chamber HFCVD Process for Growth of Diamond, Graphene and CNTs – S. Albin (Norfolk State University), R. Vispute, and A. Seiser (Blue Wave Semiconductors, Inc.)

**E1 – Poster Session – 18:00 – 20:00**

Co-Chairs: R. Todi and O. M. Leonte

- **2447** The Systematic Study and Simulation Modeling on Dislocation Edge Stress Effects for Si N-MOSFETs – M. Liao, C. Chen, L. Chang, C. Yang (National Taiwan University), C. Hsieh (Industrial Technology Research Institute), and M. Lee (National Taiwan Normal University)
- **2448** The Investigation on the Relaxation of Intrinsic Compressive Stress in CMOS Transistors by Additional N IMP Treatment and AFM-Raman Stress Extraction – M. Liao, C. Chen, L. Chang, C. Yang (National Taiwan University), C. Hsieh (Industrial Technology Research Institute), and M. Lee (National Taiwan Normal University)
- **2449** Plasmonic Color Filters for OLED by Laser Interference Lithography – J. Park (Korea University), Y. Do (KAIST), B. Hwang (Korea University), K. Choi (KAIST), and B. Ju (Korea University)
- **2450** Hot Carrier effects by Gate Induced Drain Leakage Current – K. Kim (Samsung Electronics Co.), C. Han, J. Lee, D. Kim, H. Kim (Sungkyunkwan University), H. Lee (Samsung Electronics Co.), and B. Choi (Sungkyunkwan University)
- **2451** Development of Visual Inspection System for Metal Surface with Multivariate Pattern Analysis – K. Shigyo, T. Matsumoto, K. Sakiyama (Mitsubishi Electric Corporation), and H. Kobayashi (Mitsubishi Electric METECS)
- **2452** Effects of Tungsten Composition Ratio on the Properties of W-In-Zn-O Films Deposited by RF Magnetron Sputtering – G. Heo (Korea Institute of Industrial Technology), B. Oh (LINKLINE INC), J. Park (Korea Institute of Industrial Technology), Y. Lee, Y. Lee, and D. Shin (Chosun University)
- **2453** Fabrication of n-type Semiconductive Polycrystalline Diamond by Incorporating Phosphorous Atoms – A. Nakahara, H. Naragino, K. Yoshinaga, S. Tanaka, and K. Honda (Yamaguchi University)
- **2454** Carrier Transport Mechanism at Metal/Amorphous Gallium Indium Zinc Oxide Interfaces – S. Kim, C. Choi, and H. Kim (Chonbuk National University)
- **2455** Growth of AlN Single Crystals by Sublimation Method – Y. Oshima, M. Nakamura (National institute for materials science), Y. Masa (Sumitomo Metal Mining Co., Ltd.), E. G. Villora, K. Shimamura (National Institute for Materials Science), and N. Ichinose (Waseda University)

**Chemical Mechanical Polishing 12**

Dielectric Science and Technology

317B, Level 3, Hawaii Convention Center

**CMP Symposium (E3) Day 1 – 08:00 – 15:40**

Co-Chairs: Robert Rhoades and Gautam Banerjee

- |       |             |  |
|-------|-------------|--|
| 08:00 |             | Introductory Comments (30 Minutes)   |
| 08:30 | <b>2485</b> | Corrosion Inhibition Effect of Organic Additive on Ru Film in Colloidal Silica Based Slurry with Sodium Periodate – H. Cui, J. Lim, J. Cho, H. Hwang, J. Park, and J. Park (Hanyang University)  |
| 09:10 | <b>2486</b> | Electrochemical Characterizations on Chemical Mechanical Polishing Compositions of Polishing Ruthenium Films in CMP Processes – T. X. Shi, J. Henry, and J. Schlueter (DA NanoMaterials)   |
| 09:30 | <b>2487</b> | Brush Scrubbing Scratches Reduction Methods in Post CMP Cleaning – H. Soondrum (Globalfoundries)   |
| 09:50 |             | Intermission (20 Minutes)  |
| 10:10 | <b>2488</b> | Studies on Slurry Design Fundamentals for Advanced CMP Applications – G. Basim, A. Karagoz (Ozyegin University), L. Chen, and I. Vakarelski (King Abdullah University of Science and Technology)   |
| 10:30 | <b>2489</b> | Managing Corrosion during the Chemical Mechanical Polishing (CMP) of Metal Films – J. Schlueter, J. Henry, and T. X. Shi (DA NanoMaterials)  |
| 10:50 | <b>2490</b> | Microstructure and Pattern Size Dependence of Copper Corrosion in Submicron-Scale Features – U. Lee, J. Choi, J. Won (Samsung Electronics), H. Lee (Dong-A University), H. Sohn, and T. Kang (Seoul National University)   |
| 11:10 | <b>2491</b> | Scratching of Patterned Composite Surfaces by Pad Asperities in Chemical-Mechanical Polishing – S. Kim, N. Saka, and J. Chun (Massachusetts Institute of Technology)   |
| 11:30 | <b>2492</b> | Effect of Chelating Agent on Chemical Mechanical Polishing Performance for Polycrystalline Ge <sub>2</sub> Sb <sub>2</sub> Te <sub>5</sub> Film – J. Cho, J. Lim, S. Woo (Hanyang University), E. Hwang (Hynix Semiconductor Inc.), and J. Park (Hanyang University) |
| 11:50 |             | Lunch Break (70 Minutes)   |
| 13:00 | <b>2493</b> | Metal Oxide Nano Film Characterization for CMP Optimization – G. Basim, A. Karagoz, and Z. Ozdemir (Ozyegin University)  |
| 13:40 | <b>2494</b> | Novel Ru CMP Slurry Using TiO <sub>2</sub> Nano Particle as Abrasive and H <sub>2</sub> O <sub>2</sub> as Oxidizer – J. Park, H. Cui, J. Lim, J. Jo, H. Hwang, and J. Park (Hanyang University)  |
| 14:00 | <b>2495</b> | Metal Clearing Process Control in Metal CMP – K. Xu, I. Carlsson, T. Liu, S. Shen, B. Swedek, Y. Wang, X. Xia, D. Bennett, W. Tu, and L. Karupiah (Applied Materials Inc.)   |
| 14:20 |             | Intermission (20 Minutes)  |
| 14:40 | <b>2496</b> | Post-CMP Cleaning of Copper Interconnects at Sub-32nm Technology Node – T. Dnyanesh, M. Rao (Air Products & Chemicals), and G. Banerjee (Air Products and Chemicals)   |

- 15:00 **2497** Effect of Iron(III) Nitrate Concentration on Tungsten Chemical-Mechanical-Polishing Performance – J. Lim, J. Cho, H. Hwang, H. Cui, J. Park, and J. Park (Hanyang University)
- 15:20 **2498** Effect of slurry on Vapor Deposition Polymerization (VDP) Chemical Mechanical Planarization (CMP) in Through-Silicon Via (TSV) Applications – I. Ali, B. Sapp, R. Quon, S. Kruger (SEMATECH), K. Maekawa, K. Sugita, H. Hashimoto (TEL), M. Stender, J. Dysard (Cabotmicroelectronics), and S. Arkalgud (SEMATECH)

*Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center*

### **E3 – Poster Session – 18:00 – 20:00**

**Co-Chairs: Robert Rhoades and Gautam Banerjee**

- **2499** Effects of Polishing Parameters on the Evolution of 3-D Wafer Pattern during CMP – L. Wu (Lanzhou University of Technology)
- **2500** The Step Height Reduction in STI-CMP by Controlling the Adhesion Force between Abrasive and Polishing Pad – J. Seo, J. Moon, K. Kim, W. Sigmund, and U. Paik (Hanyang University)
- **2501** Controls of Interactions among Polishing Pad, Abrasive, and Oxide Film by Modification of Polyethyleneimine(PEI) on Under 30nm Ceria Abrasive CMP Slurry – J. Moon, J. Bae, K. Park, K. Kim, H. Park, and U. Paik (Hanyang University)
- **2502** Bottom Electrode Surface Treatment effect on MTJ in MRAM Device – C. Kim, J. Jung, I. Yoon, B. Yoon, J. Park, and S. Jung (Samsung Electronics Co. Ltd.)
- **2503** Improved Removal Rate in Organic Additive Assisted Ceria Chemical Mechanical Planarization – J. Bae, J. Seo, K. Park, J. Moon, H. Park, and U. Paik (Hanyang University)
- **2504** A Modeling Study on the Layout Impact of With-In-Die Thickness Range for STI CMP – S. Kincal (Middle East Technical University) and G. Basim (Ozyegin University)

**E4**

### **Gallium Nitride and Silicon Carbide Power Technologies 2**

Electronics and Photonics / Dielectric Science and Technology

*316C, Level 3, Hawaii Convention Center*

### **SiC MOS Devices – 08:00 – 10:00**

**Co-Chairs: Mietek Bakowski and Stan Atcitty**

- 08:00 **2545** Band Diagrams and Trap Distributions in Metal-SiO<sub>2</sub>-SiC(3C) Structures with Different Metal Gates – H. M. Przewlocki, T. Gutt, K. Piskorski (Institute of Electron Technology), and M. Bakowski (Acreo AB)
- 08:20 **2546** Angle-Resolved XPS Studies on Transition Layers at SiO<sub>2</sub>/SiC Interfaces – H. Okada, A. Komatsu, M. Watanabe (Tokyo City University), Y. Izumi, T. Muro (Japan Synchrotron Radiation Research Institute), and H. Nohira (Tokyo City University)

- 08:40 **2547** Effect of Stress and Measurement Conditions in Determining the Reliability of SiC Power MOSFETs – A. Lelis, R. Green, M. El, and D. Habersat (U.S. Army Research Laboratory)
- 09:00 **2548** POCl<sub>3</sub> Annealing as a New Method for Improving 4H-SiC MOS Device Performance – H. Yano, T. Hatayama, and T. Fuyuki (Nara Institute of Science and Technology)
- 09:20 **2549** Passivation in High-Power Si Devices – An Overview – U. Grossner, A. Mihaila, U. Vemulapati (ABB Corporate Research), and C. Corvasce (ABB Switzerland Ltd., Semiconductors)
- 09:40 Intermission (20 Minutes)

### **High-Frequency Power Transistors – 10:00 – 12:00**

**Co-Chairs: Mike Spencer and Joachim Wurfl**

- 10:00 **2550** Broadband GaN Power Amplifiers – S. Leong (PolyFET RF Devices) and K. Shenai (University of Toledo)
- 10:20 **2551** A Promising New n<sup>++</sup>-GaN/InAlN/GaN HEMT Concept for High-Frequency Applications – V. Palankovski and J. Kuzmik (TU Wien)
- 10:40 **2552** Achieving Low Doped (<10<sup>16</sup>) GaN with Large Breakdown Voltages (~1000 V) – K. A. Jones, R. P. Tompkins, M. A. Derenge, K. W. Kirchner, S. Zhou (Army Research Lab.), R. Metzger, J. Leach (Kyma Technologies), P. Suvana, M. Tungare, and F. Shahedipou-Sandvik (SUNY-Albany)
- 11:00 **2553** GaN Technology for Millimeter Wave Power Amplifiers – A. K. Oki, M. Wojtowicz, B. Heying, I. Smorchkova, B. Luo, and M. Siddiqui (Northrop Grumman Aerospace Systems)
- 11:20 **2554** A Simple and Accurate Physics-Based Circuit Simulation Model for Depletion-Mode GaN Power Transistors – K. Shenai (University of Toledo) and S. Leong (PolyFET RF Devices)
- 11:40 **2555** Current Status and Future Prospects of GaN HEMTs for High Power and High Frequency Applications – T. Kikkawa, M. Kanamura, T. Ohki, K. Imanishi, K. Watanabe, and K. Joshin (Fujitsu Laboratories Ltd.)
- 12:00 **2556** S-Band 300 W Output SiC MESFET – S. Cai, L. Li, J. Li, J. Mo, B. Liu, and Z. Feng (Science and Technology on ASIC Lab.)

### **GaN Power Transistors and Converters – 14:00 – 16:00**

**Co-Chairs: Reenu Garg and Ken Jones**

- 14:00 **2557** Low Dynamic ON-Resistance in AlGaN/GaN Power HEMTs Obtained by AlN Thin Film Passivation – K. Chen, S. Huang, and Q. Jiang (Hong Kong University of Science and Technology)
- 14:20 **2558** Thickness Dependent Electrical Characteristics of AlGaN/GaN MOSHEMT with La<sub>2</sub>O<sub>3</sub> Gate Dielectrics – J. Chen, K. Tsuneishi, K. Kakushima, P. Ahmet, Y. Kataoka, A. Nishiyama, N. Sugii, K. Tsutsui, K. Natori, T. Hattori, and H. Iwai (Tokyo Institute of Technology)
- 14:40 **2559** Field Control Energy-Band (FCE) Technology for GaN-Based Heterostructure Power Devices – W. Chen, Z. Wang, X. Deng, and B. Zhang (University of Electronics Science and Technology of China)

- 15:00 **2560** Electro-Thermal Circuit Modeling of Power Inductors – K. Shenai (University of Toledo), J. Wu, and H. Cui (University of Tennessee)
- 15:20 **2561** eGaN FETs in Low Power Wireless Energy Converters – M. A. De Rooij and J. T. Strydom (Efficient Power Conversion Corp.)
- 15:40 Intermission (20 Minutes)

**SiC Bipolar Power Diodes – 16:00 – 18:00**  
**Co-Chairs: Mike Dudley and Aivars Lelis**

- 16:00 **2562** Ion Implanted 4H-SiC p-i-n Diodes: Comparison between 1600-1650°C and 1950°C Post Implantation Annealing – R. Nipoti (CNR-IMM of Bologna)
- 16:20 **2563** Thermal Behavior of SiC Power Diodes – J. Millán (IMB-CNM-CSIC), P. Godignon, and V. Banu (CNM-CSIC)
- 16:40 **2564** Multilayer Epitaxial Growth and Fabrication of 4H-SiC BJT with Double Base Epilayers – Y. Zhang, L. Yuan, Y. Zhang, X. Tang, Q. Song, X. Zhang, and Q. Zhang (Xidian University)
- 17:00 **2565** Merits of Buried Grid Technology for SiC JBS Diodes – M. Bakowski (Acreo AB), J. Lim, and W. Kaplan (Acreo)
- 17:20 **2566** Towards Very High Voltage SiC Power Devices – D. Planson, P. Brosselard, D. Tournier (Université de Lyon, INSA de Lyon, CNRS UMR 5005 Ampere Lab), and C. Brykinski (Université de Lyon, Université Lyon1, CNRS UMR 5615 Laboratoire des Multimatiériaux et Interfaces)

**Panel #3: Switch vs. Reverse Conducting Diode in a Power Module – 18:00 – 20:00**  
**Co-Chairs: Krishna Shenai and Durga Misra**

- 18:00 Introduction of Panelists (15 Minutes)
- 18:15 Stan Atecity (10 Minutes)
- 18:25 M. Bakowski (10 Minutes)
- 18:35 T. Funaki (10 Minutes)
- 18:45 S. Sato (10 Minutes)
- 18:55 R. Ranstad (10 Minutes)
- 19:05 K. Hobart (10 Minutes)
- 19:15 Q&A (45 Minutes)

**E5 Dielectric Materials and Metals for Nanoelectronics and Photonics 10**  
 Dielectric Science and Technology /  
 Electronics and Photonics  
 313A, Level 3, Hawaii Convention Center

**Strain Characterization – 09:00 – 09:40**  
**Co-Chair: Samares Kar**

- 09:00 **2610** Development of Ultrathin Gold Film Tensile Testing by Floating Specimen on Water Surface – J. Kim, A. Nizami (KAIST), H. Lee, S. Hyun (Korea Institute of Machinery and Materials), and T. Kim (KAIST)

- 09:20 **2611** Characterization of Stress Transfer from Process Induced Stressor Layer to Substrate in MOSFETs – R. THOMAS, D. Benoit, A. Pofelski, L. Clement, P. Morin (STMicroelectronics), D. Cooper (CEA LETI), and F. Bertin (CEA-LETI)

**Nano-Wire Technology – 10:00 – 11:20**  
**Co-Chairs: Hemanth Jagannathan and Kajuhiko Endo**

- 10:00 **2612** Si Nanowire Technology – H. Iwai (Tokyo Institute of Technology)
- 10:30 **2613** Fabrication of High-Quality GOI and SGOI Structures by Rapid Melt Growth Method – Novel Platform for High-Mobility Transistors and Photonic Devices – H. Watanabe, Y. Suzuki, S. Ogiwara, N. Kataoka, T. Hashimoto, T. Hosoi, and T. Shimura (Osaka University)
- 11:00 **2614** A Study of Metal Gates on HfO<sub>2</sub> using Si Nanowire Field Effect Transistors as Platform – Q. Li (George Mason University), H. Zhu, H. Yuan, O. Kirillov (NIST), D. Ioannou (George Mason University), J. Suehle, and C. A. Richter (NIST)

**EOT Scaling – 11:20 – 12:20**  
**Co-Chairs: Shinichi Takagi and Sven Van Elshocht**

- 11:20 **2615** Aggressive SiGe Channel Gate Stack Scaling by Remote Oxygen Scavenging: pFET Performance and Reliability – M. M. Frank, E. A. Cartier, T. Ando, S. W. Bedell, J. Bruley, Y. Zhu, and V. Narayanan (IBM T.J. Watson Research Center)
- 11:40 **2616** Interface Properties La-Silicate MOS Capacitors with Tungsten Carbide Gate Electrode for Scaled EOT – T. Kamale (Tokyo Institute of Technology), R. Tan (Ningbo University), K. Kakushima, P. Ahmet, Y. Kataoka, A. Nishiyama, N. Sugii, K. Tsutsui, K. Natori, T. Hattori, and H. Iwai (Tokyo Institute of Technology)
- 12:00 **2617** Remote Scavenging Technology using Ti/TiN Capping Layer Interposed in a Metal/High-k Gate Stack – X. Ma, X. Wang, K. Han, W. Wang, and T. Ye (Chinese Academy of Sciences)

**Interface Related Studies – 14:00 – 15:10**  
**Co-Chairs: Andrew Kummel and Koji Kita**

- 14:00 **2618** Band Lineup Issues Related with High-k/SiO<sub>2</sub>/Si Stack – J. Xiang, X. Wang (Chinese Academy of Sciences), T. Li (Institute of Microelectronics of Chinese Academy of Sciences), C. Zhao, W. Wang (Chinese Academy of Sciences), Q. Liang, J. Li (Institute of Microelectronics of Chinese Academy of Sciences), D. Chen, and T. Ye (Chinese Academy of Sciences)
- 14:20 **2619** Schottky Barrier Height at TiN/HfO<sub>2</sub> Interface of TiN/HfO<sub>2</sub>/SiO<sub>2</sub>/Si Structure – K. Han, X. Wang, W. Wang (Chinese Academy of Sciences), J. Zhang (North China University of Technology), J. Xiang, H. Yang, C. Zhao, D. Chen, and T. Ye (Chinese Academy of Sciences)



- 14:40 **2620** SiC MOS Interface States: Similarity and Dissimilarity from Silicon – T. Umeda, Y. Satoh (University of Tsukuba), R. Kosugi, Y. Sakuma, M. Okamoto, S. Harada (National Institute of Advanced Industrial Science and Technology), and T. Ohshima (Japan Atomic Energy Agency)

**Device Manufacturing – 15:20 – 16:20**  
Co-Chair: Samares Kar

- 15:20 **2621** Controlled Lateral Etching of Titanium Nitride in a CMOS Gate Structure using DSP+ – J. C. Foster (Intermolecular inc), S. Metzger, and P. Besser (Globalfoundries)
- 15:40 **2622** The Electrochemical Kinetics of Selectively Corroding Poly-Silicon in Generating Lonely Crater-Defects – L. Sheng and E. Glines (ON Semiconductor)
- 16:00 **2623** Local-Loading Effects for Pure-Boron-Layer Chemical-Vapor Deposition – V. Mohammadi (Delft University of Technology), W. De Boer (TUDelft), T. Scholtes (Delft University of Technology), and L. K. Nanver (TUDelft)

**E6 High Purity Silicon 12**  
Electronics and Photonics  
320, Level 3, Hawaii Convention Center

**Materials Issues in ULSI Processing – 08:30 – 09:40**  
Co-Chair: C. Claeys

- 08:30 **2653** Introduction of New Materials into CMOS Devices – H. Iwai (Tokyo Institute of Technology)
- 09:10 **2654** Cu Contamination Assessment and Control in 3-D Integration – M. Koyanagi, K. Lee, J. Bea, T. Fukushima, and T. Tanaka (Tohoku University)
- 09:40 Intermission (20 Minutes)

**Gettering and Defects in Circuits and Devices – 10:00 – 12:10**  
Co-Chairs: M. Koyanagi and E. Simoen

- 10:00 **2655** Modeling of Boron and Phosphorus Diffusion Gettering of Iron in Silicon – A. Haarahiltunen, V. Vähänissi, H. Talvitie, M. Yli-Koski, and H. Savin (Aalto University)
- 10:30 **2656** Defect Generation in Device Processing and Impact on the Electrical Performances – M. Polignano, I. Mica, G. Carnevale, A. Mauri (Micron Semiconductor Italia S.r.l.), E. Bonera (Universita' degli studi di Milano-Bicocca), and S. Speranza (Cabot Microelectronic)
- 11:00 **2657** Segregation Behavior of Copper and Tantalum in Oxide Film and Si Substrate after Device Heat-treatment – I. Lee, S. Baek, G. Lee, U. Paik, and J. Park (Hanyang University)
- 11:20 **2658** The Characteristics of Gettering Ability in Advanced Multi-Chip Packaging Thinned Wafer – J. An (SK Hynix), J. Kim, J. Kim, K. Lee, H. Kang (LG Siltron), S. Lee, B. Moon, Y. Shin, S. Hwang, and H. Park (SK Hynix)
- 11:40 **2659** Effects of Slow Diffusivity Metallic Contaminant on Electrical Characteristic Degradation for Silicon C-MOS Image Sensor – G. Lee, I. Lee, S. Baek, I. Kim, and J. Park (Hanyang University)
- 12:00 Concluding Remarks (10 Minutes)

**E7 Low-Dimensional Nanoscale Electronic and Photonic Devices 5**  
Electronics and Photonics / Dielectric Science and Technology / Sensor  
304A, Level 3, Hawaii Convention Center

**Low-Dimensional Materials for Functional Devices II – 08:20 – 09:40**  
Co-Chairs: Hiroyuki Sugimura and Zhiyong Fan

- 08:20 **2697** Transparent Conductive CNT/PMMA Nanocomposite Via Electrostatic Adsorption Technique – H. Muto, N. Hakiri, G. Kawamura, and A. Matsuda (Toyohashi University of Technology)
- 08:45 **2698** Transfer Printing of Compound Semiconductor Nanostructures on Heterogeneous Substrates – H. Ko (Ulsan National Institute of Science and Technology)
- 09:10 **2699** Electrochemical Growth of Vertically Standing Ni Nanorod Arrays on Si Substrate and the Low-Dimensional Effect on Their Enhanced Cold Field Electron Emission Properties – A. N. Banerjee and S. Joo (Yeungnam University)
- 09:25 **2700** Formation of Ge-Nanodots Capped with SiC Layer by Gas-Source MBE Using MMGe and MMSi – K. Yasui (Nagaoka University of Technology), Y. Anezaki, K. Sato, A. Kato (Nagaoka University of Technology), T. Kato (Nagaoka University of Technology), M. Suemitsu (Tohoku University), Y. Narita (Yamagata University), and H. Nakazawa (Hiroasaki University)

**Low-Dimensional Materials for Functional Devices III – 10:00 – 11:55**  
Co-Chairs: Xudong Wang and Hyunhyub Ko

- 10:00 **2701** Extremely Stretchable Electrodes beyond Intrinsic Limit Originated from Three Dimensional Nanonetworks – J. Park, C. Ahn, K. Hyun, and S. Jeon (KAIST)
- 10:25 **2702** Synthesis and Characterizations of InGaAs Nanowire Parallel Arrays for High Performance Electronic Devices – J. Hou, N. Han, F. Wang, S. Yip, F. Xiu, T. Hung, and J. C. Ho (City University of Hong Kong)
- 10:50 **2703** Self-Assembly of Gold Nanoparticle Arrays Covalently Bonded to Silicon Surface – H. Sugimura (Kyoto University)
- 11:15 **2704** Carbon Nanotube Field Emitters: Fundamental Properties and Applications – Y. Saito (Nagoya University)
- 11:40 **2705** Optically Pumped Lasing in Gallium Nitride Nanorods Structure – Y. Hsu, S. Chang, K. Sou, M. Shih, H. Kuo, K. Hsu, and C. Chang (National Chiao Tung University)

**Low-Dimensional Materials for Functional Devices IV – 14:00 – 15:45**  
Co-Chairs: Seokwoo Jeon and Johnny Ho

- 14:00 **2706** Three-Dimensional Nanowire Architectures for Highly-Efficiency Photoelectrochemical Electrodes – X. Wang (University of Wisconsin-Madison)

- 14:25 **2707** Piezoelectronics of Obliquely-Aligned InN Nanorod Array – C. Liu and N. Ku (National Cheng Kung University)
- 14:50 **2708** Self-organized 3-D Nanostructures for Photon Management and Cost-effective Photovoltaics – S. Leung, M. Yu, Q. Lin (Hong Kong University of Science and Technology), K. Kwon (Korea Advanced Institute of Science and Technology), K. Ching, K. Yu, and Z. Fan (Hong Kong University of Science and Technology)
- 15:15 **2709** Optical and Surface Recombination Properties of Compound Surface Textures for Heterojunction Solar Cells – H. Wang (National Taipei University of Technology), C. Lin (Advanced Technology Department AU Optron Corporation), and J. He (National Taiwan University)
- 15:30 **2710** Gold Nanoparticle 2D-Arrays Chemically Immobilized as Large-Area Near-Field Light Source – K. Miki (National Institute for Materials Science), K. Isozaki, T. Ochiai, T. Taguchi, and K. Nittoh (National Institute for Materials Science (NIMS) 1-1 Namiki, Tsukuba 305-0044, Japan)

**Low-Dimensional Materials for Energy Conversion – 16:00 – 17:20**  
**Co-Chairs: Sang-Woo Kim and Chuan-Pu Liu**

- 16:00 **2711** Light- and Energy-Harvesting Scheme Employing the Nanoscale Photon Management in the Solar Cells and the Photodetectors – J. He (National Taiwan University)
- 16:25 **2712** Self-Powered Flexible Strain Sensor – J. Zhou (Huazhong University of Science and Technology)
- 16:50 **2713** Thermal Properties of In<sub>2</sub>O<sub>3</sub> Nanowires – C. Hsu, C. Hung, and L. Chou (National Tsing Hua University)
- 17:05 **2714** Optical Characterization of Si Quantum Dots – S. Hu, T. Lin, D. Tsai (National Taiwan Normal University), and R. Liu (National Taiwan University)

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

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

**Plasma Processes for Barriers and Dielectrics – 08:00 – 09:40**  
**Co-Chairs: G. Mathad and R. Akolkar**

- 08:00 **2750** Stability of Glassy Ta-Rh Diffusion Barriers for Cu Metallization – N. Dalili, Q. Liu, and D. Ivey (University of Alberta)
- 08:20 **2751** Investigation of Tetrahedral Amorphous Carbon (ta-C) as Diffusion Barrier for Advanced Cu Metallization Technology – X. Ma, H. Yin, Z. Fu (Institute of Microelectronics of Chinese Academy of Sciences), X. Zhang (Key Laboratory of Beam Technology and Material Modification of Ministry of Education, Beijing Normal University), K. Du (Shenyang National Laboratory for Materials Science, Institute of Metal Research of Chinese Academy of Sciences), J. Yan (Institute of Microelectronics of Chinese Academy of Sciences), C. Zhao, D. Chen, and T. Ye (Chinese Academy of Sciences)

- 08:40 **2752** Positive-Tone, Aqueous-Developable, Polynorbornene Dielectric – B. K. Mueller, A. Grillo (Georgia Institute of Technology), E. Elce (Promerus LLC), and P. Kohl (Georgia Institute of Technology)
- 09:00 **2753** Ladder-like Polymethylsilsequioxane (PMSQ) for Interlayer Dielectric (ILD) Application – H. Lee, S. Hwang, and K. Baek (Korea Institute of Science and Technology (KIST))
- 09:20 **2754** Effect of Thermal Treatment on Physical, Electrical Properties and Reliability of Porogen-Containing and Porogen-Free Ultralow-k Dielectrics – Y. Cheng, W. Chang, Y. Chang, and J. Leu (National Chi-Nan University)

**Novel Systems Approaches – 10:00 – 11:40**  
**Co-Chairs: M. Koyanagi and M. Hayase**

- 10:00 **2755** System-in-Package concept for a Carbon Nanotube resonator – R. Gueye (Sensors Actuators and Microsystems Laboratory (SAMLAB) EPFL), S. Lee (Micro and Nanosystems Laboratory, ETHZ), T. Akiyama (The Sensors Actuators and Microsystems Laboratory (SAMLAB), Ecole Polytechnique Fédérale de Lausanne (EPFL)), D. Briand (EPFL Lausanne), M. Muoh, C. Roman, C. Hierold (Micro and Nanosystems Laboratory, ETHZ), and N. De Rooij (EPFL Lausanne)
- 10:20 **2756** Concept of Spatially Divided Deep Reactive Ion Etching of Si using Oxide Atomic Layer Deposition in the Passivation Cycle – F. Roozeboom (Eindhoven University of Technology), B. Kniknie, R. Knaepen, M. Smets, A. Illiberi, P. Poodt (TNO, Eindhoven, Netherlands), G. Dingemans, W. Keuning, and W. Kessels (Eindhoven University of Technology)
- 10:40 **2757** Adhesion Reliability Enhancement of Silicon/Epoxy/Polyimide Interfaces for Flexible Electronics – S. Kim and T. Kim (KAIST)
- 11:00 **2758** The Effects of Levelers on Copper Via Filling in 3D SiP – M. Jung, K. Kim, and J. LEE (Hongik University)
- 11:20 **2759** Direct Measurement and Enhancement of Adhesion Energy of Bi-Te Thermoelectric Thin Films – C. Kim (KAIST), S. Jeon, H. Lee (Sungkyunkwan University), S. Hyun (Korea Institute of Machinery and Materials), and T. Kim (KAIST)

**E11 Nonvolatile Memories**

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

**ReRAM-Bipolar Devices – 08:00 – 09:40**  
**Co-Chairs: S. Shingubara and H. Akinaga**

- 08:00 **2803** Scalable Non-volatile Memory and Switch Device for High-Density Bipolar ReRAM Applications – D. Lee, M. Lee, and U. Chung (Samsung Advanced Institute of Technology)

- 08:40 **2804** A Two Terminal Vertical Selector Device for Bipolar RRAM – S. Chopra (Applied Materials), P. Bafna, P. Karkare, S. Srinivasan, S. Lashkare, P. Kumbhare (IIT Bombay), Y. Kim, S. Srinivasan, S. Kuppurao (Applied Materials), S. Lodha, and U. Ganguly (IIT Bombay)
- 09:00 **2805** Forming-less Interfacial Resistive Switching Mechanism of Ultra-Thin HfO<sub>2</sub> Films – J. Kim, I. Mok, K. Lee, Y. Kim, and H. Sohn (Yonsei University)
- 09:20 **2806** Hf Cap Thickness Dependence in Bipolar-Switching TiN/HfO<sub>2</sub>/Hf/TiN RRAM Device – Y. Chen, G. Pourtois, S. Clima, B. Govoreanu, L. Goux, A. Fantini, R. Degreave, G. Groeseneken, D. Wouters, and M. Jurczak (imec)
- 15:20 **2815** Ohmic and Non-Ohmic ON States in Pt/Ta<sub>2</sub>O<sub>5</sub>/Cu Memristive Switches – P. R. Shrestha (National Institute of Standards and Technology), A. Ochia (National Institute of Standards and Technology), K. Cheung, J. Campbell (National Institute of Standards and Technology), H. Baumgart (Old Dominion University), and G. Harris (Howard University)
- 15:40 **2816** Resistive Switching Characteristics of N-doped ZnO Films Using Atomic Layer Deposition – T. Huang (Photonics and Optoelectronics), W. Chang (National Taiwan University), J. Chien (Materials Science and Engineering), C. Kang, P. Yang (National Taiwan University), M. Chen (Materials Science and Engineering), and J. He (National Taiwan University)

**PCRAM and FeRAM – 10:00 – 12:00**  
Co-Chairs: N. Takaura and H. Akinaga

- 10:00 **2807** Material Engineering of GexSbyTez and GaxSby Phase Change Materials for High Performance Phase Change Memory – H. Cheng (Macronix International Co., Ltd.), S. Raoux (IBM T. J. Watson Research Center), T. Hsu, C. Wu (Macronix International Co., Ltd.), M. BrightSky (IBM T. J. Watson Research Center), H. Lung (Macronix International Co., Ltd.), and C. Lam (IBM T. J. Watson Research Center)
- 10:30 **2808** Advances in ALD GST Process and Equipment for sub-20nm PCRAM Devices : Precursor delivery, GST Gapfill and Electrical Characterization – Z. Karim (Aixtron Inc), L. Yang (Aixtron SE), J. Mack, M. Liu (Aixtron Inc), U. Weber, P. Baumann (Aixtron SE), S. Ramanathan, B. Lu (Aixtron Inc), W. Czubatyj, S. Hudgens, and T. Lowrey (Ovonyx Inc)
- 11:00 **2809** Characterisation of GeTe Phase Change Material Deposited by Plasma Assisted MOCVD – L. Dussault (CNRS), C. Vallée, M. Aoukar (LTM/CNRS), D. Jourde, and P. Michallon (CEA/LETI)
- 11:20 **2810** Supercritical Fluid Deposition of Bismuth Titanate for Embedded FeRAM Applications – Y. Zhao, K. Jung, T. Momose, and Y. Shimogaki (The University of Tokyo)
- 11:40 **2811** Deposition Mechanism of Metal Oxide for FeRAM Electrode using Flow Type Supercritical Fluid Deposition Reactor – K. JUNG (The Univ. Tokyo), T. Momose, and Y. Shimogaki (The University of Tokyo)

**STT-MRAM and Other Memories – 14:00 – 16:00**  
Co-Chairs: Y. Suzuki and N. Takaura

- 14:00 **2812** Progresses on High Density MRAMs with perpendicular MTJs and Challenges to Realize Normally-Off systems – H. Yoda (Toshiba Electronics Korea Corporation)
- 14:30 **2813** Racetrack Memory 2.0 – S. Parkin (IBM Almaden Research Center)
- 15:00 **2814** STT-MRAM Development and Its Integration with BEOL Process for Embedded Applications – T. Sugii, Y. Iba, M. Aoki, H. Noshiro, K. Tsunoda, A. Hatada, M. Nakabayashi, Y. Yamazaki, A. Takahashi, and C. Yoshida (LEAP)

**Flash Memories – 16:20 – 18:00**  
Co-Chairs: K. Kobayashi and Z. Karim

- 16:20 **2817** Current Status of NAND Memories and its Future Prospect with 3D NAND Technology – T. Endoh (Tohoku University)
- 16:50 **2818** Analysis of the Scaling Effect on NAND FLASH Memory Cell Operation – R. Shirota and H. Watanabe (National Chao Tung University)
- 17:20 **2819** The Development of the Novel High Speed Erase Scheme for 3D Stacked NAND Flash Memory – W. Lin (National Chiao Tung University), R. Shirota (National Chao Tung University), T. Kuo, N. Mitiukhina, F. Li, and C. Chang (National Chiao Tung University)
- 17:40 **2820** Temperature Effects on Performance of nc-MoO<sub>x</sub> Embedded ZrHfO High-k Nonvolatile Memories – C. Lin and Y. Kuo (Texas A&M University)

*Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center*

**E11 – Poster Session – Nonvolatile Memoreis – 18:00 – 20:00**  
Co-Chairs: S. Shingubara and Suzuki

- **2821** Characteristics of Nano-Crystalline Ge<sub>2</sub>Sb<sub>2</sub>Te<sub>5</sub> Material for Phase Change Memory – T. Ohyanagi and N. Takaura (Low-power Electronics Association & Project)
- **2822** Oxygen Ion based Resistive Switching in Ta<sub>2</sub>O<sub>5-x</sub>/TiO<sub>2-x</sub> Bi-Layer Frameworks for the Nonvolatile Memory Applications – J. Hong, Y. Bae, and A. Lee (Hanyang University)
- **2823** Effect of Post-Annealing on the Resistance Switching Characteristic of Oxygen Modulated HfO<sub>x</sub> Films – K. Lee, J. Kim, S. Park, and H. Sohn (Yonsei University)
- **2824** Perpendicular Magnetic Dipolar Interaction of Co/Pt Nanodot Arrays on Carbon Nanopost Stamps – S. Yoon (Gwangju Institute of Science and Technology), S. Lee (Gwagnju Institute of Science and Technology), and B. Cho (Gwagnju Institute of Science and Technology)
- **2825** Low-Temperature Annealed Sol-Gel Derived SONOS-Type Flash Memory – C. Wu and Y. Yu (Graduate Institute of Biomedical Materials and Tissue Engineering)

- **2826** Large Resistive Switching Phenomenon Induced by Magnetic Field in Nano Conduction Path – T. Kato, T. Shimizu, S. Otuka, T. Kyomi, and S. Shingubara (Kansai University)
  - **2827** Electrical Properties of Sol-Gel Derived PbLaZrTiO<sub>x</sub> Capacitors with Nonnoble Metal Oxide Top Electrodes – Y. Takada, T. Tsuji, N. Okamoto, T. Saito, K. Kondo, T. Yoshimura, N. Fujimura (Osaka Prefecture University), K. Higuchi, A. Kitajima, and A. Oshima (Osaka University)
  - **2828** Converse Magnetoelectric effect in a Room Temperature Multiferroic Pb(Zr<sub>0.53</sub>Ti<sub>0.47</sub>)<sub>1-x</sub>(Fe<sub>0.5</sub>Ta<sub>0.5</sub>)<sub>x</sub>O<sub>3</sub> Ceramic System – D. A. Sanchez, R. Martinez, A. Kumar, N. Ortega (University of Puerto Rico), G. Srinivasan (Oakland University), R. Katiyar, and J. Scott (University of Puerto Rico)
  - **2829** Electric Conduction Mechanism of Resistive Switching Memory using Anodic Porous Alumina – S. Otsuka, T. Shimizu, S. Shingubara (Kansai University), N. Iwata, T. Watanabe, Y. Takano, and K. Takase (Nihon University)
  - **2830** Pulse Switching Property of Reset Process in Resistive Random Access Memory (ReRAM) Consisting of Binary-Transition-Metal-Oxides – T. Moriyama, K. Kinoshita, R. Koishi, and S. Kishida (Tottori University)
  - **2831** Physical Properties Elucidation of Filaments in HfO<sub>2</sub>-Conducting-Bridge Random Access Memory – S. Haswgawa, K. Kinoshita, S. Turuta, T. Fukuhara, and S. Kishida (Tottori University)
  - **2832** Switching Phenomena in Iron-Oxide Thin Films Deposited through Chemical Vapor Deposition – S. Lee, Y. You, H. Yang, J. Hwang (Hongik University), T. Chung, C. Kim (Korea Research Institute of Chemical Technology), S. Lee (Korea Research Institute of Chemistry Technology), and K. An (Korea Research Institute of Chemical Technology)
  - **2833** Physical Picture of Filaments in Reset Process of Resistive Random Access Memory Consisting of Pt/NiO/Pt Structure – M. Yoshihara, K. Kinoshita, R. Ogata, and S. Kishida (Tottori University)
- 09:00 **2904** Smooth and Dense CuInSe<sub>2</sub> Film Growth by Selenization of Sputtered Metallic Precursors – J. Suh (Electronics and Telecommunications Research Institute)
  - 09:20 **2905** CIGS Electrodeposition from Improved Electrolytes: Electrochemical Characterization and Transport Effects – M. A. Saeed, O. Gonzalez, and U. Landau (Case Western Reserve University)
  - 09:40 Intermission (20 Minutes)
  - 10:00 **2906** Use of Surface Chemistry Control and Low Temperature Growth Methods for Overcoming Perceived Limitations in III-Nitride Epitaxy – W. Doolittle, M. Moseley, B. Gunning (Georgia Institute of Technology), and G. Namkoong (Old Dominion University)
  - 10:20 **2907** Controlled Synthesis of Chalcogenide Nanocrystal Inks for High-Performance Photodetectors and Solar Energy Conversion – J. Hu (Institute of Chemistry), Y. Guo (Chinese Academy of Sciences), and L. Wan (Institute of Chemistry)
  - 10:40 **2908** CuInS<sub>2</sub>- and Cu<sub>2</sub>ZnSnS<sub>4</sub>-based Thin Film Solar Cells Prepared from Electrodeposited Metal Stacks – S. Ikeda, Y. Otsuka, A. Kyoraiseki, W. Septina, T. Harada, and M. Matsumura (Osaka University)
  - 11:00 **2909** Electrodeposition of In-S based Buffer Layers for High Efficiency Cu(In,Ga)Se<sub>2</sub> based Solar Cells – E. Chassaing, N. Naghavi, S. Galanti, G. Renou, M. Soro (IRDEP), M. Bouttemy (Institut Lavoisier de Versailles), A. Etcheberry (CNRS-UVSQ), and D. Lincot (IRDEP)
  - 11:20 **2910** Overview of Electrodeposition Based Copper Indium Gallium Selenide (CIGS) Solar Cell Fabrication – S. Aksu (SoloPower Inc.), S. Pethe, A. Kleiman-Shwarstein, S. Kundu, and M. Pinarbasi (SoloPower, Inc.)
  - 11:40 **2911** Electrodeposition of Cu<sub>2</sub>ZnSn(S,Se)<sub>4</sub> (CZTSSe) Thin Films for the Thin film Solar Cell Application – K. Lee, S. Seo, and J. Kim (Korea Institute of Science and Technology)

**Novel Photovoltaics – 14:00 – 17:40**  
**Co-Chairs: Sunkara, Park, and Tao**

- 14:00 **2912** Synthesis of Phase Pure Pyrite Nanowires/Nanotubes for Solar Energy Applications – D. R. Cummins, H. B. Russell, J. Jasinski, and M. K. Sunkara (University of Louisville)
- 14:20 **2913** Electrodeposition of Tin (II) Sulfide from 1-Butyl-3-methylimidazolium Dicyanamide at High Temperature for Thin Film Solar Cells – M. Steichen, R. Djemour, D. Regesch, L. Gütay, S. Siebentritt, and P. Dale (University of Luxembourg)
- 14:40 **2914** Multilayer Hybrid Solar Cell using Anodic TiO<sub>2</sub> Nanotubes – T. Ma, R. Kojima, D. Tadaki, J. Zhang, Y. Kimura, and M. Niwano (Tohoku University)

**E12 Photovoltaics for the 21<sup>st</sup> Century 8**  
 Dielectric Science and Technology / Electrodeposition /  
 Electronics and Photonics / Energy Technology / Industrial  
 Electrochemistry and Electrochemical Engineering  
 314, Level 3, Hawaii Convention Center

**CIGS – 08:20 – 12:00**  
**Co-Chairs: Park, Claeys, and Deligianni**

- 08:20 **2902** Size-dependent Photoelectrochemical Properties of Semiconducting Cu<sub>2</sub>ZnSnS<sub>4</sub> Nanoparticles – T. Torimoto, T. Osaki, T. Nagano, T. Kameyama, S. Suzuki (Nagoya University), and S. Kuwabata (Osaka University)
- 08:40 **2903** A New Approach to Fabricate Selenide-based Absorber Layer Using Stoichiometric Single Target – T. Kim, J. Park (Korea Institute of Industrial Technology), S. Lee, and J. Kim (Chonnam National University)



- 15:00 **2915** Optical Property of Random Inverted-Pyramid Textures on Si Surface by Etching with N-Fluoropyridinium Salts – M. Otani, J. Uchikoshi, K. Tsukamoto, T. Hirano (Osaka University), T. Nagai, K. Adachi (Daikin Industries, Ltd.), K. Kawai, K. Arima, and M. Morita (Osaka University)
- 15:20 **2916** Enhancement of Thermal and Chemical Stabilities of Gold Nanorods Embedded in Titanium Oxide Film – Y. Takahashi, N. Miyahara, and S. Yamada (Kyushu University)
- 15:40 Intermission (20 Minutes)
- 16:00 **2917** Development of Organic-Inorganic Hybrid Photovoltaic Cells with Metallocene Molecular Complexes – A. Ishii and T. Miyasaka (Toin University of Yokohama)
- 16:20 **2918** Effect of Ag Nano-crystals on Power-conversion-efficiency Enhancement for Polymer Photovoltaic Cells – J. Kim, D. Kim, Y. Hwang, J. Shin, J. Park, and J. Park (Hanyang University)
- 16:40 **2919** An Analysis on Electrorefining for Solar-Grade Silicon – M. Tao (Arizona State University)
- 17:00 **2920** Dislocation Analysis for a New Mushroom-Shaped Growth of Large-Size Monocrystalline Silicon by Seed Casting Technique – B. Gao (Research Institute for Applied Mechanics), H. Harada, Y. Miyamura (National Institute for Materials Science), S. Nakano, and K. Kakimoto (Research Institute for Applied Mechanics)
- 17:20 **2921** Effects of Metal Contamination on Power-conversion-efficiency Degradation for p-type Silicon Solar Cell – S. Baek, I. Lee, H. Yoon, M. Choi, G. Lee, and J. Park (Hanyang University)

**E13 Plasma Processing 19**  
Dielectric Science and Technology /  
Electronics and Photonics  
324, Level 3, Hawaii Convention Center

**Thin Film Etching Processes and Technologies – 08:40 – 12:00**  
Co-Chairs: G. S. Mathad and O. Leonte

- 08:40 **2922** Direct SiGe BFFT Patterning by Dry Plasma Etching – A. Milenin, L. Witters, B. Deweerdt, C. Vrancken, and M. Demand (IMEC)
- 09:00 **2923** Hydrogen Plasma-Based Etching of Copper – F. Wu (Globalfoundries), G. Levitin, T. Choi, and D. Hess (Georgia Institute of Technology)
- 09:40 Intermission (20 Minutes)
- 10:00 **2924** Inductively Coupled Plasma Etching of InP with Cl<sub>2</sub>/H<sub>2</sub>/Ar Plasma – E. Douglas, J. Stevens, R. Shul (Sandia National Laboratories), and S. Pearton (University of Florida)
- 10:20 **2925** Extreme Nano Etching – D. L. Olynick, Z. Liu, S. Dhuey, C. Peroz, B. Harteneck, and S. Cabrini (Molecular Foundry, Lawrence Berkeley National Lab)
- 11:00 **2926** Investigation of Synchronized Pulsed Plasma for High Selective Etching of Silicon Nitride Spacers – R. Blanc, O. Joubert, T. David (LTM), F. Leverd, and C. Vérove (STMICROELECTRONICS)
- 11:20 **2927** Systematic Approach to TDM Process Development – C. W. Johnson, D. Pays-Volard, L. Martinez, and J. Plumhoff (Plasma-Therm)

- 11:40 **2928** Advanced Dual Hard Mask Patterning Scheme to Enable High Resolution Lithography for sub 30 nm Technology Nodes – J. Paul, M. Rudolph, S. Riedel (Fraunhofer-Center Nanoelectronic Technologies), S. Wege (Plasma-Consulting), C. Hohle, and V. Beyer (Fraunhofer-Center Nanoelectronic Technologies)

**Thin Film Etching Processes and Technologies – 14:00 – 16:00**  
Co-Chairs: D. W. Hess and G. S. Mathad

- 14:00 **2929** Towards New Plasma Technologies for 22 nm Gate Etch Processes and Beyond – O. Joubert (LTM)
- 14:40 **2930** Precision, Damage-Free Etching and Cleaning by Electron-Enhanced Reactions: Results and Simulations. – H. P. Gillis, S. Anz (Systine Inc.), S. Han, J. Su (Caltech), and W. Goddard III (California Institute of Technology)
- 15:20 **2931** Simulations of Industrial Plasma Processes: SF6 Etching – S. Lopez-Lopez (Quantemol Ltd), A. Williams (University College London), D. Brown (Quantemol Ltd), and J. Tennyson (University College London)

*Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center*

**E13 – Poster Session – 18:00 – 20:00**  
Co-Chairs: O. Leonte and D. W. Hess

- **2932** Quantum Chemical Molecular Dynamics Simulation of GaN Etching Processes by Cl Radical – K. Yanagiya, H. Ito, T. Kuwahara, T. Ishikawa, Y. Higuchi, N. Ozawa, T. Shimazaki, and M. Kubo (Tohoku University)
- **2933** Dry Etching Characteristics of Palladium Thin Films Using Inductive Coupled Plasma – J. Kim, D. Lee, J. Kwak (Suncheon National University), S. Lee (Korea Polytechnic University), J. Yoon, J. Yang (Korea Basic Science Institute), and J. Lee (Suncheon National University)
- **2934** Improvement in Electric Property of ITO Films at Low Temperature – H. Lee, Y. Han, M. Lee, J. Hur, H. Kim, and H. Lee (Korea Institute of Industrial Technology)
- **2935** Feature Profile 2D and 3D Simulation with Etching, Deposition and Implantation Processes – P. Moroz (Tokyo Electron US Holdings)
- **2936** Preparation of Zinc Oxide Films by Coplanar Plasma Discharge Technique – M. Okuya, T. Hanai, M. Iyoda, and K. Nabeta (Shizuoka University)
- **2937** Preparation of Polymer Particles Coated with a Diamond-like Carbon Film by a Polygonal Barrel-Plasma Chemical Vapor Deposition Method – Y. Honda, S. Akamaru, M. Inoue, and T. Abe (University of Toyama)
- **2938** Enhanced Optical and Electrical Property of ITO by Hydrogen Plasma and Post-Wet Treatment – D. Lee, S. Yang, J. Kim, and J. Lee (Suncheon National University)
- **2939** Low Temperature TiC Coating Process by Plasma Enhanced Chemical Vapor Deposition – H. Masaoka, S. Matsumoto, N. Okamoto, T. Saito, K. Kondo (Osaka Prefecture University), and T. Kan (ULTEX)

- **2940** Observation of Vacancy-Induced Resistance Change in AlGaIn/GaN HEMT – C. Cheng, T. Chang, S. Liao, W. Ho, Y. Shiau, T. Chang, and J. Sen (Chung-Shan Institute of Science & Technology)
- **2941** Preparation of IZO Transparent Conductive Thin Film by Microwave Heating Technique – S. Muto, Y. Kawabata, and M. Okuya (Shizuoka University)
- **2942** Effect of Inductively Coupled Plasma on the Electrical and Optical Properties of Indium Tin Oxide Films Deposited by Ionized Physical Vapor Deposition – C. Hong (Electronics and Telecommunication Research Institute), J. Shin, N. Park, K. Kim (Electronics and Telecommunications Research Institute), B. Kim (Electronics and Telecommunication Research Institute), B. Ju (Korea University), and W. Cheong (Electronics and Telecommunications Research Institute)

**314 Semiconductor Wafer Bonding 12: Science, Technology, and Applications**  
Electronics and Photonics  
312, Level 3, Hawaii Convention Center

**Plasma Activation – 08:00 – 09:40**

- 08:00 **2988** Plasma Activation as a Pretreatment Tool for Low-Temperature Direct Wafer Bonding Materials in Microsystems Technology – M. Eichler, P. Hennecke, K. Nagel (Fraunhofer Institute for Surface Engineering and Thin Films IST), M. Gabriel (SUSS MicroTec Lithography GmbH), and C. Klages (Fraunhofer Institute for Surface Engineering and Thin Films IST)
- 08:40 **2989** Mechanisms for Ultra-Low Temperature Plasma Activated Direct Wafer Bonding – T. Plach (Johannes Kepler University), K. Hingerl (Center of Surface- and Nanoanalytics, Johannes Kepler University), V. Dragoi (EV Group E. Thallner GmbH), and M. Wimplinger (EV Group)
- 09:00 **2990** Treatments of Deposited SiO<sub>2</sub> Surfaces Enabling Low Temperature Direct Bonding – C. Rauer, H. Moriceau, F. Fournel (CEA, LETI), A. Charvet (CEA-LETI), C. Morales (CEA, LETI), N. Rochat, L. Vandroux (CEA-LETI), F. Rieutord (CEA, INAC), T. McCormick, and I. Radu (Soitec)
- 09:20 **2991** Room Temperature Bonding of Polymer to Glass Wafers using Surface Activated Bonding (SAB) Method – T. Matsumae (University of Tokyo), M. Nakano, Y. Matsumoto (Lantech Service Co., Ltd., Takasaki-shi, Gunma 370-3523, Japan), R. Kondo (School of Engineering, The University of Tokyo, Bunkyo-ku, Tokyo 113-8656, Japan), and T. Suga (University of Tokyo)

**Layer Transfer Technologies – 10:20 – 12:00**

- 10:20 **2992** Cost-effective layer transfer by Controlled Spalling Technology – S. W. Bedell (IBM T.J. Watson Research Center), D. Shahrjerdi (IBM T.J. Watson Research Center), K. Fogel, P. Lauro, B. Hekmatshoar, N. Li (IBM T.J. Watson Research Center), J. Ott (IBM T.J. Watson Research Center), and D. Sadana (IBM T.J. Watson Research Center)

- 11:00 **2993** Development of Porous InP for Subsequent Epitaxial Layer Transfer onto Flexible Substrates – X. Kou and M. Goorsky (University of California, Los Angeles)
- 11:20 **2994** Effect of Two-step Oxidation in Ge Condensation on Surface Roughness Property of Relaxed SiGe layer-on-insulator Substrates – T. Shim, T. Kim, D. LEE (Hanyang University), R. Okuyama (SUMCO Corporation), and J. Park (Hanyang University)
- 11:40 **2995** Advanced Characterization of a Direct Wafer Bonding-compatible Germanium Exfoliation Process – I. P. Ferain (Tyndall National Institute-UCC), X. Kou, C. Moulet-Ventosa, M. Goorsky (University of California, Los Angeles), and C. Colinge (Tyndall National Institute-UCC)

**Bonding for Photonics – 14:00 – 16:00**

- 14:00 **2996** Low-Temperature Bonding Technologies for Photonics Applications – E. Higurashi (The University of Tokyo)
- 14:40 **2997** Adhesive Wafer Bonding Applied for Fabrication of True-Chip-Size Packages for SAW Devices – T. Heuser, C. Bauer (EPCOS AG), V. Dragoi (EV Group E. Thallner GmbH), and G. Mittendorfer (EV Group)
- 15:00 **2998** Distortion Free Wafer Bonding Technology for Backside Illumination Image Sensors – M. Broekaart, A. Castex, K. Landry, R. Fontaniere, and C. Lagahe-Blanchard (Soitec)
- 15:20 **2999** Monitoring Inner Pressure of MEMS Devices Sealed by Wafer Bonding – R. Knechtel, S. Hering, and S. Dempwolf (X-FAB Semiconductor Foundries AG)
- 15:40 **3000** Chemical-Mechanical Polishing YAG For Wafer Bonding – J. Mc Kay (University of California – Los Angeles), C. Moulet-Ventosa, and M. Goorsky (University of California, Los Angeles)

**315 State-of-the-Art Program on Compound Semiconductors 54 (SOTAPCS 54)**  
Electronics and Photonics / Luminescence and Display Materials  
328, Level 3, Hawaii Convention Center

**Advances in Compound Semiconductor – 08:00 – 12:00**

- 08:00 **3034** VCSELs for Atomic Clocks – D. K. Serkland, K. Geib, and G. Peake (Sandia National Labs)
- 08:30 **3035** Oxide-Semiconductor-Based TFTs for Displays and Flexible Electronics – C. Wu (National Taiwan University)
- 09:00 **3036** Direct Observation of Conducting Nano filaments in BMO Resistive Switching Memory – C. Kang (National Taiwan University), W. Kuo, C. Huang (National Chiao Tung University), W. Chang (National Taiwan University), W. Wu, Y. Chu (National Chiao Tung University), and J. He (National Taiwan University)
- 09:15 **3037** Bloch Oscillations in Two-Dimensional Antidot Arrays – W. Pan (Sandia National Laboratory)
- 09:45 Intermission (15 Minutes)

- 10:00 **3038** Single Donor Devices for Quantum Computing – M. Carroll, E. Bielejec, N. Bishop, J. Dominguez, and M. Lilly (Sandia National Laboratories)
- 10:30 **3039** Sulfide Quantum Dots as a Sensitizer for Titanium Dioxide Photoanodes of Solar Cells – T. Li, C. Lin, and H. Teng (National Cheng Kung University)
- 11:00 **3040** Multi-Shelled Metal Oxide Hollow Microsphere: Design, Preparation and Property – Z. Dong (Institute of Process Engineering, Chinese Academy of Sciences), R. Yu (University of Science & Technology Beijing), and D. Wang (Institute of Process Engineering, Chinese Academy of Sciences)
- 11:30 **3041** Fully Transparent Non-Volatile Memory Using Multi-Layer Graphene Electrode – P. Yang (National Taiwan University), S. Jen (National Tsing Hua University), W. Chang (National Taiwan University), P. Chiu (National Tsing Hua University), and J. He (National Taiwan University)
- 11:45 **3042** Hybrid Silicon Solar Cells with Hierarchical Structure for Energy Harvesting – W. Wei, C. Ho, S. Tai, H. Wang, A. Li, R. Chung (National Taipei University of Technology), and J. He (National Taiwan University)

**E16** **Thin Film Transistors 11 (TFT 11)**  
Electronics and Photonics  
327, Level 3, Hawaii Convention Center

**TFT Structures and Materials – 08:00 – 10:10**  
Co-Chairs: J. Jang and M. Furuta

- 08:00 **3087** Channel Width and Channel Length Dependencies in Amorphous-Oxide-Semiconductor Thin-Film Transistors: From a Device Structure Perspective – M. Mativenga, J. Um (Kyung Hee University), R. Mruthyunjaya, J. Chang, G. Heiler, T. Tredwell (Carestream Health, Inc.), and J. Jang (Kyung Hee Univ.)
- 08:40 **3088** Ambipolar SnO Thin-Film Transistors and Inverters – L. Liang and H. Cao (Chinese Academy of Sciences)
- 09:00 **3089** Structure and Material Considerations for Thin Film Transistor Applications beyond LCD Driving – Y. Kuo (Texas A&M University)
- 09:40 Intermission (30 Minutes)

**Advanced Applications – 10:10 – 12:00**  
Co-Chairs: M. Furuta and J. Jang

- 10:10 **3090** Issues of Backplane Technologies for AMOLED – S. Lee, J. Lee, and M. Han (Seoul National University)
- 10:50 **3091** A Novel LTPS TFT Pixel Circuit for Compensating IR Drop of Large Area AMOLED Display – S. Lee, S. Kuk, S. Song, M. Song, and M. Han (Seoul National University)
- 11:10 **3092** Memory Thin Film Transistor with Monolayered Nanoparticles through Chemical and Biological Bindings – H. Lee, H. Jung, M. Kim, Y. Kim, S. Oh, and T. Yoon (Myongji University)

- 11:30 **3093** High Mobility Oxide TFT – S. K. Park, M. Ryu, H. Oh, C. Hwang, S. Yang (Electronics and Telecommunications Research Institute), and S. Lim (Heesung Metal LTD.)

**Advanced Applications Continued – 14:00 – 15:50**  
Co-Chairs: H. Hamada and P.-T. Liu

- 14:00 **3094** Nanocrystal Floating Gate Memory with Indium-Gallium-Zinc-Oxide Channel and Pt-Fe<sub>2</sub>O<sub>3</sub> Core-Shell Nanocrystals – S. Lee, Q. Hu, J. Lee, Y. Baek, H. Lee, and T. Yoon (Myongji University)
- 14:20 **3095** Transparent Amorphous Oxide Semiconductors for System on Panel Applications – P. Liu, L. Chu, L. Teng, Y. Fan, and C. Fuh (National Chiao Tung University)
- 15:00 **3096** Thin-Film Transistors on Germanium-on-Glass Substrate – R. G. Manley and T. Chuang (Corning Incorporated)
- 15:20 Intermission (30 Minutes)

**Novel Materials and Processes – 15:50 – 17:30**  
Co-Chairs: P.-T. Liu and H. Hamada

- 15:50 **3097** Dual In-Plane-Gate Thin-Film Transistors Gated by Chitosan on Paper Substrates – Q. Wan (Chinese Academy of Sciences) and W. Dou (Ningbo Institute of Material Technology and Engineering, Chinese Academy of Sciences.)
- 16:10 **3098** Highly Stable IGZO TFT with Electro-Less Ni Plated Cu Electrodes – S. Nam, T. Moon, K. Lee, K. Lee, S. Yoo, W. Shin (LG Display), and S. Im (Yonsei University)
- 16:30 **3099** Laser Patterned Junctionless In-Plane-Gate Oxide Thin-Film Transistors Arrays – L. Zhu and Q. Wan (Chinese Academy of Sciences)
- 17:00 **3100** The Stability and Reliability of Mixed Oxide-Based Thin Film Transistors Under Gamma Irradiation – T. L. Alford, A. Indluru, and K. E. Holbert (Arizona State University)
- 17:20 Intermission (10 Minutes)

**E17** **SiGe, Ge, and Related Compounds: Materials, Processing, and Devices 5**  
Electronics and Photonics  
316A, Level 3, Hawaii Convention Center

**GeSn Session 1: GeSn Photonics – 08:00 – 09:20**  
Co-Chairs: Benjamin Vincent and Gianlorenzo Masini

- 08:00 **3175** GeSn Photodetection and Electroluminescence Devices on Si – M. Oehme, E. Kasper, and J. Schulze (University of Stuttgart)
- 08:30 **3176** Ge<sub>1-x</sub>Si<sub>x</sub>Sn<sub>y</sub> Photodiodes with 1 eV Poptical Gaps Grown on Si(100) and Ge(100) Platforms – R. Beeler, J. Menendez, and J. Kouvetakis (Arizona State University)
- 08:50 **3177** MBE Growth of GeSn and SiGeSn Heterojunctions for Photonic Devices – J. S. Harris, R. Chen, H. Lin, Y. Huo, E. Fei, and T. Kamins (Stanford University)

**Epitaxy Session 2: New Materials – 08:00 – 09:50**

**Co-Chairs: Yihwan Kim and Masao Sakuraba**

- 08:00 **3178** Beyond Graphene: Silicene and Germanene Novel Two-Dimensional Electronic Materials – G. Le Lay (Aix-Marseille University), A. Resta (CNRS-CINaM), B. Ealet (Aix-Marseille University), P. De Padova (CNR-ISM), T. Bruhn, and P. Vogt (TU-Berlin)
- 08:30 **3179** Epitaxial Growth of Low Defect SiGe Buffer Layers for Integration of New Materials on 300 mm Silicon Wafers – G. Kozłowski, T. Schroeder (IHP), and P. Storck (Siltronic AG)
- 09:00 **3180** Synthesis of Monocrystalline Silicon-like (III-V)-Si Semiconductors: Structural and Optical Properties – A. Chizmeshya, J. Kouvetakis, T. Watkins, R. Beeler, and J. Menendez (Arizona State University)
- 09:20 **3181** Strained Ge Core/Si(Ge) Shell Nanowires: Stability and Surface Defect Passivation – P. C. McIntyre (Stanford University)

**Emerging Applications Session 1: Quantum Effects / Spintronics – 10:05 – 11:55**

**Co-Chairs: Tejas Krishnamohan**

- 10:05 **3182** Spin Coherence in Si and Applications to Quantum Information Processing – S. Lyon, A. M. Tyryshkin, J. He, and R. M. Jock (Princeton University)
- 10:35 **3183** Single-Shot Readout of Singlet-Triplet Qubit States in a Si/SiGe Double Quantum Dot – J. Prance, Z. Shi, C. Simmons, D. Savage, M. Lagally (University of Wisconsin-Madison), L. Schreiber, L. Vandersypen (Kavli Institute of Nanoscience, TU Delft), M. Friesen, R. Joynt, S. Coppersmith, and M. Eriksson (University of Wisconsin-Madison)
- 11:05 **3184** A Design Scheme for Topological Insulators based Bonds, Bands, Symmetry and Spin Orbit Coupling – C. Felser, L. Muechler, C. Stanislav (Max Planck Institute Chemical Physics of Solids), H. Zhang, and S. Zhang (Stanford University)
- 11:25 **3185** Measurement and Control of Individual Electron Spins in Silicon MOS-based Quantum Dots – H. Jiang (UCLA)

**Surfaces and Interfaces Session 2: Nanowires and New Materials – 10:05 – 12:05**

**Co-Chairs: Seiichi Miyazaki and Paul McIntyre**

- 10:05 **3186** Non Planar Non Si CMOS – Challenges and Opportunities – C. Hobbs, K. Ang, R. Hill, I. Ok, B. Min (SEMATECH), D. Franca (Research Foundation of SUNY), H. Stamper, S. Vivekanand, M. Rodgers, S. Gausepohl (CNSE), P. Kirsch, and R. Jammy (SEMATECH)

- 10:35 **3187** Phonon Dispersion in <100> Si Nanowire Covered with SiO<sub>2</sub> Film Calculated by Molecular Dynamics Simulation – T. Watanabe, T. Zushi, M. Tomita, R. Kuriyama, N. Aoki, and T. Kamioka (Waseda University)
- 10:55 **3188** Electron Transport and Strain Mapping in Ge-Si<sub>x</sub>Ge<sub>1-x</sub> Core-Shell Nanowire Heterostructures – E. Tutuc (The University of Texas at Austin)
- 11:25 **3189** Liquid-Phase Deposition of Thin Si and Ge Films Based on Ballistic Electro-reduction – T. Ohta, R. Mentek (Tokyo Univ. of A & T), B. Gelloz (Nagoya University), N. Mori (Osaka Univ.), and N. Koshida (Tokyo University of Agriculture and Technology)
- 11:45 **3190** Evidence of Layer-by-Layer Oxidation of Ge Surfaces by Plasma Oxidation Through Al<sub>2</sub>O<sub>3</sub> – R. Zhang, P. Huang, J. Lin, M. Takenaka, and S. Takagi (The University of Tokyo)

**Processing Session 2: Germanium and Nanoscaled Devices – 13:40 – 16:00**

**Co-Chairs: Harold W. Kennel and J. Murota**

- 13:40 **3191** GOI substrates -Fabrication and Characterization – A. Sakai, S. Yamasaka, J. Kikkawa, Y. Nakamura (Osaka University), Y. Moriyama, T. Tezuka (GNC, AIST), S. Takeuchi, and K. Izunome (Covalent Silicon Corp.)
- 14:10 **3192** Strained Nanoscaled Devices – D. Gruetzmacher, S. Mantl (Forschungszentrum Jülich), Q. Zhao, S. Richter, L. Knoll, J. Moers, J. Gerharz, G. Mussler, D. Buca, and R. Minamisawa (Forschungszentrum Juelich)
- 14:40 **3193** Effect of Two-step Oxidation in Ge Condensation on Surface Roughness Property of Relaxed SiGe layer-on-insulator Substrates – T. Shim, T. Kim, D. LEE (Hanyang University), R. Okuyama (SUMCO Corporation), and J. Park (Hanyang University)
- 15:00 **3194** Simple Fabrication of Suspended Germanium Structures and Their Electrical Properties from High Quality Ge on Si(001) Layers – V. A. Shah, M. Myronov, C. Wongwanitwatana, R. Morris, M. Prest, J. S. Richardson-Bullock, E. H. Parker, T. E. Whall, and D. R. Leadley (University of Warwick)
- 15:20 **3195** Formation of Graded SiGe on Insulator by Segregation-Controlled Rapid-Melting-Growth – R. Matsumura, Y. Tojo, H. Yokoyama, M. Kurosawa, T. Sadoh, and M. Miyao (Kyushu University)
- 15:40 **3196** Modeling Two Dimensional Solid Phase Epitaxial Growth for Patterned Ge Substrates – B. L. Darby, B. R. Yates, A. Kumar (University of Florida), A. Kontos (Applied Materials), R. Elliman (Australian National University), and K. S. Jones (University of Florida)



**Optoelectronics Session 3: Receivers, Emitters, and Interconnects – 13:40 – 15:50****Co-Chair: Gianlorenzo Masini**

- 13:40 **3197** Germanium/Silicon Heterostructures for Terahertz Emission – R. W. Kelsall, V. Dinh, P. Ivanov, A. Valavanis, L. Lever, Z. Ikonic (University of Leeds), P. Velha, D. Dumas, K. F. Gallacher, D. J. Paul (University of Glasgow), J. Halpin, M. Myrnov, and D. R. Leadley (University of Warwick)
- 14:10 **3198** Ge Photodiodes for CMOS Photonics Optical Engines and Interconnects – S. Sahni and G. Masini (Luxtera)
- 14:40 **3199** Long Wavelength  $\geq 1.9 \mu\text{m}$  Germanium for Optoelectronics Using Process Induced Strain – P. Velha, D. J. Paul (University of Glasgow), M. Myrnov, and D. R. Leadley (University of Warwick)
- 15:00 **3200** Single Photon Emitters on Si substrate – S. Bietti (Universita' degli Studi di Milano-Bicocca), L. Cavigli, M. Abbarchi (Universita' di Firenze), G. Isella, J. Frigerio (Politecnico di Milano), C. Frigeri (CNR-IMEM Parma), A. Vinattieri, M. Gurioli (Universita' di Firenze), and S. Sanguinetti (Universita' degli Studi di Milano-Bicocca)
- 15:20 **3201** Advanced GE-ON-SI Telecommunication Receivers – C. R. Doerr (Acacia Communications)

## 316A, Level 3, Hawaii Convention Center

**Strain Session 1: Channels, Source/Drain, and GaN – 16:15 – 17:45****Co-Chair: Ken Uchida**

- 16:15 **3202** Heteroepitaxial Lattice Mismatch Stress Relaxation in Nonpolar and Semipolar GaN by Dislocation Glide – J. S. Speck (University of California Santa Barbara)
- 16:45 **3203** Channel Strain Evolution of Recessed Source/Drain  $\text{Si}_{1-x}\text{C}_x$  Structures by Modifying Scaling Factors – S. Kim, D. Byeon, M. Jung, I. Lee, D. Ko (Yonsei University), Y. Kim (Applied Materials), and H. Lee (Sungkyunkwan University)
- 17:05 **3204** High Ge Content SiGe Selective Processes for Manufacturing Source/Drain in the Next Generations of pMOS Transistors – A. Hikavy, W. Vanherle, L. Witters, B. Vincent, J. Dekoster, and R. Loo (imec)
- 17:25 **3205** Formation of Uniaxially Strained Si/Ge Channels on SiGe Buffers Strain-Controlled with Selective Ion Implantation – K. Sawano, Y. Hoshi, S. Nagakura (Tokyo City University), K. Arimoto, K. Nakagawa (University of Yamanashi), N. Usami (Tohoku University), and Y. Shiraki (Tokyo City University)

**Emerging Applications Session 2: Quantum Effects / Spintronics – 16:15 – 17:55****Co-Chair: Tejas Krishnamohan**

- 16:15 **3206** Coherent Manipulation of a Si/SiGe-based Singlet-Triplet Qubit – M. G. Borselli (HRL Laboratories LLC)
- 16:45 **3207** Spin Generation and Relaxation in Ge/SiGe Quantum Wells – G. Isella, F. Bottegoni, S. Cecchi, A. Ferrari, F. Ciccacci (Politecnico di Milano), F. Pezzoli, A. Giorgioni, E. Gatti, E. Grilli, M. Guzzi (Università di Milano Bicocca), C. Lange, N. Koester, R. Woscholski, S. Chatterjee (Philipps-Universität Marburg), D. Trivedi, P. Li, Y. Song, and H. Dery (University of Rochester)
- 17:15 **3208** Enhancement-Mode Buried Strained Silicon Channel Double Quantum Dot with Integrated Electrometer – M. Carroll, N. Bishop (Sandia National Laboratories), T. Lu, T. Pluym, and P. Kotula (Sandia National Labs)
- 17:35 **3209** Local Quantity Analysis of Nanosize Electronics and Spintronics Material – M. Senami and A. Tachibana (Kyoto University)

## 316A, Level 3, Hawaii Convention Center

**Reception and Workshop on Next Generation Devices – 19:00 – 21:30****Co-Chair: David Hareme**

- 19:00 Reception (30 Minutes)
- 19:30 **3210** (Panel Discussion) How Far Can We Push Si CMOS and What are the Alternatives for Future ULSI – D. Hareme (IBM Systems and Technology Group)
- 21:00 Tak Ning (IBM, USA) (5 Minutes)
- 21:05 Shinichi Takaga (University of Tokyo, Japan) (5 Minutes)
- 21:10 Witak Maszara (Global Foundries, USA) (5 Minutes)
- 21:15 Cor Claeys (imec, Belgium) (5 Minutes)
- 21:20 Ken Uchida (Keio University, Japan) (5 Minutes)
- 21:25 Paolo Gargini (Intel, USA) (5 Minutes)

**Emerging Materials and Processes for Energy Conversion and Storage**

Electrodeposition / Battery / Energy Technology

313B, Level 3, Hawaii Convention Center

**Session I: Advanced Battery Materials and Concepts – 08:00 – 12:20****Co-Chairs: Y. Fukunaka and L. Deligianni**

- 08:00 **3340** (Invited) The Battery of the Future: Using Computational Modeling to Understand the Limits of Intercalation Systems Across a Wide Range of Chemistries – G. Ceder (Massachusetts Institute of Technology)
- 08:40 **3341** Single-Step and Low-Temperature Synthesis of Layered  $\text{LiCoO}_2$  Thin Film Electrodes: An Electrochemical-Hydrothermal Route – H. Porthault, F. Le Cras (CEA), and S. Franger (CNRS)

- 09:00 **3342** (Invited) Fabrication of Rechargeable Micro Lithium-Ion Battery with 3D Anode and 3D Cathode – K. Kanamura, K. Yoshima, and H. Munakata (Tokyo Metropolitan University)
- 09:40 Intermission (20 Minutes)
- 10:00 **3343** Energy Harvesting Device – Y. Garsany (EXCET/NRL) and K. Swider-Lyons (U.S. Naval Research Laboratory)
- 10:20 **3344** Fundamental Study of Li Dendrite Growth in Ionic Liquid – T. Nishida (Stellachemifa corporation), K. Nishikawa (NIMS), T. Homma, Y. Fukunaka (Waseda University), and M. Rosso (Ecole Polytechnique)
- 10:40 **3345** Effect of Dissolved Gas in an Ionic Liquid Electrolyte for Lithium and Lithium/Sodium Metal Anode – J. K. Stark and P. Kohl (Georgia Institute of Technology)
- 11:00 **3346** Two-dimensionally Patterned Electrodeposition of Sn Film from Aqueous Acid Bath – S. Yagi, E. Takeda, T. Okada (Osaka Prefecture University), D. Mu (Beijing Institute of Technology), N. Okamoto, T. Saito, and K. Kondo (Osaka Prefecture University)
- 11:20 **3347** Porous  $\text{Li}_2\text{MnO}_3$  as a High Capacity and High Rate Capability Cathode Material – M. Nookala, T. Penki, and S. Duraisamy (Indian Institute of Science)
- 11:40 **3348** Synthesis and Electrochemical Properties of Cation Doped Spinel  $\text{LiM}_x\text{Mn}_{2-x}\text{O}_4$  ( $\text{M}=\text{Ni, Al}$ ;  $0 \leq x \leq 0.5$ ) Cathode Materials for Li-Ion Battery – M. A. Kebede, N. Kunjuzwa, K. I. Ozoemena, and M. K. Mathe (Council for Scientific and Industrial Research)
- 12:00 **3349** Improved Lithium Storage and Cyclability in Graphene/Graphene Oxide Wired Mesoporous  $\text{SnO}_2$  – K. Shiva and A. J. Bhattacharyya (Indian Institute of Science)

**Session II: Emerging Materials, Processes and Devices for Solar Cells – 14:00 – 18:00**

**Co-Chair: J. Talbot and K. Kanamura**

- 14:00 **3350** (Electrodeposition Division Research Award Presentation) Electrodeposition for the Synthesis of Thin Film Solar Cells – L. Deligianni (IBM, Thomas J. Watson Research Center)
- 14:40 **3351** (Invited) New Paradigms for Cost-Effective III-V Photovoltaic Technology – D. Shahrjerdi (IBM T J Watson Research Center), S. W. Bedell, B. Hekmatshoar (IBM T.J. Watson Research Center), C. Bayram (IBM T J Watson Research Center), N. Li, K. Fogel, P. Lauro (IBM T.J. Watson Research Center), J. Ott (IIBM T.J. Watson Research Center), M. Hopstaken (IBM T J Watson Research Center), and D. Sadana (IBM Research)
- 15:20 **3352** Silicon Bonding State in Films Electrodeposited from  $\text{SiCl}_4$  in Ionic Liquid – J. Komadina, T. Akiyoshi, Y. Ishibashi (Waseda University), X. Wang (SLAC), Y. Fukunaka (Waseda University), P. Pianetta (SLAC), and T. Homma (Waseda University)
- 15:40 **3353** Novel Front Side Metallization Processes for Silicon based Solar Cells – A. Bund (Technische Universität Ilmenau), M. Fritz, U. Schmidt (Technische Universität Ilmenau), O. Luehn, and H. Kuehnlein (RENA Solar Technology Center Freiburg)

- 16:00 Intermission (20 Minutes)
- 16:20 **3354** (Invited) CIGS-Based Solar Cells Prepared from Electrodeposited Precursor Films – R. N. Bhattacharya (National Renewable Energy Laboratory) and Y. Kim (Dasstech Co., Ltd.)
- 17:00 **3355** One-Step Electrochemical Deposition of Cu-In-Ga Mixed Oxide Thin Films for Low-Cost CIGS Solar Cells – E. Chassaing, A. Duchatelet, T. Sidali, G. Savidand, and D. Lincot (IRDEP)
- 17:20 **3356** Electrophoretic Deposition: A Bottom-up Approach to Functional Nanocomposite Films – M. A. Worsley, A. Pascall, K. Sullivan, T. Olson, C. Orme, J. Satcher, and J. Kuntz (Lawrence Livermore National Laboratory)
- 17:40 **3357** Electrodeposition of Elements for Thin Film, Photovoltaic Applications: Citrate Complexation and Partial Current Densities – S. S. Zahmi and E. Podlaha (Northeastern University)

*Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center*

**F4 – Poster Session – 18:00 – 20:00**

**Co-Chairs: L. Deligianni and E. Podlaha**

- **3358** Wet Clean Efficiency Monitor by SP3 SM – Y. Chang Chien, M. Yeh, C. Yang, S. Ku (Taiwan Semiconductor Manufacturing Company), C. Wan (National Tsing-Hua University), C. Hu (National Tsing Hua University), E. Chen, J. Yan, E. Khuan, K. Joyce (KLA-Tencor), and C. Hu (National Tsing Hua University)
- **3359** Tuning of Mesopore Size in  $\text{WO}_3$ -based Photoanodes for Enhanced Visible Light Driven Water Oxidation – D. Chandra and M. Yagi (Niigata University)
- **3360** CIS Thin Film Solar Cells from Electrodeposited Cu/In Stacked Precursors – Y. Kim, S. Chae, S. Yoon, M. Jeon (Dasstech Co., Ltd.), and R. N. Bhattacharya (National Renewable Energy Laboratory)
- **3361** Various Metal Oxides based Dye-Sensitized Solar Cells – S. Kang (Chonnam National University)
- **3362** Fabrication Mediated by Self-Assembly of Block Copolymer and Photoelectrochemical Properties of Mesoporous  $\text{WO}_3$  Films – D. Chandra, K. Ouchi, and M. Yagi (Niigata University)
- **3363** Preparation and Photoanodic Properties of a Chromium-Electrodeposited  $\text{TiO}_2$  Electrode – R. Tsuriya, M. Kajita, N. Abe, A. Shoji, and M. Yagi (Niigata University)
- **3364** Energy Storage Devices from Biomass Conversion Byproducts, Lignin – J. Yang (The University of Wisconsin-Madison), S. Gunasekaran (University of Wisconsin-Madison), and S. Gunasekaran (The University of Wisconsin-Madison)
- **3365** Pore-Filling Anion-Exchange Membranes for Non-Aqueous Redox Flow Batteries (RFBs) – M. Kang (Sangmyung University), M. Lee (Samsung Advanced Institute of Technology), J. Kim, H. Cha, and J. Park (Sangmyung University)
- **3366** Novel Graphene – Polyethylene Oxide Composite Electrolyte for Highly Efficient Solid State Dye Sensitized Solar – M. Akhtar, Z. Li, J. Jang, and O. Yang (Chonbuk National University)

**Electrodeposition in Spintronics – 08:20 – 12:00**Co-Chairs: **W. Schwarzacher** and **Y. Kitamoto**

- 08:20 **3422** Aligning Superparamagnetic Nanoparticles at Temperatures Much Higher than the Blocking Temperature – W. Schwarzacher, J. Eloi, M. Okuda, and S. Ward Jones (University of Bristol)
- 09:00 **3423** Giant Magnetoelectric Effect in Thin Film Composites – E. Lage, A. Piorra, C. Kirchof, E. Yarar, D. Meyners, and E. Quandt (University of Kiel)
- 09:40 Intermission (20 Minutes)
- 10:00 **3424** SiGe Spintronics with Single-Crystalline Ferromagnetic Schottky-Tunnel Contacts – K. Hamaya, S. Yamada, and M. Miyao (Kyushu University)
- 10:40 **3425** Generation and Detection of a Pure Spin Current Using Co-based Heusler-alloy Spin Injector and Detector: Comparison of  $\text{Co}_2\text{FeSi}$  and  $\text{Co}_2\text{MnSi}$  – S. Oki, M. Kawano, K. Tanikawa, H. Aoki, S. Yamada, M. Miyao, and K. Hamaya (Kyushu University)
- 11:00 **3426** Electrochemical Synthesis of Ferromagnetic Metal-Metal Oxide Nanocontacts for Magnetic Field Sensor Application – J. George, R. Sharma (University of Houston), S. Elhalawaty, R. Carpenter (Arizona State University), D. Litvinov, and S. Brankovic (University of Houston)
- 11:40 **3427** Giantmagnetoimpedance Effect of  $\text{La}_{0.6}\text{Bi}_{0.1}\text{Sr}_{0.3}\text{MnO}_3$  at Room Temperature – S. K. Barik, R. Katiyar (University of Puerto Rico), and R. Mahendiran (National University of Singapore)

**Magnetic Materials for Biomedical Applications – 15:00 – 17:40**Co-Chairs: **T. Osaka** and **C. Bonhote**

- 15:00 **3428** Lipid-based Magnetic Nanomedicines for Cancer – Y. Namiki (The Jikei University), T. Fuchigami (Tokyo Institute of Technology), M. Nakagawa (Tohoku University), and Y. Kitamoto (Tokyo Institute of Technology)
- 15:40 **3429** FePt Magnetic Hollow Spheres Designed for Nano-Scale Drug Delivery System Targeted to Cancer Tumor – T. Fuchigami (Tokyo Institute of Technology), M. Nakagawa (Tohoku University), Y. Namiki (The Jikei University), and Y. Kitamoto (Tokyo Institute of Technology)
- 16:00 **3430** Fabrication of Magnetic Nanoparticle-Assembly with Biodegradable Polymer Core – C. Oka (Tokyo Institute of Technology), N. Horiishi (Bengala Techno Lab), and Y. Kitamoto (Tokyo Institute of Technology)
- 16:20 Intermission (20 Minutes)
- 16:40 **3431** Development of Specific Delivery of Magnetic Nanoparticles in Cancer Tissue for Hyperthermia and Their Establishment of System for Safety Assessment – H. Zhang, T. Nakanishi, and T. Osaka (Waseda University)

- 17:20 **3432** Separation of Magnetic Nano Beads by Using Soft Magnetic Flux Concentrators – M. Kaiser, J. Chen, P. Taptimthong, and L. Rissing (Leibniz Universitaet Hannover)

**Synthesis and Engineering General Session**Industrial Electrochemistry and Electrochemical Engineering  
304B, Level 3, Hawaii Convention Center**Water Electrolysis – 08:00 – 09:20**Co-Chairs: **M. Sudoh** and **V. Ramani**

- 08:00 **3433** Electroplated Ni-W-S Alloy Cathode for Alkaline Water Electrolysis – D. Suzuki, K. Someya, T. Suzuki, A. Horie (Vantec Co., Ltd.), R. Miyamoto (Utsunomiya University), Y. Ishikawa (Nippon Platec Co., Ltd.), and S. Yoshihara (Utsunomiya University)
- 08:20 **3434** Size Control of Hydrogen Nanobubble by Pt-nanoparticle/Ru Electrode – K. Kikuchi and T. Okamoto (The University of Shiga Prefecture)
- 08:40 **3435** Degradation of Nickel Anode for Alkaline Water Electrolysis under Potential Cycling – H. Ichikawa, K. Matsuzawa (Yokohama National University), I. Nagashima (Kawasaki Heavy Industries, Ltd.), A. Manabe (Chlorine Engineers Corp., Ltd.), Y. Nishiki (Permelec Electrode Ltd.), and S. Mitsushima (Yokohama National University)
- 09:00 **3436** Water Electrolysis to Produce the Dry Oxygen for the Human Activities under the Closed Environment – Y. Sone, S. Masato (Japan Aerospace Exploration Agency), Y. Tetsuya (Daiki Ataka Engineering Co. Ltd.), and S. Naoki (Japan Aerospace Exploration Agency)

**Electrolyzer – 09:20 – 10:40**Co-Chairs: **M. Sudoh** and **V. Ramani**

- 09:20 **3437** Low Voltage Electrochemical Process for Manufacturing Sodium Hydroxide and Halogenated Hydrocarbons – B. K. Boggs, S. Gorer, M. Kostowskyj, R. King, J. Miller, and R. Gilliam (Calera Corporation)
- 09:40 Intermission (20 Minutes)
- 10:00 **3438** Theoretical Study on Pressurized Operation of Solid Oxide Electrolysis Cells – M. Henke, C. Willich, C. Westner, F. Leucht, W. Bessler, J. Kallo, and K. Friedrich (German Aerospace Center (DLR))
- 10:20 **3439** Electrolytic Conversion of Sodium Salts in a Kraft Mill – J. Cloutier (Hydro-Québec)

**Soda Electrolysis – 10:40 – 12:00**Co-Chairs: **M. Sudoh** and **V. Ramani**

- 10:40 **3440** Scale-up of Low Energy Process for Generation of Alkalinity – R. L. King, D. Martinez, J. Miller, S. Gorer, M. Kostowskyj, B. K. Boggs, and R. Gilliam (Calera Corporation)
- 11:00 **3441** Design of Rechargeable Air Diffusion Cathode of Metal-Air Battery in Alkaline Solution – Y. Takeshita, S. Fujimoto, and M. Sudoh (Shizuoka University)

- 11:20 **3442** Development of a High Performance Salt Electrolysis Cell Using Soft-Zero-Gap Method – H. Matsui, H. Tanaka, and H. Okido (Tokuyama Corporation)
- 11:40 **3443** Electrochemical Processes in Waste Water Treatment: Process Development at Pilot Plant Scale – D. Woisetschlaeger (Graz University of Technology), M. Koncar (VTU Engineering), and M. Siebenhofer (Graz University of Technology)

**Water Treatment – 14:00 – 15:00**  
Co-Chairs: M. Sudoh and V. Ramani

- 14:00 **3444** Recycling Electrochemical Machining Electrolyte for Metal Recovery and Elimination of Waste – E. J. Taylor, B. Skinn, H. Garich, and M. Inman (Faraday Technology Inc.)
- 14:20 **3445** Anodic Reactivity of Ferrous Sulfide Particles Generated in Wastewater Treatment – E. Mejia Likosova (The University of Queensland), Y. Poussade (Veolia Water Australia), J. Keller, and S. Freguia (Advanced Water Management Centre at The University of Queensland)
- 14:40 **3446** Enhanced Electrochemical Oxidation of Rhodamine B by TiO<sub>2</sub>-Coated Granular Activated Carbon – X. Li, C. Wang, L. Zhang, Y. Qian, and Y. Wang (Tsinghua University)

**Anode – 15:00 – 16:00**  
Co-Chairs: M. Sudoh and V. Ramani

- 15:00 **3447** A Novel Chlorine Evolution Anode for Electrowinning of Non-ferrous Metals – M. Matsuda and M. Morimitsu (Doshisha University)
- 15:20 **3448** Preparation of Shape-Controlled Pt Nanoparticles by Galvanostatic Electrolysis – T. Nishimura, T. Nakade, T. Morikawa (Technology Research Institute of Osaka Prefecture), and H. Inoue (Osaka Prefecture University)
- 15:40 Intermission (20 Minutes)

**Electrochemical Engineering – 16:00 – 17:40**  
Co-Chairs: M. Sudoh and V. Ramani

- 16:00 **3449** Development of an Electrolysis-Reversible Hydrogen Electrode (E-RHE) – N. Kamiya (KM Laboratory CO., LTD)
- 16:20 **3450** Effect of Pt Dissolution on H<sub>2</sub>O<sub>2</sub> Formation by Using RRDE Method – K. Ono (Shizuoka University), N. Takeuchi, K. Sekizawa, T. Yoshida (Toyota Motor Corporation), and M. Sudoh (Shizuoka University)
- 16:40 **3451** Characterization and Performance of Non-Iridium Oxide Based Oxygen Evolution Anodes – T. Zhang and M. Morimitsu (Doshisha University)
- 17:00 **3452** Mathematical Modeling of Ammonia Electro-Oxidation in a Rotating Disk Electrode (RDE) System – L. A. Diaz Aldana, M. Muthuvel, and G. G. Botte (Ohio University)
- 17:20 **3453** Electrocatalytic Synthesis of Hydrogen Peroxide on Non-Precious Catalysts – F. Hasché (Technische Universität Berlin), T. Fellerger (Max Planck Institute of Colloids and Interfaces), M. Oezaslan, P. Strasser (Technische Universität Berlin), and M. Antonietti (Max Planck Institute of Colloids and Interfaces)

*Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center*

**G2 – Poster Session – 18:00 – 20:00**  
Co-Chairs: V. Ramani and M. Sudoh

- **3454** Cathodic Characteristic and Structural Analyses of a New Catalyst for Chlorate Electrolysis – K. Terada (Doshisha University), S. Hatano, K. Hara, A. Kimura (Daiso engineering Co. Ltd), M. Saito, H. Daimon, M. Inaba, and A. Tasaka (Doshisha University)
- **3455** TIZO/Ag/TIZO Multilayer Films for the Application of a Very Low Resistance Transparent Electrode – G. Heo (Korea Institute of Industrial Technology), Y. Lee (Chosun University), J. Park (Korea Institute of Industrial Technology), J. Oh (Chonnam National University), D. Shin (Chosun University), and T. Kim (Korea Institute of Industrial Technology)
- **3456** Synthesis and Properties of Pentacenes Having Alkyl- chains at 2, 3, 9, 10-Positions – S. Katsuta (Nara Institute of Science and Technology), C. Ohashi, K. Nakayama (Yamagata University), and H. Yamada (Nara Institute of Science and Technology)
- **3457** Preparation and Characterization of Cathode Active Materials from Spent Lithium Ion Batteries – J. Moon, J. Ahn, S. Son, H. Lee, H. Kim, and H. Kim (Korea Institute of Industrial Technology)
- **3458** Enhancement of Electrical Conductivity and Electrochemical Activity of Hydrogenated Amorphous Carbon by Incorporating Boron Atoms – H. Naragino, K. Yoshinaga, A. Nakahara, S. Tanaka, and K. Honda (Yamaguchi University)
- **3459** Direct Preparation of Highly Fluorescent Pyrene-Dyes from Non-Fluorescent Precursors Upon Photoirradiation – T. Aotake, D. Kuzuhara, and H. Yamada (Nara Institute of Science and Technology)

**H1 Carbon Nanotubes and Graphene: From Fundamental Properties and Processes to Applications and Devices**  
Fullerenes, Nanotubes, and Carbon Nanostructures / Dielectric Science and Technology / Energy Technology / Sensor  
*317A, Level 3, Hawaii Convention Center*

**Session III – 08:00 – 12:20**  
Co-Chairs: R. Weisman, Z. Liu, and H. Klauk

- 08:00 **3515** Effect of Boric Acid on the Nucleation and Growth of Ni Nanoparticles for CNT Growth – J. Vanpaemel, M. Van der Veen, C. Huyghebaert, S. De Gendt, and P. Vereecken (imec)
- 08:20 **3516** The Effect of Carbon-Nanotubes on the Electrochemical Impedance Behavior of Glass and Carbon fibers with AA2024 and AA7075 – Y. Yoon, K. Lafdi, and M. Bouchard (University of Dayton Research Institute)
- 08:40 **3517** Carbon Nanotube Enhanced Functional Carbon Fibers from Renewable Resources – O. Rios, W. E. Tenhaeff, M. McGuire, P. Menchhofer, A. Johs, K. L. More (Oak Ridge National Laboratory), and D. White (Maryville College-ORAU)



- 09:00 **3518** Highly Conductive, Super Stiff Carbon Nanotube-based Macroassemblies and Their Composites – M. A. Worsley, M. Merrill, S. Kucheyev, J. Kuntz, T. Han, J. Satcher, M. Stadermann, A. Hamza, J. Biener, and T. Baumann (Lawrence Livermore National Laboratory)
- 09:20 **3519** Vertically Aligned Carbon Nanofiber Based Electrode for Biosensor Applications – D. Suazo, J. Rivera (University of Puerto Rico), J. Koehne, M. Meyyappan (NASA Ames Research Center), and C. Cabrera (University Of Puerto Rico)
- 09:40 Intermission (20 Minutes)
- 10:00 **3520** Indene-C<sub>60</sub>/C<sub>70</sub> Bisadduct as Acceptor in Polymer Solar Cells – Y. Li (Institute of Chemistry, Chinese Academy of Sciences)
- 10:20 **3521** Synthesis and Separation Strategies for New Fullerenes Created in Oxidizing Atmospheres – S. Stevenson (Indiana-Purdue University)
- 10:40 **3522** Design of Robust Functional Structures on Carbon Substrates Using Syllil-Protected Aryldiazonium Electroreduction – Y. Leroux (Universite de Rennes – CNRS) and P. Hapiot (Universite de Rennes 1)
- 11:00 **3523** Preparation of Hydrophilic Nano-Carbon Particles by Electrolysis and Their Environmental Applications – S. Ikeda, S. Kawasaki, Y. Hayashi (Nagoya Institute of Technology), S. Kita, A. Nobumoto, H. Ono, and S. Ono (Shion co., Ltd.)
- 11:20 **3524** Synthesis and Functions of Hybrid Assemblies Composed of Metalloporphyrin and Heteropolyoxometallates – T. Kojima (University of Tsukuba), A. Yokoyama (Ewha Womans University), T. Ishizuka (University of Tsukuba), K. Ohkubo (Osaka University), and S. Fukuzumi (Osaka Prefecture University)
- 11:40 **3525** Synthesis and Properties of Acenes Photochemically Prepared from Diketone Precursors – H. Yamada, T. Aotake, S. Katsuta, Y. Kaneshige (Nara Institute of Science and Technology), C. Ohashi, and K. Nakayama (Yamagata University)
- 12:00 **3526** Stability Computations for La@C<sub>76</sub> – Z. Slanina (University of Tsukuba), F. Uhlik (Charles University), T. Akasaka (University of Tsukuba), and S. Nagase (Institute for Molecular Science, NINS)
- 08:40 **3673** Ionic Liquid Based Electrolytes for Zn-Air and Mg-Air Batteries – P. Howlett, A. A. Torriero (Deakin University), T. Khoo (Monash University), T. Simons (Deakin University), D. MacFarlane (Monash University), and M. Forsyth (Deakin University)
- 09:00 **3674** The Solid Oxide-molten Salts Ion Conductors and Multifunctional Nanocomposites for Advanced Fuel Cells – B. Zhu (KTH)
- 09:40 Intermission (20 Minutes)
- 10:00 **3675** The Kinetics of Electrochemical Alloying in Liquid Mg-Sb – J. M. Newhouse, H. Kim, and D. R. Sadoway (Massachusetts Institute of Technology)
- 10:20 **3676** Spectroscopic Analysis of Ceria Based Oxide-Carbonate Nanocomposite Electrolyte for Low Temperature Solid Oxide Fuel Cells – M. Mizuhata, K. Takeda (Kobe University), R. Raza, and B. Zhu (KTH)
- 10:40 **3677** Measurement of the Diffusion Coefficient of Calcium in the Calcium-Bismuth Liquid Alloy System – S. A. Barriga, H. Kim, D. Boysen, and D. R. Sadoway (Massachusetts Institute of Technology)
- 11:00 **3678** Electrochemical Properties of Ca-Sb Alloys in Molten Salt Electrolytes – T. Ouchi, H. Kim, and D. R. Sadoway (Massachusetts Institute of Technology)
- 11:20 **3679** Oxygen Reduction Reaction at LaNiO<sub>3</sub> Supported by Au Ring in Li/Na Eutectic Carbonate with La<sub>2</sub>O<sub>3</sub> – K. Matsuzawa, Y. Esaki, K. Watanabe, K. Ota, and S. Mitsushima (Yokohama National University)
- 11:40 **3680** EMHSO<sub>4</sub>-based Polymer Electrolytes and Their Applications in Solid Electrochemical Capacitors – S. Ketabi, X. Liu, Z. Le, and K. Lian (University of Toronto)
- 12:00 Lunch Break (120 Minutes)
- 14:00 **3681** Charge and Discharge Properties at Room to Intermediate Temperature of Sodium Secondary Batteries Using Molten NaFSA-MPPyFSA for the Green Base Transceiver Station (G-BTS) – E. Itani, S. Sakai, K. Nitta, S. Inazawa (Sumitomo Electric Industries, Ltd.), K. Takeno, and T. Seki (NTT Docomo)
- 14:20 **3682** Versatility of Molten Salt Synthesis for the Preparation of Cathode and Anode Electrode Materials for Lithium-Ion Batteries – M. Reddy and B. Chowdari (National University of Singapore)

**13**

### Molten Salts and Ionic Liquids 18

Physical and Analytical Electrochemistry / Electrodeposition / Energy Technology  
301A, Level 3, Hawaii Convention Center

Power – 08:00 – 14:40

Co-Chairs: M. Mizuhata and B. Zhu

- 08:00 **3671** A Design for a Membrane-less Al/Cl<sub>2</sub> Ionic Liquid Flow Battery – M. Zhang (University of Tennessee, Knoxville), T. A. Zawodzinski Jr. (The University of Tennessee), P. Trulove (US Naval Academy), J. Watson, and R. Counce (University of Tennessee, Knoxville)
- 08:20 **3672** Electrochemical Behavior of Lithium Metal Electrodes in Ionic Liquid Based Electrolytes – A. I. Bhatt (CSIRO Energy Technology)

Separations and Purification – 14:40 – 17:20

Co-Chairs: P. Trulove and R. Mantz

- 14:40 **3683** Exploiting the Versatility of Ionic Liquids and Polymeric Ionic Liquids in Chromatographic Separations and Microextractions – J. Anderson (The University of Toledo)
- 15:20 Intermission (20 Minutes)
- 15:40 **3684** Separation of Flue Gas Components by Ionic Liquids – Fundamental Chemistry and Industrial Application – R. Fehrmann, A. Kunov-Kruse, S. L. Mossin, S. Kegnæs, H. Kolding, and A. Riisager (Technical University of Denmark)

- 16:20 **3685** Reactive Separation of H<sub>2</sub>S from Fuel Process Streams Using Ionic Liquids – K. Jayne, D. Carr, B. Slote, and M. C. Kimble (Reactive Innovations, LLC)
- 16:40 **3686** Decomposition of CO<sub>2</sub> Gas in CaCl<sub>2</sub>-CaO and LiCl-Li<sub>2</sub>O Molten Salts – R. O. Suzuki, K. Otake, T. Uchiyama (Eco-Processing), H. Kinoshita (Fukushima College of Technology), and T. Kikuchi (Hokkaido University)
- 17:00 **3687** The Use of Ionic Liquids for the Purification of Heavy Metals from Coal Ash – T. E. Sutto (Naval Research Laboratory)

*Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center*

**13 – Poster Session 2 – 18:00 – 20:00**

**Co-Chairs: L. Haverhals and W. M. Reichert**

- **3688** Ionic Liquids Technology for Aluminum Deposition – T. Naguy, E. Berman (AFRL), N. Voevodin (AFRL/UDRI), P. Brezovec, and M. Miller (CTC)
- **3689** Electrode Reactions of Platinum Bromide Complexes in an Amide-Type Ionic Liquid – T. Endo, Y. Katayama, and T. Miura (Keio University)
- **3690** Electronic State Analyses of Redox-Active Molecule Tethered at Ionic Liquid / Electrode Interface by Photoelectron Spectroscopy – Y. Kanai, Y. Mino, A. Imanishi, Y. Yokota, and K. Fukui (Osaka University)
- **3691** Electrochemical Deposition of Cobalt onto the Surface of Copper Using a Choline Chloride-Based Ionic Liquid – B. Damiano, A. I. Wixtrom, and T. M. Abdel-Fattah (Christopher Newport University)
- **3692** Electrochemical Polishing Applications and EIS of a Novel Choline Chloride-based Ionic Liquid – A. I. Wixtrom, J. Buhler (Christopher Newport University), C. E. Reece (Thomas Jefferson National Accelerator Facility), and T. M. Abdel-Fattah (Christopher Newport University)
- **3693** Investigation of Oxidation State of the Electrodeposited Neodymium Metal Related with the Water Contents of Phosphonium Ionic Liquids – H. Kondo, M. Matsumiya (Yokohama National University), K. Tsunashima (Wakayama National College of Technology), and S. Kodama (Nippon Chemical Industrial Co. Ltd.)
- **3694** Electrochemical Formation of Tb-Ni Alloys in a Molten LiCl-KCl-TbCl<sub>3</sub> System – H. Konishi, K. Mizuma, H. Ono, E. Takeuchi (Osaka University), T. Nohira (Kyoto University), and T. Oishi (National Institute of Advanced Industrial Science and Technology)
- **3695** Application of Electrochemical Transient Techniques for Studying Niobium Speciation in Chloride Melts – G. Fofanov, I. B. Polovov, M. Chernyshov, V. A. Volkovich, O. Rebrin (Ural Federal University), and T. Griffiths (Redston Trevor Consulting, Ltd.)

- **3696** Complex Formation and Micropassivation at Electrodeposition of Niobium Coatings in Alkali Chloride-Fluoride Melts With Different Cationic Composition – E. Marenkova (Institute of Chemistry, Kola Science Centre RAS) and S. Kuznetsov (KSC RAS)
- **3697** Influence of the Second Coordination Sphere on the Diffusion Coefficients of Niobium Fluoride Complexes in Chloride and Fluoride Melts – A. Popova, V. Kremenetsky (Institute of Chemistry, Kola Science Centre RAS), and S. Kuznetsov (KSC RAS)
- **3698** Electrochemical Behavior and Electrorefining of Vanadium in Melts Containing Titanium Salts – O. Kazakova (Institute of Chemistry, Kola Science Centre RAS) and S. Kuznetsov (KSC RAS)
- **3699** Activity Coefficients and Solubility of Lanthanum and Praseodymium in Gallium-Indium Eutectic Alloy – A. Dedyukhin, V. Ivanov, S. Mel'chakov, A. Shchetinskii, V. A. Volkovich, L. Yamshchikov (Ural Federal University), A. Osipenko (State Scientific Centre Research Institute of Atomic Reactors), S. Raspopin (Ural Federal University), and M. Kormilitsyn (State Scientific Centre Research Institute of Atomic Reactors)
- **3700** Uranium Activity and Solubility in Liquid Ga-In Eutectic Alloy: An Electrochemistry Study – V. A. Volkovich, D. Maltsev, L. Yamshchikov (Ural Federal University), A. Osipenko (State Scientific Centre Research Institute of Atomic Reactors), S. Raspopin (Ural Federal University), and M. Kormilitsyn (State Scientific Centre Research Institute of Atomic Reactors)
- **3701** Precipitation of Rare Earth Phosphates in NaCl-2CsCl Eutectic Based Melts – V. A. Volkovich, A. Ivanov, S. Yakimov, I. B. Polovov, B. Vasin (Ural Federal University), T. Griffiths (Redston Trevor Consulting, Ltd.), A. Chukin, and A. Shtolts (Ural Federal University)
- **3702** Development of Recycling Process for Rare Earth Magnets by Electrodeposition Using Ionic Liquids Media – M. Ishii, M. Matsumiya (Yokohama National University), and S. Kawakami (Dowa Eco-System Co. Ltd.)
- **3703** Electrochemical Behavior and Solvation Analysis of Rare Earth Complexes in Ionic Liquids Media Investigated by SECM and Raman Spectroscopy – N. Tsuda, M. Matsumiya (Yokohama National University), K. Tsunashima (Wakayama National College of Technology), and S. Kodama (Nippon Chemical Industrial Co. Ltd.)
- **3704** Investigation on the Hydration State of Ionic Liquids toward the Application as a Protein Solvent – Y. Nikawa, K. Fujita, and H. Ohno (Tokyo University of Agriculture and Technology)
- **3705** Dissolution and Stabilization of Proteins in a Hydrophobic Ionic Liquid with Hydrated Zwitterions – Y. Ito, Y. Kohno, and H. Ohno (Tokyo University of Agriculture and Technology)

- **3706** Effect of Carboxylate Anions on Polarity and Water Miscibility of Hydrophobic Ionic Liquids Toward the Matrix for Cellulose Hydrolysis – T. Nakano, Y. Fukaya, and H. Ohno (Tokyo University of Agriculture and Technology)
- **3707** Evaluation of Glucose Oxidase Activity in Ionic Liquids in the Presence of Small Amount of Water – K. Nagata, M. Abe, Y. Fukaya, and H. Ohno (Tokyo University of Agriculture and Technology)
- **3708** HPLC Analysis of Cellulose Dissolved in Ionic Liquids – K. Kuroda, Y. Fukaya, and H. Ohno (Tokyo University of Agriculture and Technology)
- **3709** Ionic Liquid Facilitated Introduction of Functional Materials into Biopolymer Polymer Substrates – L. M. Haverhals, E. E. Christman (United States Naval Academy), M. P. Foley (U.S. Naval Academy), E. K. Brown (United States Naval Academy), H. De Long (AFRL/AFOSR), and P. Trulove (US Naval Academy)
- **3710** Direct Dissolution of Wet and Saliferous Microalgae with Ionic Liquids and Isolation of Poly(3-Hydroxybutyrate) – D. Kobayashi, K. Fujita, N. Nakamura, and H. Ohno (Tokyo University of Agriculture and Technology)
- **3711** Preparation of Ionic Liquids Composed of Benzoic Acid Derivatives and Their Phase Behavior with Water – T. Ando, Y. Kohno, and H. Ohno (Tokyo University of Agriculture and Technology)
- **3712** High Temperature Stability of Carbon-Carbonate Mixture in Solid Oxide Electrolyte DCFC – B. Chu, K. Kang, K. Kang (Korea Institute of Industrial Technology), and J. Hwang (KITECH)
- **3713** Task-Specific Room Temperature Ionic Liquids (RT-ILs) for Biological Liquid/Liquid Extraction – A. J. McIntosh, S. A. Goodchild (Dstl Porton Down), and T. Welton (Imperial College, London)

- 09:00 **3787** Influence of Peroxodisulfate Electro-Generation on the Electrochemical Oxidation of Formic Acid on Boron Doped Diamond Electrodes – Y. Honda, S. Fierro (Keio University), C. Comminellis (Swiss Federal Institute of Technology (EPFL)), and Y. Einaga (Keio University)
- 09:20 **3788** Effect of pH on Electrooxidation of Formic Acid/Formate on Platinum – J. Joo, T. Uchida (Hokkaido University), A. Cuesta (Instituto de Quimica Fisica “Rocasolano” CSIC), M. T. Koper (Leiden University), and M. Osawa (Hokkaido University)
- 09:40 Intermission (20 Minutes)
- 10:00 **3789** Investigation on MEA-performances of Highly Durable Silica-coated Pd/C Electrocatalysts – Y. Sato (JX Nippon Oil & Energy Corp), K. Fujii (JX Nippon Oil & Energy Corporation), M. Ito (JX Nippon Oil & Energy Corp), S. Takenaka, and M. Kishida (Kyushu University)
- 10:20 **3790** Durable Oxide-Based Catalysts for Application as Cathode Materials in Polymer Electrolyte Membrane Fuel Cells (PEFCs) – E. Fabbri, A. Rabis, A. Foelske-Schmitz (Paul Scherrer Institute), D. Kramer (University of Southampton), R. Kötz, and T. J. Schmidt (Paul Scherrer Institute)
- 10:40 **3791** NO Conversion in Porous Cell Stacks – R. M. Werchmeister, K. B. Andersen, and K. Kammer Hansen (Technical University of Denmark)
- 11:00 **3792** Photoelectrochemistry Applied to Organic Dye Oxidation and Concomitant Hydrogen Generation – M. B. Zaroni (Chemistry Institute) and T. Guaraldo (UNESP)
- 11:20 **3793** Preparation of Photocatalytic TiO<sub>2</sub>/WO<sub>3</sub> Hollow Fiber Using Polysulfone as Template – K. I. Liu, P. Chen, Y. Hsueh, H. Chen, and T. Perng (National Tsing Hua University)
- 11:40 **3794** Composite Thin Film Ir<sub>1-x</sub>Nb<sub>x</sub>O<sub>2</sub> Electrocatalysts for the Oxygen Evolution Electrode – A. Zlotorowicz, F. Seland, and S. Sunde (Norwegian University of Science and Technology)

## 14 Electrocatalysis 6

Physical and Analytical Electrochemistry / Energy Technology / Industrial Electrochemistry and Electrochemical Engineering  
315, Level 3, Hawaii Convention Center

### Electrocatalysis VI – General Session – 08:00 – 12:00

Co-Chairs: N. Hoshi and V. Ramani

- 08:00 **3784** Electrocatalytic Oxidation of Phenol within the Interlayer Space of Surfactant/MnO<sub>2</sub> Multilayer Films – M. Nakayama, S. Mito, M. Shamoto, and K. Tomono (Yamaguchi University)
- 08:20 **3785** Electrochemical Studies of Ternary And Quaternary Pt Based Catalysts for Glycerol Oxidation – C. Caliman and J. Ribeiro (Universidade Federal do Espirito Santo)
- 08:40 **3786** Highly Active Pd-based Metallic Glass Nanowires for Alcohol Oxidation in Alkaline Media – R. C. Sekol, M. Carmo, G. Kumar, F. Gittleson (Yale University), K. Sun (University of Michigan), J. Schroers, and A. D. Taylor (Yale University)

### Electrocatalysis VI – General Session – 14:00 – 17:20

Co-Chairs: G. Brisard and P. K Shen

- 14:00 **3795** A Comparative Study of Nickel and Cobalt based Nanoparticles as Electrocatalyst for Alkaline Water Electrolysis – A. Patru, F. Favier (Institut Charles Gerhardt Montpellier), and N. Jerez (Bulane SAS)
- 14:20 **3796** Chemical Amplitude: A Quantitative Descriptor for the Surface Reactivity of Metals – L. Zhuang, B. Huang, L. Xiao, and J. Lu (Wuhan University)
- 14:40 **3797** Nanostructured and Hybrid Carbon Films for Electrocatalytic Reaction with Biomolecules – O. Niwa, T. Kamata, D. Kato (National Institute of Advanced Industrial Science and Technology), A. Ueda (Tokyo Institute of Technology), K. Yoshioka (National Institute of Advanced Industrial Science and Technology), S. Umemura (Chiba Institute of Technology), and S. Hirono (National Institute of Advanced Industrial Science and Technology, MES Afty)

- 15:00 **3798** Electrochemical Characterization of Cup-Stacked Carbon Nanofiber-Modified Electrodes and its Application to Biosensing – K. Komori, S. Ko, S. Komatsu, T. Tatsuma, A. Sakoda, and Y. Sakai (University of Tokyo)
- 15:20 Intermission (20 Minutes)
- 15:40 **3799** Large-Scale Self-Assembly of the Nitrogen-Doped Graphene with High Electrocatalytic Activity for Oxygen Reduction – C. He and P. Shen (Sun Yat-Sen University)
- 16:00 **3800** Plasmonic Application of Pt-Group Metal Nanostructures – K. Ikeda, S. Uchiyama, and K. Murakoshi (Hokkaido University)
- 16:20 **3801** Pit Falls in the Use of Point Electrodes – K. Kammer Hansen (Technical University of Denmark)
- 16:40 **3802** Recent Development on Electroanalytical Application of Boron-Doped Diamond Electrodes – Y. Einaga (Keio University)
- 17:00 **3803** Redox Properties and Catalytic Activity for Oxygen Reduction Reaction of Electropolymerized Aromatic Diamines – S. Kishioka (Gunma University)

- 10:20 **3810** Ultra-long Hollow Chalcogen and Chalcogenide Nanofibers by Galvanic Displacement Reaction – H. Park, M. Zhang (University of California, Riverside), C. Chang, H. Jung (University of California-Riverside), J. Lim (Korea Institute of Materials Science), Y. Choa (Hanyang University), and N. Myung (University of California – Riverside)
- 10:40 **3811** Pulsed Electrodeposition of Bi<sub>2</sub>Te<sub>3</sub>/Sb<sub>2</sub>Te<sub>3</sub> Superlattices in Flow Cells vs. Single Baths – D. Banga, J. Sugar, D. Medlin, V. Stavila, D. B. Robinson, and P. Sharma (Sandia National Laboratories)
- 11:00 **3812** Bismuth Thin Films: Growth, Structure and Properties – M. Saini, S. Zheng (York University), S. Huang (The John Hopkins University), W. Wang (The John Hopkins University), C. Chien (The John Hopkins University), and S. Morin (York University)
- 11:20 **3813** Electrochemical Routes to the Reduction of Resistance in Single-Walled Carbon Nanotube Networks – D. Asheghali, N. Bhatt, P. Vichchulada, and M. D. Lay (University of Georgia)

## 15 Electrochemical Atomic Layer Epitaxy and Quantum Confinement

Physical and Analytical Electrochemistry / Electrodeposition  
318B, Level 3, Hawaii Convention Center

### Semiconductor Deposition I – 08:00 – 09:40

Co-Chairs: John Stickney and Stephen Maldonado

- 08:00 **3804** Electrochemical Liquid-Liquid Solid Deposition of Crystalline Semiconductor Materials – J. Gu, E. Fahrenkrug, S. Collins, and S. Maldonado (University of Michigan)
- 08:20 **3805** Kesterite Group Materials Thin Films by Electrodeposition for Photovoltaic Applications – M. Innocenti, I. Bencistà, F. Di Benedetto, S. Cinotti, A. De Luca, S. Bellandi (University of Florence), A. Lavacchi (ICCOM\_CNR), M. Muniz Miranda (University of Florence), F. Vizza (ICCOM\_CNR), and M. Foresti (University of Florence)
- 08:40 **3806** New Route for Low Cost Fabrication of Semiconducting Materials for Photovoltaic Applications – R. Salazar, S. Sanchez, D. Rouchon (CEA-Leti), C. Levy-Clement (CNRS), and V. Ivanova (CEA-Leti)
- 09:00 **3807** Electrochemical Atomic Layer Deposition of PV Materials – B. Perdue, V. Stickney, J. Stickney (The University of Georgia), and D. Banga (Sandia National Laboratories)
- 09:20 **3808** Characterization of Electrochemical ALD Processes on Bipolar Electrodes Using Confocal Raman Microscopy – S. Ndzesse and C. Shannon (Auburn University)

### Semiconductor Deposition II – 10:00 – 11:40

Co-Chairs: John Stickney and Erik Menke

- 10:00 **3809** Cadmium Telluride Nanowire Electrodeposition for Advanced Photovoltaics – E. Menke, L. Reed, and J. Hujdic (University of California)

### Surface Limited Redox Replacement – 14:00 – 18:00

Co-Chairs: Nikolay Dimitrov and Natasa Vasiljevic

- 14:00 **3814** Thermodynamics and Kinetics Aspects of Metal Deposition via Surface Limited Redox Replacement Reaction – S. Brankovic (University of Houston)
- 14:20 **3815** Deposition of Ultra Thin Pt Films via Surface Limited Redox Replacement of UPD Layers on Au – N. Vasiljevic, J. Nutariya (University of Bristol), M. Fayette (SUNY at Binghamton), B. Rawlings (University of Bristol), and N. Dimitrov (SUNY at Binghamton)
- 14:40 **3816** The Electrochemical Atomic Layer Deposition of Pt and Pd Nanoparticles on Ni Foam for the Electro-Oxidation of Alcohols – R. M. Modibedi, E. Louw (CSIR), K. I. Ozoemena, and M. K. Mathe (Council for Scientific and Industrial Research)
- 15:00 **3817** Electrodeposition of Metals in Catalysts Syntheses: Platinum Monolayer Electrocatalysts for the Oxygen Reduction Reaction – M. Vukmirovic, S. Bliznakov, K. Sasaki, J. Wang, and R. R. Adzic (Brookhaven National Laboratory)
- 15:20 **3818** Highly-Active Pt Coated NPG Catalyst for HCOOH Oxidation: Synthesis, SLRR Coating, Activity and Durability – N. Dimitrov (SUNY at Binghamton), M. Kamundi, L. Bromberg, D. McCurry (Chemistry, SUNY Binghamton), M. Fayette (SUNY at Binghamton), and E. Fey (Chemistry, SUNY Binghamton)
- 15:40 **3819** Epitaxial Ag(111) Overlayers on Noble Metals – K. Soliman and L. A. Kibler (University of Ulm)
- 16:00 **3820** Electrodeposition of Pt Thin Films by Pulsed Potential – Y. Liu, D. Gokcen, U. Bertocci, and T. Moffat (National Institute of Standards and Technology)



- 16:20 **3821** NEAR-Surface Equilibrium Phases in Electrochemically Fabricated Low-dimensional Multi-Component Catalysts – F. M. Alamgir, R. Rettew, and A. Vitale (Georgia Institute of Technology)
- 16:40 **3822** Self-Limiting Electroless Deposition of Nanoscale Ruthenium Oxide: Catalyst, Electron/Proton Conductor, Broadband Transparent Oxide – D. R. Rolison, C. N. Chervin, J. W. Long, M. Osofsky, J. Melinger, J. Owrusky, F. Rachford, J. Pietron, and M. Pomfret (U.S. Naval Research Laboratory)
- 17:00 **3823** *In Situ* Stress Measurement During Pt Deposition Using Surface Limited Redox Replacement – G. Stafford, M. C. Lafouresse (NIST), Y. Liu (National Institute of Standards and Technology), J. Shin, and U. Bertocci (NIST)
- 17:20 **3824** First Principles Studies of Trends in Metal Electrodeposition and Reactivity – J. Greeley (Argonne National Laboratory)
- 17:40 **3825** Reduction of Nitrate Mediated By Metal UPD on Pd-Modified Au Electrodes In Aqueous Electrolytes – A. J. Jebaraj and D. J. Scherson (Case Western Reserve University)
- 09:20 **3891** Redox-Active Alkali Insertion Materials as Inner Contact Layer in All-Solid-State Ion-Selective Electrodes – S. Komaba, C. Suzuki, N. Yabuuchi, S. Kanazawa, T. Hasegawa, and T. Akatsuka (Tokyo University of Science)
- 09:40 **3892** Sensing Characteristics of a Fiber Bragg Grating Hydrogen Gas Sensor using Sol-Gel Derived Pt/WO<sub>3</sub> Film – S. Okazaki (Yokohama National University), Y. Maru, and T. Mizutani (Japan Aerospace Exploration Agency)
- 10:00 **3893** Zirconia-based Electrochemical Oxygen Sensor for Accurately Determining Water Vapor Concentration – R. E. Soltis (Ford Motor Company)
- 10:20 **3894** Fabrication of Surface Enhanced Raman Scattering (SERS)-active substrates by using Dip-Pen Nanolithography – K. Chao and K. K. Ou (Taipei Medical University)
- 10:40 **3895** Application of Commercial Manufacturing Methods to Mixed-Potential NO<sub>x</sub> Sensors – C. R. Kreller (Los Alamos National Laboratory), P. Sekhar (Washington State University Vancouver), W. Li, P. Palanisamy (ESL ElectroScience), E. L. Brosha, R. Mukundan, and F. H. Garzon (Los Alamos National Laboratory)
- 11:00 **3896** Research on Filter Materials for LP Gas Sensors – M. Sai, K. Shinnishi, K. Kaneyasu (Figaro Engineering Inc.), T. Suzuki, and M. Takeuchi (Osaka Prefecture University)

*Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center*

**15 – Poster Session – 18:00 – 20:00**

**Co-Chairs: Nikolay Dimitrov and John Stickney**

- **3826** Preparation of Size-quantized Lead Sulfide Thin Layer on Silver Nanocubes via Electrochemical Atomic Layer Deposition – M. Nakano, K. Okazaki, and T. Torimoto (Nagoya University)

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

Sensor

*319B, Level 3, Hawaii Convention Center*

**J1-5 – Gas and Liquid Phase Chemical Sensors – 08:00 – 11:20**

**Co-Chairs: M. Sailor and S. Uchiyama**

- 08:00 **3887** CO Sensing Properties of Electrochemical Gas Sensors using an Anion-Conducting Polymer as an Electrolyte – T. Goto, T. Hyodo (Nagasaki University), K. Kaneyasu (Figaro Engineering Inc.), H. Yanagi (Tokuyama Corp.), and Y. Shimizu (Nagasaki University)
- 08:20 **3888** Investigation of ZnO-Nanowire-Based Extended-Gate Field-Effect-Transistor pH Sensors – C. Li, S. Chang, T. Yang, and S. Chang (National Cheng Kung University)
- 08:40 **3889** NO<sub>2</sub> Sensing Properties of Porous In<sub>2</sub>O<sub>3</sub>-based Powders Prepared by Utilizing Ultrasonic-Spray Pyrolysis Employing PMMA Microsphere Templates: Effects of the Size of the PMMA Microspheres on Their Gas-Sensing Properties – E. Fujii, T. Hyodo, K. Matsuo, and Y. Shimizu (Nagasaki University)
- 09:00 **3890** Biosensors for Health Monitoring – S. Anastasova and P. Vadgama (Queen Mary University of London)
- 08:00 **3926** Optoelectronic and Persistent Luminescence Properties in Ce<sup>3+</sup>-Doped Garnet Ceramics – J. Ueda, K. Aishima, and S. Tanabe (Graduate School of Human and Environmental Studies, Kyoto University)
- 08:40 **3927** Ce<sup>3+</sup>-Tb<sup>3+</sup> Energy Transfer in Aluminate Garnets – A. Setlur and J. Shiang (GE Global Research)
- 09:00 **3928** Systematic Studies of Structural and Optical Properties of Pure and Doped Pyrochlore Crystals – A. Srivastava (GE Global Research) and M. G. Brik (University of Tartu)
- 09:20 **3929** Experimental and Crystal Field Studies of Spectroscopic Properties of Mn<sup>2+</sup> Ions in Fluoride Crystals in UV-VUV – M. G. Brik, M. Kirm (University of Tartu), M. True (Carl Zeiss EyeTec GmbH), and G. Zimmerer (HASYLAB at DESY)
- 09:40 **3930** Improvement of Luminescence Properties of K<sub>2</sub>SrPO<sub>4</sub>:Eu by a Polymerizable Complex Method Employing a Water Soluble Phosphorus Oligomer – M. Kim, M. Kobayashi, H. Kato, and M. Kakihana (Tohoku University)
- 10:00 Intermision (20 Minutes)

**J2 Luminescence and Display Materials: Fundamentals and Applications**

Luminescence and Display Materials

*323A, Level 3, Hawaii Convention Center*

**Luminescence from Inorganic Materials – 08:00 – 12:00**

**Co-Chairs: Charles Hunt and David Lockwood**

- 10:20 **3931** Relationship between Emission Properties and Host Structure for Eu<sup>2+</sup>-doped Phosphate Investigated by Quantitative Structure Relationship and First Principles Calculation – H. Takaba (Tohoku University), R. Miura, A. Suzuki, N. Hatakeyama, and A. Miyamoto (Tohoku University)
- 10:40 **3932** Transparent Inorganic Downconverters for Luminescent Solar Concentrators – L. Shea-Rohwer, J. Martin, and M. Nyman (Sandia National Laboratories)
- 11:00 **3933** Spectroscopy of Pr-doped CaTiO<sub>3</sub> Nano-particles under Excitation into the Charge Transfer State – J. Collins, Y. Tsehay (Wheaton College), P. Boutinaud, G. Chadeyron, and R. Boosin (Clermont Université)
- 11:20 **3934** Development of YVO<sub>4</sub>:Bi<sup>3+</sup>,Eu<sup>3+</sup> Nanophosphor and Its Application as a Spectral Down-Shifters for Solar Cells – S. Takeshita and T. Isobe (Keio University)
- 11:40 **3935** Liquid Phase Synthesis and Characterization of LaPO<sub>4</sub>:Yb<sup>3+</sup>/GdPO<sub>4</sub> Nanoparticles with NIR Emission under NIR Excitation – T. Isobe, T. Shimizu, K. Hara, and S. Takeshita (Keio University)

*Luminescent Semiconductor Materials – 14:00 – 17:00*

**Co-Chairs: Lauren Shea-Rohwer and Anant Setlur**

- 14:00 **3936** Photoluminescence of single InAsP quantum dots in InP nanowires – P. Poole, D. Dalacu, J. Lapointe, and K. Mnaymneh (National Research Council Canada)
- 14:40 **3937** Fast Luminescence in Silicon-Germanium Nanostructures – D. J. Lockwood, X. Wu, J. Baribeau (National Research Council), N. Modi, and L. Tsybeskov (New Jersey Institute of Technology)
- 15:00 Intermission (20 Minutes)
- 15:20 **3938** XANES and XEOL Studies of Luminescent Silicon Carbonitride (SiCN) Thin Films – Z. Khatami, P. Wilson, J. Wojcik, and P. Mascher (McMaster University)
- 15:40 **3939** Design Rule of Ti/Al Ohmic contacts on N-face n-GaN : Solution for Thermal Degradation – B. Kim, Y. Song (Pohang University of Science and Technology), J. Son (University of California at Berkeley), C. Yoo, and J. Lee (Pohang University of Science and Technology)
- 16:00 **3940** Colloidal Synthesis of (CuAg)<sub>x</sub>In<sub>2x</sub>Zn<sub>2(1-2x)</sub>S<sub>2</sub> Solid Solution Nanocrystals with Tunable Band Gap – M. Dai, K. Okazaki (Nagoya University), A. Kudo (Tokyo University of Science), S. Kuwabata (Osaka University), and T. Torimoto (Nagoya University)
- 16:20 **3941** Core/Shell structured Nanoparticles and Hybrid Electrode Materials for Electrically Tunable Photonic Crystal Display – H. Shim, M. Han (Samsung Advanced Institute of Technology), J. Lim (Seoul National University), C. Heo, H. Jin, C. Shin, S. Jeon, J. Kim (Samsung Advanced Institute of Technology), J. Lee (Seoul National University), and S. Lee (Samsung Advanced Institute of Technology)

- 16:40 **3942** Enhanced Electrochemiluminescence Light-Emitting Device Driven by Application of AC Voltage and Its Emission Mechanism – T. Nobeshima, K. Nakamura, and N. Kobayashi (Chiba University)



**Microfabricated and Nanofabricated Systems for MEMS/NEMS 10**

Sensor / Dielectric Science and Technology / Electronics and Photonics / Physical and Analytical Electrochemistry  
311, Level 3, Hawaii Convention Center

**Micro/Nanofabrication – 08:00 – 12:00**  
**Co-Chairs: Peter Hesketh and Gary Hunter**

- 08:00 Introductory Remarks (5 Minutes)
- 08:05 **3985** Micro-systems and Nanotechnologies in ELISA and Droplet Generation Applications – C. Yeh and Y. Lin (National Cheng Kung University)
- 08:50 **3986** A Novel Microdevice for the Treatment of Hydrocephalus – J. Oh (Harvard University), F. Kralick, and H. Noh (Drexel University)
- 09:25 **3987** Wafer Scale Processing of Plasmonic Nanopore Arrays in 200mm CMOS Fab Environment – K. Malachowski, R. Verbeeck, T. Dupont, C. Chen, S. Musa, Y. Li, T. Stakenborg, D. Sabuncuoglu, and P. Van Dorpe (IMEC Belgium)
- 09:45 Intermission (15 Minutes)
- 10:00 **3988** Tunable Young's Modulus in Carbon MEMS using Graphene-based Stiffeners – C. M. Washburn (Sandia National Laboratories), T. Lambert, J. Blecke, D. Davis, P. Finnegan, B. Hance, and J. Strong (Sandia National Labs)
- 10:20 **3989** Residue-Free Dry Etching of Polymer Sacrificial Layer for Microelectromechanical-System Device Fabrication – K. Takagahara, K. Ono, K. Kuwabara, T. Sakata (NTT Microsystem Integration Laboratories), H. Ishii (Toyohashi University of Technology), Y. Sato, and Y. Jin (NTT Microsystem Integration Laboratories)
- 10:40 **3990** Low Cost UV Laser Direct Write Photolithography System for Rapid Prototyping of Microsystems – J. Waynelovich, A. Sepehri (Black Box Inc), B. Mehta (Black Box Inc.), S. Kassegne (MEMS Lab, San Diego State University), and A. Khosla (Simon Fraser University)
- 11:00 **3991** The Carbonized SU-8 Electrospun Nano-Fiber for an Electrode in the Energy Storage Device – H. Kim, J. Woo, Y. Joo, Y. Chun, and C. Kim (Chung-Ang University)
- 11:20 **3992** Hydrodynamic Cell Enrichment in Double Spiral Microfluidic Channels – J. SUN, M. Li (National Center for Nanoscience and Technology), C. Liu (Institute of Mechanics, Chinese Academy of Sciences), G. Hu (Institute of Mechanics, CAS), and X. Jiang (National Center for Nanoscience and Technology)
- 11:40 **3993** Nanostructured Columnar Thin Films for Biological and Chemical Sensing Applications – P. Shah (University of Dayton), H. Knachel, A. Sarangan, and K. Hansen (University of Dayton)

**Cantilevers and Microdevices – 13:30 – 18:00**  
**Co-Chairs: Yu Cheng Lin and Hongseok Noh**

- 13:30 **3994** Thermal Conductivity Engineering via Nano Patterning – B. Kim, I. El-Kady, and R. Olsson (Sandia National Laboratories)
- 14:00 **3995** Photothermal Cantilever Deflection Spectroscopy – T. Thundat, M. Bagheri, S. Kim, D. Lee (University of Alberta), and S. Jeon (POSTECH, S. Korea)
- 14:20 **3996** Development of Insulated Conductive AFM Probes for Molecular Electronics – Y. Wu, T. Akiyama (The Sensors Actuators and Microsystems Laboratory (SAMPLAB), Ecole Polytechnique Fédérale de Lausanne (EPFL)), P. D. Van der Wal (EPFL), S. Gautsch (The Sensors Actuators and Microsystems Laboratory (SAMPLAB), Ecole Polytechnique Fédérale de Lausanne (EPFL)), and N. De Rooij (EPFL Lausanne)
- 14:40 **3997** All Thin Film Micromachined Cantilever Using PZT/Terfenol-D Multilayer for High Sensitive Magnetoelectric Sensors – D. Lee (Kwangwoon University), S. Kim, Y. Yoo (Korea Institute of Science and Technology), J. Han (Chungnam National University), W. Jo (Cantis Co), and J. Lee (Kwangwoon University)
- 15:00 **3998** Characterization and Response of Metal Organic Frameworks Based Microcantilever Sensors for the Detection of Volatile Organic Compounds – I. Ellern (Georgia Institute of Technology)
- 15:20 **3999** Manipulation of Micro Condensed Matter by Direct Peeling Method by using Atomic Force Microscope Tip – A. Kawai (Nagaoka University of Technology)
- 15:40 Intermission (20 Minutes)
- 16:00 **4000** A MEMS-based Platform for Multi-physics Characterization of Ultra-thin Freestanding Films – A. Haque (Penn State University)
- 16:20 **4001** Effects of Adsorbate Surface Diffusion in Focused Electron-Beam-Induced-Deposition – A. Szkudlarek, M. Gabureac, and I. Utke (Empa Swiss Federal Laboratories for Materials Science and Technology)
- 16:40 **4002** Electroplating of Microstructured Nickel Phase Gratings for X-Ray Phase Contrast Tomography – M. Amberger, K. Bade, J. Meiser, D. Kunka, and J. Mohr (Karlsruhe Institute of Technology (KIT))
- 17:00 **4003** The Defect and Transport Properties of TlBr – S. R. Bishop (Kyushu University), G. Ciampi (Radiation Monitoring Devices), M. Kuhn, H. L. Tuller (Massachusetts Institute of Technology), W. Higgins, and K. Shah (Radiation Monitoring Devices)
- 17:20 **4004** Microfabricated Systems to Measure Marine Variables – S. Aravamudhan (North Carolina A&T State University)
- 17:40 **4005** Nanoporous Alumina as a Platform for 3-D Ceramic Microdevices – D. Routkevitch (InRedox LLC)

*Kamehameha Exhibit Hall 3, Level 1, Hawaii Convention Center*

**J4 – MEMS/NEMS Poster Session – 18:00 – 20:00**  
**Co-Chairs: Peter Hesketh and Kalpathy Sundaram**

- **4006** Radiophotoluminescence in Ag<sup>+</sup>-Doped Phosphate Glass Dosimeter – T. Ohno, Y. Miyamoto (Kanazawa Institute of Technology), T. Kurobori (Kanazawa University), Y. Takei, K. Hirasawa (Kanazawa Institute of Technology), T. Yamamoto (Chiyoda Technol Co. Ltd.), and H. Nanto (Kanazawa Institute of Technology)
- **4007** Characterization and Process Optimization of UV Patternable Electrically Conducting SU-8 Silver Nanocomposite Polymer – A. Khatri, S. Kassegne (MEMS Lab, San Diego State University), and A. Khosla (Simon Fraser University)
- **4008** Effects of Added Uranium on the Triboluminescent Properties of EuD<sub>4</sub>TEA – R. Fontenot (Alabama A&M University), W. Hollerman (University of Louisiana at Lafayette), K. Bhat, and M. Aggarwal (Alabama A&M University)
- **4009** Micropatternable, Electrically Conducting Polyaniline Photoresist Blends for MEMS Applications – C. Patel, S. Kassegne (MEMS Lab, San Diego State University), and A. Khosla (Simon Fraser University)
- **4010** Micro-Structures for Electrophoretic Display: Case Studies of the Response Speed/Time and Contrast Ratio Depending on Micro-Structures – J. Kim, C. Kim, and K. Suh (Electronics and Telecommunications Research Institute)