

Friday, October 12

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



Lithium-Ion Batteries

Battery / Energy Technology

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

Lithium-Ion Batteries: Operational Methodologies – 08:00 – 09:40 Co-Chairs: John Wang and David Wetz

- 08:00 **1055** Cycling Fatigue Induced on Electrochemical Energy Storage Cells as a Result of High C Pulsed Charging – P. M. Novak, D. A. Wetz, and B. Shrestha (The University of Texas at Arlington)
- 08:20 **1056** The Impact of High Pulsed Loading on the Fatigue of Electrochemical Energy Storage Devices – B. Shrestha, D. A. Wetz, and P. M. Novak (The University of Texas at Arlington)
- 08:40 **1057** Heating Strategies for Li-Ion Batteries Operated from Subzero Temperatures – Y. Ji and C. Wang (The Pennsylvania State University)
- 09:00 **1058** Thermal Management for Startup of Li-Ion Batteries – C. Shaffer and C. Wang (EC Power)
- 09:20 **1059** Rechargeable Lithium-ion Batteries For Wireless Smart Designs & Extreme Conditions – F. Fusalba, H. Rouault (CEA), L. Daniel (CEA-LITEN), M. Chami, D. Mourzagh, and G. Moreau (CEA)

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Lithium-Ion Batteries: Anodes V (General) – 08:00 – 09:40 Co-Chairs: Tetsuya Kajita and Gleb Yushin

- 08:00 **1060** Negative Electrode Properties of Carbon-Coated Si Leaf Powder for Lithium-Ion Batteries – M. Saito, T. Okubo, T. Yamada, C. Yodoya (Doshisha University), A. Kamei, M. Hirota, T. Takenaka (Oike & Co., Ltd.), A. Tasaka, and M. Inaba (Doshisha University)
- 08:20 **1061** Temperature Dependence of Cycle Performance at Various Cut-Off Voltages of Li-Ion Batteries Using SiO Anode – T. Kajita, J. Iriyama, H. Takahashi, R. Kasahara, T. Numata, S. Serizawa, and K. Utsugi (NEC corporation)
- 08:40 **1062** Anodic Compatibility of LiTfDI Based Electrolytes with MPCVD Manufactured Si/C Nanostructured Electrodes – P. Wiczorek (Warsaw University of Technology), A. Bitner (ALISTORE-European Research Institute), L. Niedzicki (Warsaw University of Technology), A. Plewa-Marczewska (ALISTORE-European Research Institute), E. Zero-Sasim, G. Zukowska, M. Kasprzyk (Warsaw University of Technology), F. Lindgren, K. Edström (Uppsala University), W. Wiczorek, and M. L. Marcinek (Warsaw University of Technology)

- 11:00 **3948** Thermo-switchable Emission and Coloration of Composite Material Containing Luminescent Europium(III) Complex and Fluoran Dye – K. Nakamura (Chiba University), Y. Kobayashi (Graduate School of Advanced Integration Science, Chiba University), K. Kanazawa, and N. Kobayashi (Chiba University)
- 11:20 **3949** Color tunable organic plasmon-emitting diodes – I. Lee, K. Kim, S. Kim, B. Koo, B. Lee, and J. Lee (Pohang University of Science and Technology)
- 11:40 **3950** Electroswitchable Emission of the Luminescent Eu(III) Complex based on Electrochemical Reaction – K. Kanazawa, K. Nakamura, and N. Kobayashi (Chiba University)
- 12:00 Lunch Break (120 Minutes)
- 14:00 **3951** Ultrafine Silver Nanowire Networks as Scattering Core in Organic Light Emitting Diodes – B. Lee, K. Kim, S. Kim, I. Lee, B. Koo, and J. Lee (Pohang University of Science and Technology)
- 14:20 **3952** Enhancing Light Outcoupling of Flexible Organic Light Emitting Diodes by Domain Selective-Etching – I. Lee, K. Kim, S. Kim, B. Koo, B. Lee, and J. Lee (Pohang University of Science and Technology)
- 14:40 **3953** Triboluminescent Properties of EuD₄TEA and ZnS:Mn and Their Use for Smart Sensors – R. Fontenot, K. Bhat (Alabama A&M University), W. A. Hollerman (University of Louisiana at Lafayette), and M. Aggarwal (Alabama A&M University)
- 15:00 **3954** Using Triboluminescence To Detect Ballistic and Hypervelocity Impacts – W. A. Hollerman (University of Louisiana at Lafayette) and R. Fontenot (Alabama A&M University)

- 09:00 **1063** Microstructural Evolution during Battery Charge and Discharge in Si Alloy Anode – J. Cho, J. Moon (MK Electron Co., Ltd.), C. Kang, S. Kim, S. Son (Seoul National University), C. Lee, S. Kang, Y. Kim (Samsung SDI), S. Lee (University of Colorado at Boulder), and K. Oh (Seoul National University)
- 09:20 **1064** Ultra-Strong Silicon-Coated Carbon Nanotube Fabric as Multi-Functional Lithium Ion Battery Anodes – K. Evanoff, J. Benson (Georgia Tech), M. Schauer (Nanocomp), I. Kovalenko (Georgia Institute of Technology), D. Lashmore (Nanocomp), J. Ready (Georgia Tech), and G. Y. Yushin (Georgia Institute of Technology)

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Lithium-Ion Batteries: Modeling – 10:00 – 12:20
Co-Chairs: Venkatasailanathan Ramadesigan and Mattieu Dubarry

- 10:00 **1065** Determination and Evaluation of Charge Distribution in Lithium Battery Electrodes – T. J. Richardson, C. Sirisopanaporn, V. Srinivasan, J. Liu, and V. Zorba (Lawrence Berkeley National Laboratory)
- 10:20 **1066** Multiscale Multiparadigm in Silico Design of New Materials for Li-ion Batteries – W. Goddard III, B. V. Merinov, A. Jaramillo-Botero (California Institute of Technology), H. Kim (Graduate School of EEWS (WCU), KAIST, Republic of Korea), D. Seo (Seoul National University, Republic of Korea), H. Kim, and K. Kang (Seoul National University)
- 10:40 **1067** Computational Framework for Modeling Multi-Physics Phenomenon of Li-Ion Batteries across Various Hierarchies – S. Allu, S. Pannala (Oak Ridge National Laboratory), P. Mukherjee (Texas A&M University), W. Elwasif, and J. Turner (Oak Ridge National Laboratory)
- 11:00 **1068** Evaluation Model for Used Lithium-Ion Battery Life – K. Kaji, K. Tanaka, K. Maeda, H. Akimono, J. Zhang, and H. Horie (The University of Tokyo)
- 11:20 **1069** Parameterizing Li-Ion Cell Models Supported by Microstructure Reconstructions – M. Ender, J. Illig, and E. Ivers-Tiffée (Karlsruhe Institute of Technology (KIT))
- 11:40 **1070** Electrothermal Simulation of Spirally-Wound Lithium Ion Cells – R. Spotnitz, G. Yeduvaka (Battery Design LLC), D. Schad, V. Gudimetta, J. Votteler, G. Damblanc, C. Lueth, E. Oxenham, and S. Hartridge (CD-adapco)
- 12:00 **1071** Ab Initio Study of Li Interaction with Graphene, Multi-Layer Graphene and Graphite Relevant for Li-Ion Electrode Materials – K. A. Persson and E. Lee (Lawrence Berkeley National Laboratory)

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Lithium-Ion Batteries: Anodes II (Tin Based Systems) (Continued) – 10:00 – 12:20
Co-Chairs: Gleb Yushin and Tetsuya Kajita

- 10:00 **1072** Binder Assisted Stabilization of Pure Sn Based Anode for Lithium Ion Batteries – S. Xun, X. Song, J. Chong, V. Battaglia, and G. Liu (Lawrence Berkeley National Laboratory)
- 10:20 **1073** Porous Sn-C Composite Synthesized by Electrochemical Method for the Binder-free Anode of Li-ion Battery – J. Jeun, W. Kim, K. Park, K. Kang, and S. Hong (Seoul National University)
- 10:40 **1074** SnO Microcrystals vs. Nanoparticles as Anode for Lithium Ion Batteries – C. T. Cherian, M. Reddy, C. Sow, and B. Chowdari (National University of Singapore)
- 11:00 **1075** Electrochemical Analysis of Sn Electrodeposition to Optimize Preparation Process of SnOC Anode Material – M. Jeong, H. Nara, T. Yokoshima, T. Momma, and T. Osaka (Waseda University)
- 11:20 **1076** Multi-scaled Sn Dispersed in Ni-Ti Shape Memory Alloy as High Performance Anode for Li-ion Battery – R. Hu, H. Liu, and M. Zhu (South China University of Technology)
- 11:40 **1077** Autogenically-Prepared Spherical Carbon Particles (SCPs) and SCP-Sn Composites as Anodes for Li-Ion Batteries – V. G. Pol, K. C. Lau, L. A. Curtiss, and M. M. Thackeray (Argonne National Laboratory)

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Lithium-Ion Batteries: Modeling – 14:00 – 15:40
Co-Chairs: Matthieu Dubarry and Venkatasailanathan Ramadesigan

- 14:00 **1078** Effect of Particle Morphology on Stress in a Lithium-Ion Battery Using an Integrated Model in 2-D – R. T. Purkayastha and R. M. McMeeking (University of California, Santa Barbara)
- 14:20 **1079** Simulation-Based Prediction of Residual Performance of Lithium-Ion Batteries – K. Maeda, W. Imamura, K. Tanaka, H. Akimoto, and H. Horie (The University of Tokyo)
- 14:40 **1080** Modeling of Fracture Initiation and Propagation in Lithium Ion Battery Electrodes – P. Barai (University of Tennessee Knoxville), S. Simunovic (Oak Ridge National Laboratory), and P. Mukherjee (Texas A&M University)
- 15:00 **1081** Modeling of the Interactions of Uniformly Sized Nanoparticles – B. Orvananos (University of Michigan), H. Yu (University of Michigan), T. Ferguson, M. Bazant (Massachusetts Institute of Technology), and K. Thornton (University of Michigan)
- 15:20 **1082** Dynamic Optimization Using Efficient Reformulated Models for Maximizing Energy Storage and Life of Lithium-Ion Batteries – V. Ramadesigan, P. Northrop (Washington University), R. Braatz (Massachusetts Institute of Technology), and V. Subramanian (Washington University)

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

Lithium-Ion Batteries: Anodes V (General) – 14:00 – 15:40

Co-Chairs: Pradeep Guduru and Corey Love

- 14:00 **1083** Synthesis of Co_3O_4 - SnO_2 Multi-Layered Hollow Sphere and Their High Reversible Capacity for Anode of Li-Ion Battery – W. Kim, Y. Hwa, J. Jeun, H. Sohn, and S. Hong (Seoul National University)
- 14:20 **1084** Development of Li-Ion Rechargeable Battery Using Glassy $\text{SnO-P}_2\text{O}_5$ Anode and Glass-Ceramic LiFePO_4 Cathode and Their Safety Evaluation – A. Yamano, M. Morishita (National Institute of Advanced Industrial Science and Technology (AIST)), H. Yamauchi, T. Nagakane, A. Sakamoto, M. Ohji (Nippon Electric Glass), and T. Sakai (National Institute of Advanced Industrial Science and Technology (AIST))
- 14:40 **1085** Development of Li-Ion Rechargeable Battery Using Glassy $\text{SnO-P}_2\text{O}_5$ Anode and Glass-Ceramic LiFePO_4 Cathode Materials – T. Nagakane, H. Yamauchi, A. Sakamoto, M. Ohji (Nippon Electric Glass), A. Yamano, M. Morishita, and T. Sakai (National Institute of Advanced Industrial Science and Technology (AIST))
- 15:00 **1086** Study of the Factors that Enable Carbon-Free Insulating Li-Ion Battery Electrodes – C. Kim, C. Alexander, N. S. Norberg, R. M. Kostecki, and J. Cabana (Lawrence Berkeley National Laboratory)
- 15:20 **1087** Single-Crystalline Porous Indium Phosphide as Novel Anode Material for Li-Ion Batteries – M. Gerngross, E. Quiroga-González, J. Carstensen, and H. Föll (Christian-Albrechts-University of Kiel)

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

Lithium-Ion Batteries: Life Studies II – 16:00 – 18:00

Co-Chairs: Kevin Gerring and Mark Verbrugge

- 16:00 **1088** A Thermodynamics-based Approach to Predicting Path Dependence of Aging in Electrochemical Cells: Part 2. Large-scale Simulation of Cell Aging Across Multiple US Cities – K. L. Gering (Idaho National Laboratory)
- 16:20 **1089** Cycle-Life Study and Aging Mechanism Diagnosis of NCM Composite/Graphite Cells – J. Wang (HRL Laboratories), P. Liu (HRL Laboratories LLC), J. Hicks-Garner, L. Westman, E. Sherman, S. Soukiasian (HRL Laboratories), M. W. Verbrugge (General Motors Global R&D Center), and H. Tataria (General Motors)
- 16:40 **1090** Characterization of Cycle-Life Aging in Automotive Lithium-Ion Pouch Cells – J. Marcicki, A. Bartlett, M. Canova, A. Conlisk, G. Rizzoni, Y. Guezennec (Ohio State University), X. Yang, and T. Miller (Ford Motor Company)
- 17:00 **1091** A Common Capacity Loss Trend: LiFePO_4 Cell's Cycle and Calendar Aging – Y. Miyaki, K. Hayashi, T. Makino, K. Yoshida, M. Terauchi, T. Endo, and Y. Fukushima (Sony Energy Devices Corporation)

- 17:20 **1092** Capacity Fading of Mechanically Stressed Lithium-Ion Pouch Cells – J. Cannarella and C. B. Arnold (Princeton University)
- 17:40 **1093** Battery Cycle Life Prediction with Coupled Chemical Degradation and Fatigue Mechanics – R. D. Deshpande (Lawrence Berkeley National Laboratory), M. W. Verbrugge (General Motors Global R&D Center), Y. Cheng (University of Kentucky), J. Wang, and P. Liu (HRL Laboratories LLC)

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

Lithium-Ion Batteries: Anodes V (General) – 16:00 – 17:40

Co-Chairs: Corey Love and Pradeep Guduru

- 16:00 **1094** Lithium Storage Properties of Defect-Introduced Graphene Sheets – W. Lee, S. Suzuki, and M. Miyayama (The University of Tokyo)
- 16:20 **1095** Study of Solid Electrolyte Interface (SEI) on Graphite Anodes – J. Benson, J. Lee, N. Nitta, A. Magasinski, I. Kovalenko, T. Joshi, T. Fuller, and G. Yushin (Georgia Institute of Technology)
- 16:40 **1096** Origin of Voltage Hysteresis of the Li-Cu-TiS_2 Displacement Reaction System: A Multi-Scale Simulation Based on Thermodynamics and Kinetics – H. Yu, J. Bhattacharya, C. Ling, A. Van Der Ven, and K. Thornton (University of Michigan)
- 17:00 **1097** The Effect of the Active Material of Lithium battery to the Contact Resistance between Carbon and Aluminum Current Collector – C. Honda, S. Onodera, K. Tachibana, and T. Nishina (Yamagata University)
- 17:20 **1098** Entangled Structures of Germanium Nanowires & Graphite Nanofibers for the Anode of Lithium Ion Batteries – S. Woo, S. Choi (Sungkyunkwan University), J. Park (Samsung Electronics), S. Hwang (Samsung Advanced Institute of Technology), and D. Whang (Sungkyunkwan University)

B9

Polymer Electrolyte Fuel Cells 12 (PEFC 12)

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

Tapa 1, Tapa Conference Center, Hilton Hawaiian Village

A-4.1 Fuel Cell Performance and Degradation – 08:00 – 12:00

Co-Chairs: Dusan Spornjak and Cynthia Rice-York

- 08:00 **1670** Ex Situ Characterization of Degradation Mechanisms of MEAs by Imaging XPS and SEM – K. Artyushkova (The University of New Mexico), A. Patel (University of New Mexico), P. Atanassov (The University of New Mexico), M. Dutta, V. Colbow, and S. Wessel (Ballard Power Systems)
- 08:20 **1671** PEMFC Gas Diffusion Media Degradation Determined by Acid-Base Titrations – J. Chlistunoff, K. C. Rau, R. Mukundan, and R. L. Borup (Los Alamos National Laboratory)

- 08:40 **1672** Influence of *In Situ* and Ex Situ Aging of Gas Diffusion Layers on Fuel Cell Performance Degradation – D. Spornjak, J. D. Fairweather, T. Rockward, K. C. Rau, R. L. Borup, and R. Mukundan (Los Alamos National Laboratory)
- 09:00 **1673** Subzero Degradation Analysis of Membrane Electrode Assemblies Modified with Additives – A. Pistono (Tennessee Technological University), C. A. Rice (Tennessee Tech University), J. Lewis, and V. Ramani (Illinois Institute of Technology)
- 09:20 **1674** PEM Fuel Cell Performance and Durability with Different Treatments of Microporous Layer – D. Spornjak, R. Mukundan (Los Alamos National Laboratory), P. Wilde, R. Schweiss (SGL Carbon GmbH), K. L. More (Oak Ridge National Laboratory), D. Langlois, J. D. Fairweather, and R. L. Borup (Los Alamos National Laboratory)
- 09:40 Intermission (20 Minutes)
- 10:00 **1675** Effects of Pt Concentration of Carbon Supported Catalysts on High Temperature PEMFC Performance – J. O. Park, J. Ha, S. Hong, Y. Lee (Samsung Advanced Institute of Technology), M. Takezawa (Samsung Yokohama Research Institute), and K. Choi (Samsung Advanced Institute of Technology)
- 10:20 **1676** Improvement of PEFC Performance by Removing GDLs – K. Takeuchi (Nippon Soken, Inc.)
- 10:40 **1677** Effect of Gas Diffusion Layer Design on PEM Fuel Cell MEA Water Removal in an Under Humidified Environment – J. Bellerive and A. Bellemare-Davis (Ballard Power Systems)
- 11:00 **1678** PEMFC GDE Oxygen Mass Transport Coefficient Separation with Different Gas Diluents – T. V. Reshetenko (University of Hawaii at Manoa) and J. St-Pierre (University of Hawaii)
- 11:20 **1679** The Dew Point Temperature as a Criterion for Optimizing PEMFC Operating Conditions – T. Berning (Aalborg University)
- 11:40 **1680** Handheld Characterization Probe for Catalytic Assessments of Electrodes and MEAs – D. Carr, B. Slote, K. Jayne, and M. C. Kimble (Reactive Innovations, LLC)
- 09:20 **1684** Alternative Electrocatalyst Support Materials for Polymer Electrolyte Fuel Cells – K. Sasaki, S. Hayashi, K. Kanda, Y. Takabatake, T. Tsukatsune, T. Higashi, F. Takasaki, Z. Noda, and A. Hayashi (Kyushu University)
- 09:40 Intermission (20 Minutes)
- 10:00 **1685** Electrochemical Characterization of Pt Catalysts Supported on $\text{Sn}_{0.96}\text{Nb}_{0.04}\text{O}_{2-8}$ and $\text{Sn}_{0.96}\text{Sb}_{0.04}\text{O}_{2-8}$ with Aggregated Structure in Rotating Disk Electrode and Membrane Electrode Assembly Measurements – K. Kakinuma, Y. Chino, M. Uchida, H. Uchida, S. Deki, and M. Watanabe (University of Yamanashi)
- 10:20 **1686** Mixed Metal Oxides as Corrosion-Resistant Catalyst Supports for Polymer Electrolyte Fuel Cells – A. Kumar and V. Ramani (Illinois Institute of Technology)
- 10:40 **1687** Titania and Carbon Nanotube Composite Catalyst Supports for Durable Electrocatalyst Performance – W. A. Rigdon (University of South Carolina), J. J. Sightler (USC), D. Larrabee (University of South Carolina), E. McPherson, and X. Huang (USC)
- 11:00 **1688** Conductive Nanostructured Materials for Supported Metal Catalysts – J. Sansinena (Los Alamos National Laboratory (LANL)), M. Wilson, and F. H. Garzon (Los Alamos National Laboratory)
- 11:20 **1689** Molybdenum Carbide as Support for Platinum Catalysts for Oxygen Reduction in Fuel Cells – L. Elbaz (Los Alamos National Laboratory), J. Philips (Naval Postgraduate School Monterey), N. J. Henson, and E. L. Brosha (Los Alamos National Laboratory)
- 11:40 **1690** Vanadium Carbide Derived Carbon as a Possible Catalyst Support for PEMFC – E. Härk (University of Tartu), J. Nerut, K. Vaarmets, S. Sepp, P. Valk, R. Jäger (University of Tartu), and E. Lust (University of Tartu)

Honolulu 2, Tapa Conference Center, Hilton Hawaiian Village

D-4.1.2 Non-Precious Metal Catalysts 2 – 08:00 – 12:00
Co-Chairs: Piotr Zelenay and Shigenori Mitsushima

- Tapa 2, Tapa Conference Center, Hilton Hawaiian Village*
- D-4.1.1 Corrosion-Resistant Pt Cathodes – 08:00 – 12:00**
Co-Chairs: Michael Lennartz and Kazunari Sasaki
- 08:00 **1681** The Potential of Non-Carbon Supported Electrocatalyst for Automotive Fuel-Cells – J. Suchsland (SolviCore), B. Klose-Schubert, D. Herein, and M. Lennartz (Umicore)
- 08:40 **1682** Microstructure and Durability of Non-Carbon Supported Cathode Prepared by a Direct Dry Deposition Technique – R. Maric, J. Roller, M. Arellano-Jiménez, W. E. Mustain, and C. Carter (University of Connecticut)
- 09:00 **1683** Corrosion-Resistant PEFC Cathode Catalysts Based on Sub-Stoichiometric Titanium Oxide Supports – T. Ioroi, M. Asahi, S. Yamazaki, Z. Siroma, N. Fujiwara, and K. Yasuda (National Institute of Advanced Industrial Science and Technology)
- 08:00 **1691** Catalytic Activity and Stability of Ta Compounds for Oxygen Reduction Reaction – S. Mitsushima, Y. Fujita, A. Ishihara, Y. Ohgi, K. Matsuzawa (Yokohama National University), M. Matsumoto, M. Arai, H. Imai (NISSAN ARC Ltd.), and K. Ota (Yokohama National University)
- 08:20 **1692** Non-Precious Metal Oxygen-Reduction Catalysts for PEM Fuel Cells Based on N-Doped Ordered Porous Carbon – A. Dorjgotov, J. Ok, Y. Jeon (Yonsei University), S. Yoon (Kyushu University), and Y. Shul (Yonsei University)
- 08:40 **1693** Evaluation of Nitrogen Species and Microstructure of Silk-Derived Activated Carbon as Non-Precious Metal Catalyst for PEFC Cathode – H. Fukunaga, T. Shimoyama, N. Takahashi, T. Takatsuka (Shinshu University), and H. Kishimoto (Dai Nippon Printing Co. Ltd)

- 09:00 **1694** Insight into the Possible Nature of the Active Catalytic Site in Non-Precious Metal Fuel Cell ORR Catalysis – P. Zelenay, G. Wu, H. T. Chung, M. Blair, E. F. Holby, C. D. Taylor (Los Alamos National Laboratory), and M. Neidig (University of Rochester)
- 09:20 **1695** Active Site Modeling: Non-Precious Metal Based Catalysts for ORR – E. F. Holby, C. D. Taylor, G. Wu, and P. Zelenay (Los Alamos National Laboratory)
- 09:40 Intermission (20 Minutes)
- 10:00 **1696** Using a Dual Plasma Process to Produce Cobalt-Polypyrrole Catalysts for the Oxygen Reduction Reaction in Fuel Cells – C. Walter (INP Greifswald), K. Kummer (European Synchrotron Radiation Facility), D. Vyalikh (TU Dresden), A. Quade, V. Brüser, and K. Weltmann (INP Greifswald)
- 10:20 **1697** Low-Cost, High-Efficiency Non-PGM Cathode Catalysts Using MOFs as Precursors – D. Zhao, J. Shui, C. Chen, S. Comment, B. Reprögle, and D. Liu (Argonne National Laboratory)
- 10:40 **1698** Basicity of Non-precious Metal Catalysts for Oxygen Reduction – N. D. Leonard and S. Calabrese Barton (Michigan State University)
- 11:00 **1699** Templated Non-PGM Electrocatalysts for Polymer Electrolyte Fuel Cells – P. Atanassov (The University of New Mexico), A. Serov (University of New Mexico), B. Halevi, K. Artyushkova (The University of New Mexico), and B. Kiefer (New Mexico State University)
- 11:20 **1700** Investigation of Fe-N-C Cathode Catalysts in Laminar Flow Fuel Cells – M. Naughton (University of Illinois at Urbana-Champaign), N. D. Leonard, S. Calabrese Barton (Michigan State University), and P. J. Kenis (University of Illinois at Urbana-Champaign)
- 11:40 **1701** Development of Hybrid Cathode Catalyst for PEM Fuel Cells – T. Kim, W. Jung, T. Xie, A. Kriston, P. Ganesan, and B. N. Popov (University of South Carolina)

Honolulu 3, Tapa Conference Center, Hilton Hawaiian Village

E-4.1 Electrolysis and Alkaline Fuel Cell Materials – 08:20 – 10:40
Co-Chairs: Christopher Arges and EunAe Cho

- 08:20 **1702** High Temperature Electrochemical Hydrogen Pump Cell Using a PBI Membrane at High Current Densities – T. J. Petek, J. S. Wainright, and R. F. Savinell (Case Western Reserve University)
- 08:40 **1703** Testing of 17-Cell Dimensionally Stable Membrane (DSA) High-Pressure Electrolysis Stack – A. K. Kisor (California Institute of Technology), M. Errico (Caltech/ JPL), T. I. Valdez (California Institute of Technology), M. Hamdan, J. Willey, T. Norman, C. Mittelsteadt (Giner Inc.), and M. Hoberecht (NASA/ Glenn Research Center)
- 09:00 **1704** Optimization of Clamping Pressure for High Pressure (Proton Exchange Membrane) PEM Electrolyzers – O. F. Selamet, M. Acar, M. Ergoktas, and M. Mat (Nigde University)

- 09:20 **1705** Comparing Platinum and Palladium as Hydrogen Oxidation/Evolution Electrocatalysts in Alkaline Medium – J. Herranz, P. Rheinländer, S. Henning, and H. A. Gasteiger (Technische Universität München)
- 09:40 Intermission (20 Minutes)
- 10:00 **1706** Carbonate and Bicarbonate Ion Transport in Alkaline Anion Exchange Membranes – A. M. Kiss, T. D. Myles (University of Connecticut), K. N. Grew (U.S. Army Research Laboratory), A. A. Peracchio, G. J. Nelson, and W. K. Chiu (University of Connecticut)
- 10:20 **1707** Alkaline Stability and Ion Conductivity of Polysulfone Anion Exchange Membranes (AEMs) with Different Cation Chemistries – C. G. Arges and V. Ramani (Illinois Institute of Technology)



Sodium Batteries

Battery / Energy Technology / High Temperature Materials
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High Temperature Sodium Batteries – 08:00 – 11:20
Co-Chairs: David Hall and Jeffrey Fergus

- 08:00 **1871** The Effect of Discharge Duration Distribution on Sodium Metal Halide Battery Cycle Life for Uninterruptible Power Supplies – D. B. Hall (GE Global Research)
- 08:30 **1872** Solid Electrolytes for Sodium Batteries – J. W. Fergus (Auburn University)
- 09:00 **1873** Novel Sodium-Zinc Chloride Battery – X. Lu, G. Li, J. Kim, J. Lemmon, V. Sprenkle, and Z. Yang (Pacific Northwest National Laboratory)
- 09:20 **1874** Development of Sodium-Metal Halide Batteries for Energy Storage – G. G. Tao, N. Weber (Materials and Systems Research Inc.), and A. V. Virkar (The University of Utah)
- 09:40 Intermission (20 Minutes)
- 10:00 **1875** Molten Sodium Battery with NaSICON Ceramic Membrane – A. Eccleston, M. Robins (Ceramatec, Inc.), S. V. Bhavaraju (Ceramatec Inc.), Y. Kim, W. Koh, J. Chae, and J. Kim (SK Innovation)
- 10:20 **1876** Effects of Nickel Content and Operating Conditions on Cathode Degradation of Sodium-Nickel Chloride (Zebra) Battery – G. Li, X. Lu, J. Kim, and V. Sprenkle (Pacific Northwest National Laboratory)
- 10:40 **1877** Development of a Brass Supported Zinc-Chloride Sodium Cell – D. C. Bogdan Jr. (General Electric Company), M. Vallance, K. Gourishankar, H. Seshadri, G. Sundararajan, and A. Viswanathan (GE Global Research)
- 11:00 **1878** Influence of Sulfur Concentration on Low Temperature Operation of the Cell Na/β²-Alumina/S(IV) in AlCl₃-NaCl Melt – T. J. Dunstan (Electrochemical Systems Inc.) and J. Caja (Electrochemical Systems, Inc.)

**Related Compounds Session 1: Heterogeneous Integration –
08:00 – 10:00**
Co-Chair: Alexander Reznicek

- 08:00 **3236** Materials Integration for III-V/SiGe+CMOS Integrated Circuit Platforms (Invited) – E. A. Fitzgerald, P. Sharma, M. Bulsara, T. Milakovich (Massachusetts Institute of Technology), S. Ringel, A. Pitera, J. Hennessy, and A. Malonis (4Power LLC)
- 08:30 **3237** Heterogeneous Integration of III-V Devices and Si CMOS on a Silicon Substrate – T. Kazior (Raytheon)
- 09:00 **3238** Heterogeneous Integration of InP HBTs on CMOS: Leveraging and Providing Value to Conventional Silicon Technologies – J. C. Li, Y. Royter, P. Patterson, T. Hussain, J. Duvall, M. Montes, I. Valles, F. Ku, M. Boag-O'Brien, A. Lopez, D. Le, D. Zehnder, S. Kim, S. Chen, T. Oh, M. Akmal, E. Wang, D. Hitko, M. Sokolich, D. Chow, P. Brewer, and K. Elliott (HRL Laboratories LLC)
- 09:30 **3239** Wafer-level Heterogeneous Integration of GaN HEMTs and Si (100) MOSFETs – H. Lee, Z. Li, M. Sun, K. Ryu, and T. Palacios (Massachusetts Institute of Technology)

Related Compounds Session 2: Processing – 10:15 – 12:00
Co-Chair: Alexander Reznicek

- 10:15 **3240** Scalable GaN-on-Silicon Using Rare Earth Oxide Buffer Layers – F. Arkun (Translucent Inc), M. Leby, R. Dargis, R. Roucka, R. S. Smith, and A. Clark (Translucent Inc.)
- 10:45 **3241** Formation and Characterization of Nickel Germanosilicide on $\text{Si}_{1-x}\text{Ge}_x/\text{Si}/\text{SiO}_2/\text{Si}$ – W. Yoo (WaferMasters, Inc.), N. Hasuike, H. Harima, and M. Yoshimoto (Kyoto Institute of Technology)
- 11:05 **3242** Low Specific Ohmic Contacts to n-type Germanium Using a Low Temperature NiGe Process – K. F. Gallacher, P. Velha, D. J. Paul, I. Maclaren (University of Glasgow), M. Myronov (University of Warwick), and D. Leadly (Warwick University)
- 11:25 **3243** Formation of 1.7-nm-thick-EOT Germanium Dioxide Film with a High-Quality Interface Using a Direct Neutral Beam Oxidation Process – A. Wada (Tohoku University), R. Zhang, S. Takagi (The University of Tokyo), and S. Samukawa (Tohoku University)
- 11:45 Concluding Remarks (15 Minutes)

Materials – 08:00 – 11:40
Co-Chairs: M. Foley and A. Bund

- 08:00 **3729** The Structure of Nickel Compounds in the Ionic Liquid 1-Ethyl-3-Methyl Imidazolium Chloride/Aluminum Chloride – D. F. Roeper (Excet, Inc.), C. Graham (United States Naval Academy), K. Pandya (Brookhaven National L), and W. O'Grady (Excet, Inc.)
- 08:20 **3730** Intercalation Chemistry of Ionic Liquids – T. E. Sutto (Naval Research Laboratory)
- 08:40 **3731** Dispersion of Organically Modified Layered Silicates in Melt Blended Poly(lactic acid) Composites: Effects of Cation Head Groups and Oxygenated Alkyl Chains – D. M. Fox (American University), M. Zammarano (National Institute of Standards and Technology), and M. Novy (American University)
- 09:00 **3732** Ionic Liquids for Controlled Synthesis of Functional Materials – P. Fulvio, H. Luo, and S. Dai (Oak Ridge National Laboratory)
- 09:40 Intermission (20 Minutes)
- 10:00 **3733** Use of Ionic Liquid as a New Medium under Vacuum Conditions – S. Kuwabata, A. Imanishi (Osaka University), T. Torimoto (Nagoya University), and T. Tsuda (Osaka University)
- 10:40 **3734** Control of Formation Process of Au Nanoparticles Prepared by Low Energy Quantum Beam Irradiation in Ionic Liquid – A. Imanishi, T. Arimura, T. Sakamoto, T. Tsuda, S. Kuwabata, and K. Fukui (Osaka University)
- 11:00 **3735** Simple Fabrication of Pt Nanoparticle-Carbon Nanotube Composite with Ionic Liquid-Sputtering Method – K. Yoshii, T. Tsuda, T. Arimura, A. Imanishi (Osaka University), T. Torimoto (Nagoya University), and S. Kuwabata (Osaka University)
- 11:20 **3736** Fabrication of 3D Polymer Structures from Room-Temperature Ionic Liquid by Quantum Beam Techniques – H. Minamimoto, K. Inoue, T. Tsuda, A. Imanishi, S. Seki, and S. Kuwabata (Osaka University)