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**Meeting Abstracts — MA 2013-02**  
**224<sup>th</sup> ECS Meeting**  
**October 27 - November 1, 2013 — San Francisco, CA**

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- 553 Synthesis and Characterization of P2-Na<sub>2/3</sub>Fe<sub>x</sub>Mn<sub>1-x</sub>O<sub>2</sub> for Na-Ion Batteries  
*J. Zhao, J. Xu, D. H. Lee, S. Meng, and S. Okada*
- 554 Corrosion Behavior of Cathode Current Collector Materials On Molten Carbonate Fuel Cell  
*M. Kim, S. Ahn, J. Youn, Y. Kim, and H. Kwon*

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- 555 Atomic-Level Characterization of Interfaces in  $\text{LiCoO}_2$   
*C. A. J. Fisher, S. Zheng, A. Kuwabara, H. Moriwake, Y. H. Ikuhara, H. Oki, and Y. Ikuhara*
- 556 Thermodynamic Theory and Simulation of Transport and Intercalation of Solvated Ions in Li Ion Batteries  
*A. Latz and J. Zausch*
- 557 Lithium Segregation Induced Structure and Strength Change At Amorphous-Si/Cu Interface  
*M. E. Stournara, X. Xiao, Y. Qi, P. Johari, P. Lu, B. W. Sheldon, H. Gao, and V. B. Shenoy*
- 558 Comparison of Phase Stability in Layered  $\text{NaCrO}_2$  and  $\text{LiCrO}_2$  Oxides By First-Principles DFT Calculations  
*H. Shiiiba, S. Hotta, T. Nakamura, S. Chizawa, M. Nakayama, N. Yabuuchi, and S. Komaba*
- 559 Computational Modeling of the Layer-Spinel Interface Properties for Cathode Materials in Lithium Ion Batteries  
*D. Qian and S. Meng*
- 560 First-Principles Calculations Study On the Electrochemical Activity and Structural Stability of the  $\text{Li}_2\text{MnO}_3$   
*E. Lee and K. Persson*
- 561 Combining First Principles Computation and Advanced Characterization to Understand Disorder and Interfaces in Batteries  
*M. K. Y. Chan*
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*Y. Koyama, H. Arai, I. Tanaka, Y. Uchimoto, and Z. Ogumi*
- 563 First Principles Modeling of the Interface Between a Solid State Lithium Thiophosphate Electrolyte and a Lithium Metal Anode  
*N. A. W. Holzwarth and N. D. Lepley*
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*Y. Qi*
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*T. Markus*
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*M. M. Islam and A. C. T. van Duin*

- 567 Parameterization of a Physico-Chemical Model for Lithium-Ion Batteries  
*M. Ecker, S. Käbitz, D. Tran, and D. U. Sauer*
- 568 First-Principles Thermodynamic Analysis of Hydrogen-fluoride Scavenging Cathode Coatings for Lithium-Ion Batteries  
*M. Aykol and C. Wolverton*
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*A. Goldberg, M. D. Halls, and K. Tasaki*
- 570 Influence of Morphology and Microstructure On the Lithium-Ion Battery Electrode Damage Behavior  
*P. Barai and P. P. Mukherjee*
- 571 Analysis of Long-Range Interaction in Lithium-Ion Battery Electrodes  
*M. Stein IV, S. Cho, A. Wiegmann, and P. P. Mukherjee*
- 572 Optimization of Tab Placement in Li-Ion Battery Using Multi-Physics Simulations  
*S. Allu, W. Elwasif, S. Pannala, S. Kalnaus, S. Simunovic, and J. A. Turner*
- 573 Analysis of the Influence of Microstructures On the Impedance Response in Lithium-Ion Battery Electrodes  
*S. Cho and P. P. Mukherjee*
- 574 Lithium and Rare-Earth Oxides Thermodynamics and Kinetics Studied By Density Functional Theory  
*F. Grosse*
- 575 Phase transformation kinetics and morphology in LiFePO<sub>4</sub>  
*G. Ceder, A. Abdellahi, O. Akyildiz, R. Malik, and K. Thornton*
- 576 Effect of Rb and Ta Doping On the Ionic Conductivity and Stability of the Garnet Li<sub>7+2x-y</sub>(La<sub>3-x</sub>Rb<sub>x</sub>)(Zr<sub>2-y</sub>Ta<sub>y</sub>)O<sub>12</sub> (0≤x≤0.375, 0≤y≤1) Superionic Conductor – a First Principles Investigation  
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- 577 *Ab Initio* Molecular Dynamics Study of Garnet-Type Li<sub>7-x</sub>La<sub>3</sub>Zr<sub>2-x</sub>Ta<sub>x</sub>O<sub>12</sub> (0≤x≤2)  
*R. Jalem, M. Nakayama, T. Kasuga, and K. Kanamura*
- 578 Computational Investigation and Design of Solid Lithium-Ion Electrolytes Based On the Li<sub>10</sub>GeP<sub>2</sub>S<sub>12</sub> Superionic Conductor  
*S. P. Ong, Y. Mo, W. D. Richards, L. J. Miara, H. S. Lee, and G. Ceder*
- 579 Phase-Field Modeling of Li Deposits Growth in Li-Ion Batteries  
*L. Liang, Y. Qi, S. J. Harris, and L. Q. Chen*

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- 585 Modeling of Fundamental Charge Transfer Processes in Stable Free-Radical Organic Polymers  
*R. E. Larsen, T. Kemper, W. Braunecker, and T. Gennett*
- 586 Li-Ion Desolvation and Transport Through Model SEI/Electrolyte Interface  
*D. Bedrov and O. Borodin*
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*T. H. Yu, B. V. Merinov, and W. A. Goddard III*
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- 595 Effects of Delithiation On Lithium Manganese Oxides: A Combined DFT and NMR Based Study  
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- 598 Evaluation of Carbon Nanotube-Encapsulated Silicon and Germanium Nanowires As Proposed Lithium-Ion Battery Anode Materials  
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- 599 Electrochemical Capacitor Power Performance At Low Temperature: Commercial Product Differences  
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- 600 Improved Low Temperature Performance of Supercapacitors  
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- 601 Methods for Enhancing the Flowable Electrode Capacitance in the Electrochemical Flow Capacitor  
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- 604 Application of Multistep Electrospinning Method for Preparation of Electrical Double-Layer Capacitor Half-Cells  
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- 605 Electrochemical Properties Enhancement of Flexible Textile Based Supercapacitor  
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- 606 Asymmetric Supercapacitor Containing Carbon Nanotube-Embedded Polyacrylonitrile-Based Carbon Nanofiber and  $\delta$ -MnO<sub>2</sub> As Electrodes  
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- 607 CDCs From Silicon Carbide With Tunable Ordered Meso and Macroporosity for High-Power Supercapacitor  
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- 608 Electrochemical Modification of Carbon Fiber Electrode and Its Application to Capacitor  
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- 609 Electrodeposited Thin Films of Carbon for Use in Electrical Double Layer Capacitors  
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- 610 D-Glucose Derived Micro/Mesoporous Carbons for Ultra-High Rate Supercapacitor Application  
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- 611 Activated Biochar: A Green and Low-Cost Electrode Material for Capacitor Applications  
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- 612 Activated Carbon Synthesized From Banana Peel as Electrodes in Li-Ion Capacitors  
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- 613 Pseudocapacitive Charge Storage in Two-Dimensional Materials  
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- 614 Cycle Behavior of Aqueous and Nonaqueous Vanadium Oxide Electrochemical Capacitors  
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- 616 Pretreatment Effects On Charge Storage of Early Transition-Metal Carbides and Nitrides  
*A. Djire, P. Pande, A. Sleightholme, A. Deb, J. Penner-Hahn, P. Rasmussen, and L. T. Thompson*
- 617 MnO<sub>2</sub> - Carbon Nanofiber Composites for Flexible supercapacitors  
*O. Ghodbane, M. Louro, L. Coustan, A. Patru, and F. Favier*
- 618 Electrochemically Deposited Phosphotungstic Acid – Manganese Dioxide Hybrid Materials for Application in Electrochemical Capacitors  
*S. W. Donne and A. J. Gibson*

- 619 High Areal Capacitance Micro-Supercapacitor Based On Electrodeposited MnO<sub>2</sub> Thin Films On Silicon 3D Microstructures  
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- 620 Fabrication of Novel Hierarchical Hollow Manganese Oxide Nanospheres for High-Voltage Stability Supercapacitors in Aqueous Electrolyte  
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- 624 Knitted Electrochemical Capacitors for Applications in Wearable Electronics  
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- 625 Comparing Symmetric and Asymmetric Electrochemical Capacitors: A Modeling Approach  
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- 632 A Comparative Study of Solid Pseudocapacitive Electrochemical Capacitors  
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- 636 Lanthanum Based Perovskites Exhibiting Hydroxide Ion Storage for Pseudocapacitor Electrodes  
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- 640 Reduced Graphene Oxide Decorated With V<sub>2</sub>O<sub>5</sub> Nanowires As An Efficient Electrode Material for Supercapacitor Applications  
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- 647 Three Dimensional Graphene-Based Assemblies  
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*M. Chiku, M. Toda, E. Higuchi, and H. Inoue*
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- 656 Outer and Inner Surface Contribution in Manganese Dioxides Energy Storage Characterization By Cavity Microelectrode Technique  
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- 657 Electrochemically Deposited Multi-Layered Phosphotungstic Acid – Manganese Dioxide Materials From Square Wave Pulse Deposition for Electrochemical Capacitor Applications  
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- 662 Fluoroethylene Carbonate and Propylene Carbonate Mixtures Based Electrolytes for Supercapacitors  
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- 665 Preparation and Characterization of Carbon Aerogel/Polymer Composites for Supercapacitor  
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- 666 Nano-Scale Morphology Control of Graphene, Conducting Polymer, and Carbon Nanotube Electrodes for High Performance Energy Storage  
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- 670 Electrochemical Properties of Carbon Nano Fiber As Negative Material in Capacitor  
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- 673 Ion Insertion Into Porous Carbon Electrodes Investigated By *in-Situ* AFM Measurements  
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- 675 Time-Resolved Ion Dynamics in Carbon Supercapacitor Electrodes Using *In Situ* Infrared Spectroscopy  
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- 682 Manganese Oxide/Graphene Aerogel Composites As An Outstanding Supercapacitor Electrode Material  
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*E. García - Quismondo, C. Santos, J. Palma, and M. A. Anderson*
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*C. Ramirez-Castro, C. Schütter, S. Passerini, and A. Balducci*

- 685 "On Recent Work Related to Super and Pseudo Capacitors"  
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## **B6 - Electrochemical Synthesis of Fuels 2**

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*S. Pylypenko, K. N. Wood, A. Serov, P. Atanassov, and R. O'Hayre*
- 1604 A Study of Au/C Nanoparticles With Pt Monolayer and Sub-Monolayer Electrocatalysts for Ethanol Oxidation Reaction  
*R. Loukrakpam, S. R. Brankovic, and P. Strasser*
- 1605 EDTA Assisted Ce(III)/Pt Vulcan Xc-72 Catalyst Synthesis for Direct Methanol Fuel Cell Applications  
*C. R. Cabrera, C. Menendez, R. Guzman-Blas, K. Sasaki, D. J. Stacchiola, S. D. Senanayake, D. Suazo-Dávila, and C. A. Vélez*
- 1606 Performance Stability of Carbon-Supported *Vs.* Metal-Black DMFC Catalysts  
*Q. Li, D. Spornjak, Y. S. Kim, and P. Zelenay*
- 1607 Synthesis of Nanostructured Platinum and Platinum-Based Electrocatalyst for Dafc  
*M. V. Tran, G. H. Nguyen Thi, H. P. Vu Thi, P. M. L. Le, and T. T. P. Nguyen*
- 1608 Pd-Bi Catalysts for Electrooxidation of Alcohols  
*A. Zalineeva, U. Martinez, A. Serov, S. Baranton, C. Coutanceau, and P. Atanassov*

- 1609 Corrosion Study of Mesoporous Carbon Supports for Use in PEM Fuel Cells  
*F. Forouzandeh, D. Banham, F. Feng, X. Li, S. Ye, and V. Birss*
- 1610 Covalently, Non-Covalently and Non Functionalized Networked Graphitic Structures As Robust Catalyst Support in PEM Electrodes  
*E. Negro, M. de Vries, R. Latsuzbaia, and G. Koper*
- 1611 Development of Ultra-Low Loading Pt/AGC Catalyst for PEM Fuel Cells  
*T. Kim, W. S. Jung, T. Xie, and B. N. Popov*
- 1612 Pt Catalysts Supported On High Surface Area Graphene Composites for PEFCs  
*J. Xie*
- 1613 Pt-Decorated graphene-like foam for Electrochemical Oxygen Reduction With High Mass Activity  
*J. Liu, K. Sasaki, and S. M. Lyth*
- 1614 Development of Durable Electrocatalysts for PEFC By Controlling Nanostructure of Carbon Supports  
*A. Hayashi, X. Zhao, Y. Minamida, Z. Noda, and K. Sasaki*
- 1615 Durable and Water Manageable Ordered Mesoporous Supports for Polymer Electrolyte Fuel Cells  
*S. M. Hwang, S. Lee, Y. J. Sohn, T. H. Yang, and G. G. Park*
- 1616 Development of Graphitic-Carbon Nitride Materials as Catalyst Supports for Polymer Electrolyte Fuel Cells  
*N. Mansor, A. Belen Jorge, F. Corà, C. Gibbs, R. Jervis, P. F. McMillan, X. Wang, and D. J. L. Brett*
- 1617 Application of Mesoporous Carbon Nano Dendrites(MCND) As Catalyst Supporting Materials for PEFCs  
*K. Matsumoto, T. Iijima, and M. Hiyoshi*
- 1618 Highly Dispersed Pt on Mo<sub>2</sub>C: Durable Catalyst for Oxygen Reduction Reaction  
*A. Roy, U. Martinez, E. L. Brosha, P. Atanassov, and T. L. Ward*
- 1619 Evidence of Enhanced Activity of *In-Situ* formed Pt Nano-Rafts On Molybdenum Carbide Support  
*L. Elbaz, T. Rockward, N. J. Henson, K. Artyushkova, K. L. More, J. Phillips, and E. L. Brosha*
- 1620 Pt-Based ORR Catalyst On Carbon-Supported Amorphous Niobium Oxide Support  
*C. Xu, P. Pietrasz, J. Yang, R. Soltis, K. Sun, M. Sulek, and R. Novak*
- 1621 Characterization and Modeling of Mass Transport in Gas Diffusion Layer and Catalyst Layer of PEM Fuel Cells  
*J. Kleemann*

- 1622 In-Situ Measurement of Oxygen Partial Pressure in the Cathode Flow Field With Hydrophilic Surface  
*S. Hirano, M. Potocki, G. Saloka, S. Palluconi, and J. Crafton*
- 1623 Water Vapor Exchange Flow Channels to Enhance the Performance of Polymer Electrolyte Fuel Cells Without Cathode Humidification  
*H. Nakajima, T. Kitahara, and K. Tsuda*
- 1624 Visualization of O<sub>2</sub> Partial Pressures in Running PEFC With Straight Channels  
*K. Nagase, M. Uchida, J. Inukai, Y. Nagumo, H. Motegi, M. Yoneda, T. Suga, H. Nishide, and M. Watanabe*
- 1625 Simultaneous Visualization of Oxygen Partial Pressure and Current Density in Running PEFC  
*K. Takanohashi, J. Inukai, M. Uchida, Y. Nagumo, T. Suga, H. Nishide, and M. Watanabe*
- 1626 Effect of Fuel Permeability On MEA Performances Using Quaternized Multiblock Copolymers  
*K. Asazawa, E. Nishino, J. Miyake, M. Uchida, K. Miyateke, and M. Watanabe*
- 1627 Oriented Electrode Based On TiO<sub>2</sub> nanotube Arrays  
*H. Yu and C. Zhang*
- 1628 Composite Carbon Nanotube and Titania Catalyst Supports for Enhanced Activity and Durability  
*W. A. Rigdon, D. Larrabee, and X. Huang*
- 1629 Ta Modified TiO<sub>2</sub> Supports Exhibit Exceptional Durability in Polymer Electrolyte Fuel Cells  
*A. Kumar and V. K. Ramani*
- 1630 Iridium-Titanium Oxide as Support for Pt Catalyst in PEFC Cathodes  
*T. Binninger, E. Fabbri, R. Koetz, and T. J. Schmidt*
- 1631 Alternative Oxide-Supported Electrocatalysts for PEFCs  
*K. Sasaki, Y. Takabatake, K. Kanda, T. Tsukatsune, T. Higashi, F. Takasaki, Z. Noda, and A. Hayashi*
- 1632 Highly Durable Metal-Oxides As An Alternative Catalyst Supports for PEM Fuel Cells  
*D. Cilingir Dogan, S. M. Hwang, Y. J. Sohn, T. H. Yang, and G. G. Park*
- 1633 Exploring the Activity and Stability Limits for Pt/ITO ORR Electrocatalysts  
*W. E. Mustain and Y. Liu*
- 1634 Performance and Durability of Titanium Nitride-Supported Platinum Catalysts for Polymer Electrolyte Fuel Cells  
*H. Shintani, K. Kakinuma, M. Uchida, H. Uchida, Y. Tsuji, and M. Watanabe*

- 1635 Chaos During H<sub>2</sub>/CO Electrooxidation: Trends and Usefulness  
*A. Mota, T. A. Rocha, and E. R. Gonzalez*
- 1636 Reformate Hydrogen Fuel in PEM Fuel Cells: the Effect of Alkene Impurities on Anode Activity  
*K. Kortsdottir, F. J. Perez Ferriz, C. Lagergren, and R. W. Lindström*
- 1637 A Perspective of TM-N<sub>x</sub> (TM=Fe, Co, and x=2, 4) Non-PGM Electrocatalysts From First-Principles Calculations  
*B. Kiefer, S. J. Paddison, and P. Atanassov*
- 1638 Role of Transition Metal in Non-Noble Metal Electro-Catalysts in Proton Exchange Membrane (PEM) Fuel Cells  
*D. Singh, J. Tian, K. Mamtani, and U. S. Ozkan*
- 1639 Mechanistic Studies On Fe-PEI Derived Non-PGM Catalysts for Oxygen Reduction  
*U. Tylus, A. Serov, K. Artyushkova, S. Mukerjee, and P. Atanassov*
- 1640 Modeling Non-Precious Metal Catalyst Structures and Their Relationship to ORR Activity  
*E. F. Holby, G. Wu, P. Zelenay, and C. D. Taylor*
- 1641 Structure-to-Property Relationships in Non-Platinum Group Fuel Cell Catalysts: Examination of Length Scale Correlations  
*M. J. Workman, A. Serov, M. S. Rojas Carbonell, P. Atanassov, and K. Artyushkova*
- 1642 Scale-Up of Metal-Nitrogen-Carbon Electrocatalyst Synthesis By High-Pressure Pyrolysis  
*S. Ganesan, N. Leonard, and S. Calabrese Barton*
- 1643 Scale Up of Non-PGM ORR Catalysts  
*B. Halevi, P. Short, A. Serov, P. Atanassov, S. Ganesan, S. Mukerjee, and S. Calabrese Barton*
- 1644 Novel Non-Platinum Group Metal Cathode Catalyst for Fuel Cell Electric Vehicle Application  
*A. Serov, K. Artyushkova, P. Atanassov, E. Niangar, C. Wang, and N. Dale*
- 1645 Effect of High-Voltage Cycling On Non-Precious Metal Catalysts for the ORR  
*F. Jaouen, V. Goellner, and D. J. Jones*
- 1646 Corrugated Pore Model for Design of Non-Precious Oxygen Reduction Cathodes  
*N. Leonard, S. Calabrese Barton, A. Serov, P. Atanassov, and S. Mukerjee*
- 1647 Structure and Reactivity of Fe-N-C Non-PGM Cathode Catalysts Derived by the Sacrificial Support Method  
*P. Atanassov, A. Serov, K. Artyushkova, B. Kiefer, and S. Mukherjee*
- 1648 Alkaline Membrane Fuel Cells Technology Challenges and Approaches to Their Resolution  
*S. Gottesfeld*



- 1649 Enhanced Efficiency With Autonomous Oscillations: Challenges for Dafe  
*A. Mota and E. R. Gonzalez*
- 1650 Effect of the Membrane Thickness on the Over-Potential Behavior of the Direct Formic Acid Fuel Cell  
*T. Tsujiguchi, T. Iwakami, and N. Nakagawa*
- 1651 The Promotion Effect of An Oxide Phase On Pd Electrocatalysts for the Oxidation of Ethanol: *in Situ* irras Studies in An Alkaline Environment  
*U. Martinez, A. Serov, M. Padilla, and P. Atanassov*
- 1652 *In Situ* Degradation Measurements of a DMFC By a Dynamic Hydrogen Reference Electrode  
*N. Aoun, U. Kunz, and T. Turek*
- 1653 Nickel-Cerium Alloys for Borohydride Oxidation  
*D. M. F. Santos, B. Sljukic, D. Macciò, A. Saccone, C. Sequeira, and L. Amaral*
- 1654 Progress in The Development of Alkaline Membrane Fuel Cells and Regenerative Fuel Cells  
*K. Scott, X. Wu, M. Mamlouk, and R. Espiritu*
- 1655 The Electrocatalytic Oxidation of Ethanol in a Proton Exchange Membrane Electrolysis Cell (PEMEC): A Way to Produce Clean Hydrogen for PEFC  
*C. Lamy, S. Baranton, and C. Coutanceau*
- 1656 Synthesis of Cobalt Nanoparticle Embedded Carbon Nanofiber Catalysts With High Oxygen Reduction Reaction Activity  
*M. Kim, D. Nam, H. Park, K. Eom, E. Cho, C. Kwon, S. J. Yoo, and H. Kwon*
- 1657 Palladium Alloy Catalysts Synthesized By Sacrificial Support Method for the Electrooxidation of Ethylene Glycol in Alkaline Environment  
*C. Cremers, D. Bayer, F. Jung, T. Jurzinsky, A. Serov, P. Atanassov, K. Pinkwart, and J. Tübke*

### **B12 - Stationary and Large-scale Electrical Energy Storage Systems 3**

*Battery, Energy Technology, Industrial Electrochemistry and Electrochemical Engineering*

- 1658 Advances in PNNL's Vanadium Redox Flow Battery Stack  
*V. Sprenkle, E. Thomsen, W. Wang, B. Li, B. J. Koeppe, K. P. Recknagle, X. Wei, Z. Nie, Q. Luo, and D. Reed*
- 1659 Redox Flow Cell Component Validation At Sub-Stack Level  
*V. Sprenkle, E. Thomsen, W. Wang, B. Li, B. J. Koeppe, K. P. Recknagle, X. Wei, Z. Nie, Q. Luo, and D. Reed*

- 1660 Redesign of a Vanadium Redox Flow Battery for Reduced Pressure Loss Using An Interdigitated Flow Field  
*B. J. Koepfel, K. P. Recknagle, D. E. Stephenson, D. Reed, E. Thomsen, and V. Sprenkle*
- 1661 Nano-Catalysts Decorating Graphite Felts As High-Performance Electrodes for An All-Vanadium Redox Flow Battery  
*B. Li, W. Wang, X. Wei, Q. Luo, Z. Nie, and V. Sprenkle*
- 1662 Mitigating Capacity Fade in Vanadium Redox Flow Batteries Using Asymmetric Currents During Cycling  
*E. Agar, A. Benjamin, C. R. Dennison, D. Chen, M. A. Hickner, and E. C. Kumbur*
- 1663 On the Determination of Coulombic Efficiency for Vanadium Redox Flow Batteries: Cutoff Voltage Vs. State of Charge Limits  
*A. Benjamin, E. Agar, C. R. Dennison, and E. C. Kumbur*
- 1664 Influence of Cell Geometry and Operating Parameters On Performance of a Redox Flow Battery With Serpentine and Interdigitated Flow Fields  
*S. Tsushima, S. Sasaki, and S. Hirai*
- 1665 Investigation of the Hydrogen Evolution in All-Vanadium Redox Flow Battery  
*C. N. Sun, F. Delnick, L. Baggetto, G. M. Veith, and T. A. Zawodzinski*
- 1666 Overvoltage Measurements With Reference Electrodes in Redox Flow Batteries  
*J. Langner*
- 1667 State of Charge Effects On the Performance of Vanadium Rfbs  
*T. A. Zawodzinski, C. N. Sun, D. Aaron, E. Hollmann, A. B. Papandrew, and M. M. Mench*
- 1668 Ex Situ Measurements of Transport Properties of Vanadium Ions for Vanadium Redox Flow Batteries  
*J. S. Lawton, A. Jones, Z. Tang, C. Zhang, and T. A. Zawodzinski*
- 1669 Measurement of Localized Current Distribution Applied to a Vanadium Redox Flow Battery  
*M. M. Mench, J. Clement, and T. A. Zawodzinski*
- 1670 GPU-Enabled Pore-Scale Transport Resolved Model for Vanadium Redox Flow Batteries  
*C. Andersen, G. Qiu, and Y. Sun*
- 1671 Modeling of a Vanadium Redox Flow Battery for Energy Storage  
*C. L. Hsieh, Y. L. Jhong, K. L. Hsueh, and C. Y. Dai*
- 1672 Characterization of Battery for Energy Storage Applications – Lead Acid Battery, Lithium Battery, Vanadium Redox Flow Battery, and Capacitor  
*C. L. Hsieh, Y. T. Liu, K. L. Hsueh, and J. S. Hung*

- 1673 A Precious-Metal Free Regenerative Fuel Cell for Storing Renewable Electricity  
*D. Ng, Y. Gorlin, T. Hatsukade, and T. F. Jaramillo*
- 1674 Comparison of Acid and Alkaline Hydrogen-Bromine Fuel Cell Systems  
*T. V. Nguyen, V. Yarlagadda, G. Lin, G. Weng, V. C. Y. Li, and K. Y. Chan*
- 1675 Effect of Operating Condition On Cyclic Performance of a Hydrogen-Bromine Flow Battery  
*K. T. Cho, M. S. Ding, A. Z. Weber, V. Battaglia, and V. Srinivasan*
- 1676 Investigation of the Active Site of Rhodium Sulfide Electrocatalysts  
*N. Singh, D. C. Upham, R. F. Liu, H. Metiu, and E. McFarland*
- 1677 Synthesis and Characterization of  $\text{Rh}_x\text{S}_y/\text{C}$  Catalysts for HOR/HER in HBr  
*J. Masud, J. Walter, T. V. Nguyen, G. Lin, N. Singh, E. McFarland, H. Metiu, M. Ikenberry, K. Hohn, C. J. Pan, and B. J. Hwang*
- 1678 Charge Transfer and Storage in the Electrochemical Flow Capacitor – A New Concept for Grid-Scale Energy Storage  
*C. R. Dennison, M. Beidaghi, K. B. Hatzell, J. W. Campos, Y. Gogotsi, and E. C. Kumbur*
- 1679 Assessment of the Iron-Ion/Hydrogen Redox Flow Cell  
*M. C. Tucker, K. T. Cho, V. Srinivasan, P. N. Ross, and A. Z. Weber*
- 1680 Advanced Redox Flow Battery R&D At Pacific Northwest National Laboratory  
*W. Wang, Q. Luo, Z. Nie, M. Vijayakumar, X. Wei, B. Li, B. Chen, Y. Shao, E. Thomsen, D. Reed, and V. Sprenkle*
- 1681 Roles of Cathode Additives for Sodium-Nickel Chloride (Zebra) Battery  
*G. Li, X. Lu, J. Y. Kim, J. P. Lemmon, and V. Sprenkle*
- 1682 Performance Stability of Novel Sodium-Zinc Chloride Battery  
*X. Lu, G. Li, J. Y. Kim, J. P. Lemmon, and V. Sprenkle*
- 1683 Analysis of Electrochemical Properties of Zn-Br Flow Battery  
*S. Mukherjee, A. Bates, S. C. Lee, O. Kwon, and S. Park*
- 1684 A Large Format Stationary Energy Storage Device Based On a Composite Sodium Titanium Phosphate Anode Materials System  
*J. Whitacre*
- 1685 Performance Assessment of Solid Oxide Cells for Electrical Energy Storage  
*P. Kazemipoor, C. Wendel, and R. J. Braun*
- 1686 Identifying and Suppressing Side Reactions in Soluble Lead Flow Batteries to Achieve High Efficiency and Cyclability  
*M. Verde, K. Carroll, and S. Meng*

- 1687 Applications of Quinone Redox Chemistry for Flow Batteries  
*M. P. Marshak, B. Huskinson, M. R. Gerhardt, and M. J. Aziz*
- 1688 A Quinone-Based Flow Battery for Large-Scale Electrochemical Energy Storage  
*B. Huskinson, M. P. Marshak, M. R. Gerhardt, and M. J. Aziz*
- 1689 New TYPE Of LOW Cost, LONG CYCLE Life, High POWER, and SAFE Battery  
*R. Huggins*
- 1690 Double-Membrane Design for High-Voltage and Low-Crossover Redox Flow Batteries  
*S. Gu, K. Gong, E. Z. Yan, and Y. Yan*
- 1691 Nanoporous Separator Development for Various Redox Flow Batteries At Pacific Northwest National Laboratory  
*X. Wei, W. Wang, B. Li, Q. Luo, Z. Nie, B. Chen, and V. Sprenkle*
- 1692 Improved Membranes for Redox Flow Batteries  
*M. L. Perry, W. Xie, W. Li, and R. M. Darling*
- 1693 Modeling and Optimal Control of Energy Storage Devices for a Lithium-Ion Battery-Photovoltaic Hybrid System  
*M. T. Lawder, A. Jagwani, P. W. C. Northrop, V. Ramadesigan, P. Biswas, and V. R. Subramanian*
- 1694 Comparing Limits of Performance in Aqueous and Non-Aqueous Redox Flow Batteries  
*C. N. Sun, M. M. Mench, and T. A. Zawodzinski*
- 1695 Cardo-Polyetherketone Anion Exchange Membranes With Suitable Chemical/Mechanical Stability and Performance for All-Vanadium Redox Flow Battery  
*S. Yun, J. Parrondo, and V. K. Ramani*
- 1696 Importance of Ion-Ion Interactions in Membranes for All-Vanadium Redox Flow Batteries  
*L. D. Griffith, S. U. Kim, H. Y. Chen, and C. Monroe*
- 1697 Comparing Membrane Properties for Redox Flow Batteries  
*T. A. Zawodzinski, Z. Tang, J. S. Lawton, M. Bright, A. Jones, A. Schnyder, C. N. Sun, and C. Fujimoto*
- 1698 Broadband Electrical Spectroscopy (BES) Studies On Hydroxide-Conducting Membrane  
*V. Di Noto, A. Maes, S. Lavina, E. Negro, B. E. Coughlin, A. M. Herring, and G. Pace*

## **D1 - Corrosion General Poster Session**

### *Corrosion*

- 1699 Formation of An Anti-Bacterial Oxide Film On Ti-Ta Alloy By Anodic Oxidation  
*S. F. Ou, F. Y. Fan, and K. L. Ou*

- 1700 Oxidation Behavior of Ni-Base Single Crystal Superalloys At 1000°C  
*Y. Hwang, S. Won, and D. B. Lee*
- 1701 Influence of the pH On the Corrosion Protection of Epoxy-Silica-Zirconia Sol-Gel Coatings Applied On EN Aw-6063 Aluminium Alloy  
*I. R. Fontinha, M. M. Salta, M. L. Zheludkevich, M. G. S. Ferreira, R. B. Figueira, E. V. Pereira, and C. J. R. Silva*
- 1702 Mesoporous Titania Film As Photoanodes for Cathodic Protection of Stainless Steel  
*Z. Feng, C. LEI, H. Zhou, and C. WANG*
- 1703 Electrochemical Growth of  $\beta$ -Ni(OH)<sub>2</sub> and NiOOH On Ni Electrodes At Well-Defined Polarization Potential, Polarization Time, and Temperature Conditions  
*M. Alsabet*
- 1704 Comparison of Corrosion Resistance of Stainless Steels in Sour Environments With Various Chloride Concentration and Temperature  
*J. W. Rho, G. E. Park, K. Y. Kim, and C. J. Park*
- 1705 Dissolution Behavior of Pt-Co Binary Alloy Thin Films in Sulfuric Acid  
*A. Ooi*
- 1706 Preparation and Evaluation of Zn Doped Hap Plasma Spray Biocompatible Coatings On Titanium  
*S. TAKE, K. Kikuchi, S. Suda, and Y. Itoi*
- 1707 Thin-Film Ceramic Coatings Based On Sol-Gel Chemistries for Corrosion Protection of Low-Grade Carbon Steels  
*R. E. Pérez-Roa, M. I. Tejedor, and M. A. Anderson*
- 1708 Fast Macropore Etching Via Large Current and High HF Concentration On p-Type Silicon  
*D. Ge, N. Ren, and Q. Wang*
- 1709 Corrosion Resistance and Mechanism of Zinc Rich Paint in Corrosive Media  
*A. H. Sofian and K. Noda*
- 1710 Compositional Characterization of Inclusion/Matrix Boundaries and Relation to Pit Initiation At Mns in Stainless Steel  
*M. Tohjoh, I. Muto, A. Chiba, Y. Sugawara, and N. Hara*
- 1711 Controlling the Corrosion of Metals With Polyphenolic Proteins  
*W. F. Nelson and D. C. Hansen*
- 1712 The Effect of Potential Scan Rate and Temperature At Aluminum Passive State in Borate Buffer Solution  
*S. Kaluzhina and T. Minakova*
- 1713 Corrosion Behavior of Bipolar Plate Materials in Acid Media  
*M. V. Tran, T. Q. Tran, H. T. Nguyen, and T. T. P. Nguyen*

- 1714 A Rapid and Facile Measurement for Corrosion Rates Using Dynamic Light Scattering Technique  
*C. Yim, D. Kwon, S. Jeon, S. Kim, and J. Park*
- 1715 Surface Potential Distribution Observation of Surface Modified of 304 Stainless Steel  
*T. D. Widodo and K. Noda*
- 1716 Three-Dimensional Networked Nanoporous Anodic Alumina Films With Vertical and Transverse Pores Fabricated On Al With Different Purity  
*S. Z. CHU, K. Osaka, H. Yashiro, H. Segawa, K. Wada, and S. Inoue*
- 1717 Applications of Embedded Sensors for in-Situ Corrosion Monitoring in Subsea Tunnel  
*C. Gong, S. Zhang, Z. Shao, Q. Li, and X. Cheng*
- 1718 Adsorption Behavior of Polyphenolic Proteins Onto High Strength Steel (HY80) and 5083 Aluminum Alloys  
*L. Han and D. C. Hansen*
- 1719 Effect of Stress Intensity Factor On Fatigue Crack Morphology in High-Strength Steels in Sour Environments  
*M. Ziomek-Moroz, J. A. Hawk, K. Collins, R. Thodla, and F. Gui*
- 1720 Corrosion Investigation of AISI 316 Stainless Steel With CNT and CNT-Polymer Coating Materials Under Simulated PEMFC Working Conditions  
*M. Hashempour, A. Vincenzo, M. Bestetti, S. Sharma, and D. Gonzalez*
- 1721 Biocorrosion Study of Aluminum Aerospace Alloy in Marine and Urban Environments  
*M. Sancy, A. Abarzua, E. Morales, M. I. Azocar, G. Gomez, M. Paez, and N. Vejar*
- 1722 Corrosion Resistance Of Niobium, Tantalum and Titanium In Sea WATER and Sulfuric ACID  
*D. R. Do Carmo and C. A. Picone*
- 1723 Electrochemical Behaviour of Copper-Coated Carbon Steel  
*S. Ramamurthy, D. Zagidulin, J. Chen, P. Jakupi, R. Jacklin, D. Shoesmith, and P. Keech*
- 1724 Critical Corrosion Temperature (CCorrT) A Novel Electrochemical Methodology to Qualify Coatings At High Temperature in Chloride Containing Environments  
*L. F. Garfias-Mesias*
- 1725 Electrochemical Evaluation of Hot-Dip Galvanized Steel (HDGS) Coated With Organic-Inorganic Hybrid Sol-Gel in Cementitious Materials  
*R. B. Figueira, C. J. R. Silva, E. V. Pereira, and M. M. Salta*
- 1726 Multidimensional Simulation of Corrosion At Coating Defects  
*J. N. Harb and C. Lueth*

- 1727 Dissolution/Deposition of Zinc in the Deionized Water ( $60 < T (^{\circ}\text{C}) < 93.3$ )  
*J. H. Park, P. Mast, and J. Poska*
- 1728 Corrosion Behavior of Copper-Silver-Phosphorus Brazing Alloy in Chloride Containing Electrolyte At Various Temperature  
*A. Nurrochman and K. Cho*
- 1729 Hydrogen Diffusion Coefficients Through Inconel 718 in Different Metallurgical Conditions  
*J. J. M. Jebaraj, D. J. Morrison, and I. I. Suni*
- 1730 Effect of ECAP On the Pitting Corrosion of 304 Stainless Steel  
*Z. Zheng and Y. Gao*
- 1731 Bipolar Electrochemistry for High-Throughput Corrosion Screening  
*S. Munktell, M. Tydén, J. Högström, L. Nyholm, and F. Björefors*
- 1732 Corrosion of Buried Plumbing Materials By Soil Chemistry and Leakage Current  
*Y. B. Park, Y. J. Choi, H. J. Jang, Y. S. Park, and I. S. Park*

## **D2 - Atmospheric Corrosion**

### *Corrosion, Physical and Analytical Electrochemistry*

- 1733 Revisiting Atmospheric Corrosion of Active Metals : What We Have Learn't and What We Need to Learn  
*I. S. Cole*
- 1734 Improving the Corrosion Resistance of Weathering Steel Bridges  
*S. Ramamurthy, D. Shoesmith, C. Coomarasamy, and D. Lai*
- 1735 Atmospheric Corrosion of Plain Carbon Steel Below the Deliquescence Point of Sodium Chloride  
*E. Schindelholz, B. Risteen, and R. G. Kelly*
- 1736 Marine Aerosol Drop Size Effects On the Corrosion Behavior of Plain Carbon Steel  
*B. Risteen, E. Schindelholz, and R. G. Kelly*
- 1737 Identification of Hydrogen Uptake Sites and Local Hydrogen Concentrations During Atmospheric Exposure of Steels Using Scanning Kelvin Probe Microscopy and Electrochemical Extraction  
*R. F. Schaller and J. R. Scully*
- 1738 Hydrogen Uptake During Atmospheric Corrosion of Galvanized steel  
*M. Rohwerder and S. Evers*
- 1739 Evaluation of hydrogen absorption Into Steel With Alternating Current Responses  
*E. Tada*

- 1740 Accelerated Atmospheric Corrosion Testing of Steel and AA5083  
*P. Khullar and R. G. Kelly*
- 1741 Galvanic Corrosion Behavior of Zinc/Steel Couple Under Thin Electrolyte Layer  
*L. Wen, Y. Jin, and J. Cheng*
- 1742 Effect of Various Electrolytes On Zinc Corrosion Investigated By Scanning Flow Cell System With Dynamic Electrolyte Change  
*C. A. Laska*
- 1743 Effect of Stabilization Treatment and Nb/C Ratio On the Intergranular Corrosion Susceptibility of Super304H Austenitic Heat-Resistant Steel  
*Y. Gao, X. Xiong, Z. Zheng, and C. Zhang*
- 1744 Under-Deposit Chloride-Induced Stress Corrosion Cracking in Austenitic Stainless Steels: Aspects Associated With Deposit Type, Size and Composition  
*A. Cook, S. Lyon, T. S. Leung, B. Gu, N. Stevens, R. Newman, M. Gunther, G. McFiggans, and D. Engelberg*
- 1745 Synchrotron Tomography Study of Atmospheric Pitting Corrosion of Stainless Steel During Wet-Dry Cycles  
*L. Guo, S. Street, H. Mohammed-Ali, S. Glanvill, N. Mi, M. Ghahari, A. Du Plessis, A. J. Davenport, T. Rayment, and C. Reinhard*
- 1746 Synchrotron Microtomography Studies of Atmospheric Corrosion of Stainless Steel and Aluminum Alloys  
*A. J. Davenport, A. Du Plessis, N. Mi, L. Guo, S. Street, M. Ghahari, H. Mohammed-Ali, T. Rayment, C. Reinhard, M. Stamparoni, and P. Modregger*
- 1747 Evaluation of Atmospheric Corrosion of Bare Metals During a Two Year Outdoor Exposure  
*Y. Yoon, D. C. Hansen, J. D. Angel, W. H. Abbott, W. J. Culhane, L. Petry, and C. A. Joseph*
- 1748 Atmospheric Pitting and Galvanic Corrosion of High Strength Al Alloys  
*Z. Feng, S. C. Morton, M. S. Thomson, and G. Frankel*
- 1749 The Stability Criteria for Localized Corrosion of AA7075-T6 and Its Application in Galvanic Interaction With Noble Materials  
*Y. Shi and R. G. Kelly*
- 1750 In Situ Monitoring of Ultra Slow Oxide Growth On Copper Protected By a Self Assembled Monolayer  
*S. Hosseinpour, M. C. Johnson, and C. Leygraf*
- 1751 Mechanistic Studies of Corrosion Product Flaking On Copper and Copper-Based Alloys in Marine Environments  
*X. Zhang, S. Goidanich, C. Leygraf, and I. Odnevall Wallinder*



- 1752 Corrosion Performance of Zinc Magnesium Aluminium Coated Steel: Effect of Chloride Deposition and CO<sub>2</sub>  
*D. Thierry*
- 1753 Corrosion Performance of Zinc Magnesium Aluminium Coated Steel: Discussion of Fundamental mechanisms  
*M. Rohwerder, R. Krieg, A. Vimalanandan, D. Thierry, and N. Le Bozec*
- 1754 Molecular Studies of Self Assembled Monolayers As Corrosion Inhibitors for Copper  
*S. Hosseinpour, M. C. Johnson, and C. Leygraf*
- 1755 Characterization of the Inhibition Effect of CaSO<sub>4</sub> On Pitting Damage Accumulation of Aluminum Alloy 7075-T6  
*P. Klomjit and R. Buchheit*
- 1756 Atmospheric Corrosion of Different Zinc Coating On Steel  
*P. Zabinski, K. Mech, and R. Kowalik*
- 1757 Comparison of Atmospheric Parameters On the Corrosion of Epoxy Coated 2024-T3 Al Alloy  
*L. Petry, D. C. Hansen, S. A. Hayes, Y. Yoon, and J. D. Angel*
- 1758 Chromate Mitigation in Atmospheric Corrosion By the Use of Smart-Release Pigments  
*H. N. McMurray and G. Williams*
- 1759 Atmospheric Corrosion of Top Coats Used to Protect Carbon Steel and Stainless Steels in Chloride Containing Environments  
*L. F. Garfias-Mesias, J. Warren, and J. V. Cauich-Rodriguez*
- 1760 Predicting Atmospheric Corrosion Rates for 1010 Steel Using a Cumulative Damage Approach  
*D. H. Rose, S. J. McCombie, J. D. Angel, and D. C. Hansen*
- 1761 Dynamic Characterization for Soil/Environmental Conditions in Coating/Substrate Metal Interface Systems By Stochastic Modeling  
*H. Castaneda, X. Li, A. Yajima, and R. Liang*
- 1762 Evaluation of the Maximum Pit Size Model On Stainless Steel Under Atmospheric Conditions  
*M. T. Woldemedhin, J. Srinivasan, M. E. Shedd, M. McGrath, and R. G. Kelly*

### **D3 - Degradation of Carbon Structural Materials**

*Corrosion, New Technology Subcommittee*

- 1763 Corrosion Studies On Alumina and Carbon Fibres/Magnesium Metal Matrix Composites  
*V. W. Neubert and A. Bakkar*

- 1764 Development of the Atmospheric Corrosion Model of Nickel-Coated Carbon Reinforced Aluminum (Al/C/50f) MMCs  
*S. Tiwari and L. H. Hihara*
- 1765 Corrosion Protection of Interfaces Between Aluminum and Mechanically-Coupled Polymer Matrix Composites (PMCs)  
*R. Srinivasan, L. H. Hihara, and J. Nelson*
- 1766 Evaluating Adhesive Bonds With Carbon-Composites Using Electrochemical Impedance Spectroscopy  
*G. Davis, FECS*
- 1767 Electrochemical Corrosion Investigations On Metal Doped a-C:H Coatings for Bipolar Plates in Redox-Flow Batteries  
*J. Richards, K. Schmidt, P. Fischer, and J. Tübke*

#### **D4 - Mass Transport Phenomena in Localized Corrosion**

##### *Corrosion*

- 1768 Mass Transport and Electrochemical Factors Influencing Stainless Steel Pitting and Repassivation in Neutral Chloride Media  
*J. Srinivasan, M. McGrath, and R. G. Kelly*
- 1769 Imaging of Mass Transport Process for Localized Corrosion of Stainless Steel  
*C. Lin*
- 1770 The Effect of NaNO<sub>3</sub> On Salt Films in Pitting Corrosion of 304 Stainless Steel Using Synchrotron X-Ray Diffraction  
*S. Street, W. Xu, L. Guo, P. Quinn, F. Mosselmans, T. Rayment, and A. J. Davenport*
- 1771 Investigation of Localized Corrosion and the Role of Transport in Lightweight Alloys Using Microkinetic Models With First-Principles Link  
*S. Chaudhuri, A. Sumer, J. Xiao, and M. Losada*
- 1772 Coupling of Dissolution and Mass Transport for Pitting of Nickel Base Alloys in Solutions Containing Thiosulfate Ions  
*R. Newman, A. G. Carcea, and W. Zhang*
- 1773 The Role of Elemental Sulfur and Chloride Ions on Pit Initiation at MnS Inclusion in Stainless Steel  
*A. Chiba, I. Muto, Y. Sugawara, and N. Hara*
- 1774 The Local Redox Conditions Within Spent Nuclear Fuel Inside a Failed Nuclear Waste Container – a Modelling Study  
*L. Wu, Z. Qin, and D. Shoesmith*

- 1775 Effect of Applied Stress On Dissolution Morphology and Pit Initiation Behavior of Mns Inclusion in Stainless Steel  
*N. Shimahashi, I. Muto, Y. Sugawara, and N. Hara*
- 1776 Chloride Ion Concentration Effects On Passivity Breakdown in Magnesium  
*G. Williams, H. Dafydd, and H. N. McMurray*
- 1777 Effects of Sulphide and Chloride Concentrations On the Morphology and Growth Kinetics of Sulphide Films During Copper Corrosion in Anaerobic Aqueous Solutions  
*J. Chen, Z. Qin, and D. Shoesmith*
- 1778 Corrosion Behavior of Copper Patina in Presence of Marine Biofouling  
*L. P. Veleva, D. L. Sauri, and J. L. Lopez*
- 1779 Quantitative Chemical Speciation of Copper Electro-Deposition Studied By Stxm  
*Z. Qin, V. Lee, and A. P. Hitchcock*
- 1780 Development Of Semi-Elliptical Surface Cracks In Lightly Sensitized Al-Mg Alloys  
*S. Lee and D. D. Macdonald*
- 1781 Stress Corrosion Cracking of Alloy 22  
*S. K. Lee and D. D. Macdonald*
- 1782 Modeling of the Effect of Crystallographic Orientation On Pit Growth and Shape  
*S. M. Qidwai, N. Kota, and V. G. DeGiorgi*
- 1783 Influence of the Microstructure On Stress Concentration Due to Localized Corrosion  
*N. Kota, S. M. Qidwai, and V. G. DeGiorgi*
- 1784 A Model of Damage Evolution During Crevice Corrosion of Nickel Base Alloys  
*R. S. Lillard, A. Stenta, K. L. Kreider, and G. Young*
- 1785 Monitoring Crevice Corrosion Via the Coupling Current: Effect of Anodamine  
*W. Kuang, S. Lee, J. Mathews, and D. D. Macdonald*

#### **D5 - Oxide Films: A Symposium in Honor of Clive Clayton on his 65th Birthday**

##### *Corrosion*

- 1786 An XAS Study of the Surface of Low-Temperature Carburized Stainless Steel  
*D. F. Roeper, W. E. O'Grady, K. I. Pandya, and P. M. Natishan*
- 1787 Effect of Non-Random Atomic Arrangements On the Initiation of Passivation in Solid-Solution Alloys  
*D. Artymowicz, K. Sieradzki, and R. Newman*
- 1788 Characterization of Electric Conduction of Passive Films and Oxide Films Formed On Fe-Cr Alloys  
*S. Fujimoto, Y. Iwamizu, Y. Tai, and M. Saito*

- 1789 A Unified Theory for Passivity and Passivity Breakdown  
*D. D. Macdonald*
- 1790 Surface Oxide films : Growth, Chemical Composition, Structure Investigated By Surface Analytical Techniques (XPS, ToF-SIMS, STM, STS) and Recent Progress in Modeling  
*P. Marcus*
- 1791 Light Thermal Damage in Polymer Composite Systems: Analysis of Bulk and Surface Properties Through Vibrational and X-Ray Spectroscopy  
*C. R. Clayton, C. N. Young, R. D. Granata, W. R. Scott, and G. M. Connelly*
- 1792 Corrosion of Carbon Steel in Physically-Constrained Locations in Hlnw Isolation  
*G. Engelhardt, B. Kursten, and D. D. Macdonald*
- 1793 Oxide Film Formation and Corrosion of Stainless Steels in Supercritical and Ultra Supercritical Water  
*D. Rodriguez, A. Merwin, and D. Chidambaram*
- 1794 Electrochemical and Oxidation Behaviour of Smat Alloy 800 SG Tubing Specimens  
*M. G. Faichuk, S. Ramamurthy, J. J. Noel, and D. Shoesmith*
- 1795 Effects of pH On S-Induced Passivity Degradation of Alloy 800 in Simulated Crevice Chemistries  
*D. Xia, R. Zhu, C. Shen, Y. Behnamian, J. Luo, and K. Stan*
- 1796 Corrosion Resistance of Oxide Scales Formed in High-Temperature Oxidation of Al-Bearing Ferritic Stainless Steels  
*Y. Sugawara, M. Ogiwara, I. Muto, T. Inakuma, H. Sakamoto, and N. Hara*
- 1797 Nanostructure and Local Properties of Oxide Layers Grown On Stainless Steel in High Temperature Water  
*V. Maurice, T. Massoud, L. H. Klein, A. Seyeux, and P. Marcus*
- 1798 Oxidation of Superalloys in Supercritical Water  
*A. Merwin, D. Chidambaram, and D. Rodriguez*
- 1799 Concurrent Cathodic Disbonding and Microscopy At High Temperatures and High Pressures On Steel Coated Exposed to Seawater  
*L. F. Garfias-Mesias and E. Ramirez*
- 1800 Effect of Sour Environment Temperature On Fatigue Crack Propagation in Ultrahigh-Strength Steel  
*M. Ziomek-Moroz, J. A. Hawk, R. Thodla, and F. Gui*
- 1801 The Composition of Oxide Films On Gd-Doped Uranium Dioxide (UO<sub>2</sub>)  
*M. Razdan and D. Shoesmith*
- 1802 The Corrosion Behaviour of Passive Multi-Phase Metallic Nuclear Wasteforms  
*R. M. Asmussen, J. Chen, D. Zagidulin, J. J. Noel, S. Wallon, U. M. Tefashe, J. Mauzeroll, and D. Shoesmith*

- 1803 Material Stability in Molten Salt for Nuclear Power Applications  
*A. Merwin and D. Chidambaram*
- 1804 Protective Oxide Film On Aluminium Encapsulated With Different Nanocontainers  
*A. Lisenkov, S. Poznyak, A. Salak, M. L. Zheludkevich, and M. G. S. Ferreira*
- 1805 Stress Distributions in Anodic Alumina Films Prior to the Onset of Pore Formation  
*O. O. Capraz, P. Shrotriya, and K. Hebert*
- 1806 Imaging and Characterizing Oxide Breakdown and Pit Initiation in Aluminum Using Electron Microscopy  
*K. R. Zavadil*
- 1807 Tutorial: The Power Law Model for Interpretation of CPE Parameters  
*M. E. Orazem, B. Tribollet, I. Frateur, M. Musiani, and V. Vivier*
- 1808 Modeling Stress Distributions in Anodic Alumina Films Prior to the Onset of Pore Formation  
*K. Hebert, O. O. Capraz, S. Ide, and P. Shrotriya*
- 1809 Simultaneous Ellipsometric and Potentiostatic Study of Aluminum Oxide Growth and Dissolution in Acetate Buffer  
*N. H. Giskeødegård, O. Hunderi, and K. Nisancioglu*
- 1810 A Novel Application of the Scanning Vibrating Probe for Determination of Coupling Currents: Understanding the Mechanisms SCC in 5000 Series Al Alloys  
*K. D. Williams, R. Bayles, P. M. Natishan, and D. D. Macdonald*
- 1811 Microstructural Studies of Pure Aluminum and Al1100: the Effect of Grain Size and Boundaries On Quality of Anodic Aluminum Oxide Template  
*D. Pourjafari*
- 1812 Effect of Vacuum System Base Pressure On Corrosion Resistance of Sputtered Al Thin Films  
*G. Frankel, X. Chen, R. Gupta, S. Kandasamy, and N. Birbilis*
- 1813 Characterization of Self-Assembled Monolayer On Anodized Aluminum By XPS, AFM and Low-Voltage SEM  
*H. Habazaki*
- 1814 (2013 ECS Corrosion Division H. H. Uhlig Award Lecture) Active Corrosion Protection By Ldhs  
*M. G. S. Ferreira*
- 1815 (2013 ECS Corrosion Division Morris Cohen Graduate Student Award Lecture) Internal Stresses in Ultrathin Oxide Films: Influence On Growth and Reliability  
*Q. Van Overmeere*
- 1816 Corrosion Behavior of AZ31B Friction Stir Welds  
*J. Kish, Z. Cano, S. Zhang, J. McDermid, G. Williams, and C. Glover*

- 1817 Corrosion Films On Single Crystal Magnesium  
*E. A. McNally and J. Kish*
- 1818 Modeling the Chloride Ion Attack of Aluminum Oxide By Experimental and Theoretical XANES Analysis  
*D. F. Roeper, W. E. O'Grady, and P. M. Natishan*
- 1819 Effects of Aging Temperature and Time On the Corrosion Protection Provided By Trivalent Chromium Process Coatings On AA2024-T3  
*L. Li and G. M. Swain*
- 1820 Pretreatment Effects On the Corrosion Protection Provided By Trivalent Chromium Process Coatings On AA2024-T3  
*L. Li, A. L. Desouza, and G. M. Swain*
- 1821 Effects of Chromate and Molybdate Ions On Scratch Repassivation Behavior of Precipitation Hardened Aluminum Alloys  
*S. B. Madden*
- 1822 Synthesis and Electrochemical Characterization of TiO<sub>2</sub> Materials  
*I. E. Castañeda and J. U. Uruchurtu*
- 1823 Parameters and Underlying Mechanisms Affecting the Morphology of Bifurcating TiO<sub>2</sub> Nanotube  
*D. J. LeClere, A. Ashari, G. Kawamura, H. Muto, and A. Matsuda*
- 1824 TiO<sub>2</sub> Nanotubes and Mesosponges: Modification Approaches to a Strongly Enhanced Water Splitting Activity  
*P. Schmuki*
- 1825 TiO<sub>2</sub>-WO<sub>3</sub> Nanotubular Composite Synthesized By Anodization of Simultaneous Multi-Target Sputtered Thin Films Characterized By Laser Ablation ICP-MS  
*Y. R. Smith, K. N. Chappanda, S. K. Mohanty, and M. Misra*
- 1826 Stability of Photoactive Oxide Semiconductors  
*D. Chidambaram and R. Gakhar*
- 1827 Investigating Surfaces By Complimentary Chemical Spectroscopies  
*G. P. Halada*
- 1828 Growth and Characterization of Tubular Oxide Layers On Ti Substrates  
*H. Tsuchiya, S. Yamamoto, and S. Fujimoto*
- 1829 Porous Anodic Oxide Films Grown On Compound Semiconductor  
*S. Ono, K. Sugawara, and H. Asoh*
- 1830 Evaluation of Corrosion Resistance of Multilayered Sn/Ag<sub>3</sub>Sn Electroplating On Cu Alloys for Electric Connectors  
*S. Z. CHU and H. Yashiro*

- 1831 Electrical Stability Enhancement of the Thin Filmtransistor With the Back-Channel Deposited By Cosputteringamorphous In-Ga-Zn-O and Siox  
*H. R. Lee, J. H. Kim, J. H. Park, Y. H. Ko, J. S. Park, and J. G. Park*
- 1832 Interstitially Hardened 316L Stainless Steel: A Surface Analytical Study of the Oxide  
*N. R. Tailleart, P. M. Natishan, F. J. Martin, R. J. Rayne, H. Kahn, and A. H. Heuer*
- 1833 A Super Austenitic 6 Mo Stainless Steel (UNS N08367) Passivity-Breakdown Characterization in Acidic Fluoride Solutions  
*E. M. Maya Visuet and H. Castaneda*
- 1834 The Point Defect Model for the Passive Sulfide Films On Copper  
*S. sharifi-Asl and D. D. Macdonald*
- 1835 Thin Surface Films Over copper–nickel Alloys: Corrosion Behavior in Neutral and Acidic Medium in Presence of Chloride Ions  
*F. M. Al-Kharafi, A. Abdel Nazeer, R. M. Abdullah, and A. Galal*
- 1836 The Corrosion of Carbon Steel in Simulated Concrete Pore Water Under Anoxic Conditions  
*P. Lu, A. Almarzooqi, B. Kursten, and D. D. Macdonald*
- 1837 Steady State Analysis of Thin Oxide Barrier Layers Formed in Neutral and Weakly Alkaline Solutions  
*C. Albu, J. Deconinck, and V. Topa*
- 1838 Repassivation On Type 316L Stainless Steel With Cyclic Deformation in Simulated Body Fluid Including Cells  
*K. Doi, S. Miyabe, and S. Fujimoto*
- 1839 Electrochemically Fabricated of TiO<sub>2</sub> Nano-Layers On Ti-6Al-4V  
*S. Roy, J. Varia, and J. Portoles*
- 1840 Effect of Anaerobic Microbial Corrosion On the Surface Film Formed On Steel  
*D. D. Bala and D. Chidambaram*
- 1841 ZrO<sub>2</sub> Hybrid Sol-Gel Coatings for Active Corrosion Protection of Ti6Al4V Biomedical Alloy in Simulated Body Fluids  
*J. C. Galván, F. R. García-Galván, A. A. El hadad, R. Montoya, and A. Jiménez-Morales*

## **D6 - Biodegradable and Bioabsorbable Metals and Materials**

### *Corrosion*

- 1842 Critical Factors in Mg Alloy Corrosion and Biocompatibility  
*S. Virtanen*

- 1843 Effect of Alloying Element Ca and Anodization On Corrosion Resistance and Bioactivity of AZ61 Alloy  
*A. Anawati, H. Asoh, and S. Ono*
- 1844 Switch of Guanine and Adenine Current Caused By Temperature Change in DNA/NIPA and PAM-Based Hydrogels  
*E. Zabost, M. Karbarz, M. Donten, and Z. Stojek*
- 1845 Evaluation of Transparent Polyimide Film As a Biological cell Culture Sheet With Microstructures  
*H. Maenosono, H. Saito, and Y. Nishioka*
- 1846 A Study On the Affect of Novel Surface Treatments and Biodegradable Polymer Coatings On Corrosion and Surface Properties of Ternary Nitinol Alloy  
*C. Pulletikurthi and N. Munroe*

### **E1 - Solid State Topics General Session**

*Dielectric Science and Technology, Electronics and Photonics, Energy Technology*

- 1847 Enhancement-Mode AlGaAs/InGaAs Pseudomorphic High-Electron-Mobility Transistor With a Liquid Phase Oxidized GaAs As Gate Oxide  
*J. S. Huang, K. W. Lee, J. J. Lin, and Y. H. Wang*
- 1848 Enhancement-Mode Metal-Oxide-Semiconductor Metamorphic High-Electron-Mobility Transistor  
*J. S. Huang, K. W. Lee, H. W. Chen, and Y. H. Wang*
- 1849 Negative Capacitance Tunnel Field Effect Transistor: A Novel Device With Low Subthreshold Swing and High On Current  
*N. Chowdhury, S. M. F. Azad, and Q. D. M. Khosru*
- 1850 Cp'Cpcn' v'ecr'O qf gr'v'F gyto kpg'v'j g'S wcpw' gf 'Gpgti { 'Ngxgm'c'pf 'Y cxg'H'p'ek'qpu'hqt S wcpwo 'Y gm'F g'xlegu  
*N. Chowdhury, I. Ahmed, Z. A. Azim, M. H. Alam, I. A. Niaz, and Q. D. M. Khosru*
- 1851 A Stacked Sputtered Process for  $\beta$ -FeSi<sub>2</sub> Formation  
*T. Inamura, A. Sasaki, K. Aoki, K. Kakushima, Y. Kataoka, A. Nishiyama, N. Sugii, H. Wakabayashi, K. Tsutsui, K. Natori, and H. Iwai*
- 1852 Photo-Anode Nanostructure Design and Electron Transport Mechanism of Photoelectrochemical Cells  
*C. T. Liu and C. W. Hong*
- 1853 Modulation Doped Hydrogenated Amorphous Silicon Germanium Superlattice Contacts and Application to Optoelectronic Devices  
*B. Hekmatshoar, W. Rieutort-Louis, D. Shahrjerdi, and R. Haight*



- 1854 Epinephrine Detection In Copper Self Assembled Monolayers  
*J. F. Silva Sr.*
- 1855 High Quality of  $\text{Ge}_{1-x}\text{Si}_x$  ( $0.9 \leq x \leq 0.95$ ) Buffers Grown On  $6^\circ$  off Si(100) By Using Low Temperature Ge Seed Layer  
*C. L. Nguyen*
- 1856 Hot Hole-Induced Device Degradation By Drain Junction Reverse Current  
*K. S. Kim, J. Song, D. Song, and B. Choi*

## **E2 - Atomic Layer Deposition Applications 9**

*Dielectric Science and Technology, Electronics and Photonics*

- 1857 ALD Growth of PbTe and PbSe Superlattices for Thermoelectric Applications  
*K. Zhang, A. D. Ramalingom Pillai, D. Nminibapiel, M. Tangirala, V. S. Chakravadhanula, C. Kübel, H. Baumgart, and V. Kochergin*
- 1858 Synthesis, Characterization, and Application of Tunable Resistance Coatings Prepared By Atomic Layer Deposition  
*J. W. Elam, A. U. Mane, J. A. Libera, O. H. Siegmund, J. McPhate, M. J. Wetstein, A. Elagin, M. J. Minot, A. O'Mahony, R. G. Wagner, W. M. Tong, A. D. Brodie, M. A. McCord, and C. F. Bevis*
- 1859 Unit Steps of an ALD Half-Cycle  
*T. Blomberg*
- 1860 *In Situ* Characterization of Plasma-Assisted Pt ALD on W ALD Adhesion Layers with Spectroscopic Ellipsometry  
*A. S. Cavanagh, L. Baker, J. W. Clancey, J. Yin, A. Kongkanand, F. T. Wagner, and S. M. George*
- 1861 Vapor Phase Surface Functionalization Using Atomic Layer Deposition (ALD) and Self Assembled Molecules (SAMs)  
*G. M. Sundaram, L. Lecordier, and R. Bhatia*
- 1862 Diaphragm Durability Enhancement for Valves Supplying Gas for Atomic Layer Deposition  
*M. Yamaji, T. Tanikawa, T. Yakushijin, T. Funakoshi, S. Yamashita, A. Hidaka, M. Nagase, N. Ikeda, S. Sugawa, and T. Ohmi*
- 1863 ZnO Nanorods Grown On ZnO Seed Layer Derived By Atomic Layer Deposition Process  
*K. Zhang, S. Khadka, D. Nminibapiel, M. Tangirala, and H. Baumgart*
- 1864  $\text{VO}_2$  Films Prepared By Atomic Layer Deposition and RF Magnetron Sputtering  
*K. Zhang, M. Tangirala, D. Nminibapiel, V. Pallem, C. Dussarrat, W. Cao, H. Elsayed-Ali, H. Baumgart, T. N. Adam, and C. S. Johnson*

- 1865 Nanoscale Film Thickness Measurements By X-Ray Fluorescence Spectroscopy for ALD Grown Films  
*T. M. Abdel-Fattah and H. Baumgart*
- 1866 Microstructure Analysis of ALD Bi<sub>2</sub>Te<sub>3</sub>/Sb<sub>2</sub>Te<sub>3</sub> Thermoelectric Nanolaminates  
*K. Zhang, D. Nminibapiel, M. Tangirala, V. S. Chakravadhanula, C. Kübel, H. Baumgart, and V. Kochergin*
- 1867 Ultra Dielectrophoresis Using Atomic Layer Deposited Films: Electrothermal Analysis  
*S. Emaminejad, M. Javanmard, R. W. Dutton, and R. W. Davis*
- 1868 Physical, Electrical, and Reliability Characteristics of Multi-Step Deposition-Annealed HfO<sub>2</sub> Film  
*Y. L. Cheng, C. Y. Hsieh, and T. C. Bo*
- 1869 Growth of TiO<sub>2</sub> Nanoparticles by Atomic Layer Deposition  
*A. G. Scheuermann, J. P. Lawrence, M. Gunji, C. E. D. Chidsey, and P. C. McIntyre*
- 1870 Characteristics of SnS<sub>x</sub> By Atomic Layer Deposition for CIGS Solar Cells  
*G. Ham, S. Shin, J. Park, and H. Jeon*
- 1871 Atomic Layer Deposition of Multi-Component Metal Sulfides Applied to Thin Film Photovoltaics  
*E. Thimsen*
- 1872 Spatial-ALD of Transparent and Conductive Oxides  
*A. Illiberi, T. Grehl, A. Sharma, B. Cobb, G. Gelinck, P. Poodt, H. Brongersma, and F. Roozeboom*
- 1873 Characteristics of Thin Film Ytria-Stabilized Zirconia Electrolyte by Atomic Layer Deposition for Thin Film Solid Oxide Fuel Cells  
*G. Y. Cho, J. Y. Paek, J. Park, T. Park, Y. H. Lee, and S. W. Cha*
- 1874 Conformal Deposition for 3D Thin-Film Batteries  
*P. M. Vereecken and C. Huyghebaert*
- 1875 High Areal Capacity Li-Ion All Solid State 3D Microbattery Based on Anatase TiO<sub>2</sub> Deposited by ALD on Silicon Microstructures  
*E. Eustache, P. Tilmant, L. Morgenroth, P. Roussel, N. Rolland, T. Brousse, and C. Lethien*
- 1876 Advanced Dielectrics Targeting 2X nm DRAM MIM Capacitors  
*M. Popovici, J. Swerts, M. Aoulaiche, A. Redolfi, B. Kaczer, M. S. Kim, B. Douhard, A. Delabie, S. Clima, M. Jurczak, and S. Van Elshocht*
- 1877 ALD of SrTiO<sub>3</sub> and Pt for Pt/SrTiO<sub>3</sub>/Pt MIM structures: Growth and Crystallization study  
*V. Longo, M. Verheijen, F. Roozeboom, and E. Kessels*

- 1878 Atomic Layer Deposition of Thin Oxide Films for Resistive Switching  
*K. Frohlich Sr., P. Jancovic, B. Hudec, J. Derer, A. Paskaleva, T. Bertaud, and T. Schroeder*
- 1879 ALD and Pulsed-CVD of Ru, RuO<sub>2</sub>, and SrRuO<sub>3</sub>  
*J. H. Han and C. S. Hwang*
- 1880 Catalytic Surface Reactions during Nucleation and Growth of Atomic Layer Deposition of Noble Metals: a Case Study for Platinum  
*A. Mackus, A. Bol, and E. Kessels*
- 1881 Conductivity Improvements of Atomic Layer Deposited Ta<sub>3</sub>N<sub>5</sub>  
*H. F. W. Dekkers, S. Van Elshocht, and L. P. B. Lima*
- 1882 Room Temperature Sensing of O<sub>2</sub> and CO By ALD Prepared ZnO Films Coated With Pt Nanoparticles  
*I. Erkens, M. Blauw, M. Verheijen, F. Roozeboom, and E. Kessels*
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### **E3 - GaN and SiC Power Technologies 3**

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#### **E4 - Low-Dimensional Nanoscale Electronics and Photonic Devices 6**

*Electronics and Photonics, Dielectric Science and Technology, Sensor*

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*X. Zheng*



- 1956 Scalable and Direct Growth of Graphene Microribbons and Nanoribbons On Dielectric Substrates  
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*W. Lu*
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*K. Takei*
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- 2017 High-Performance Molecular FLASH Memory With Redox-Active Molecules  
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*K. S. Chae, D. Y. Lee, M. S. Jeon, S. E. Lee, T. H. Shim, and J. G. Park*

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*R. G. D. Jeyasingh, S. W. Fong, J. Lee, E. Bozorg-Grayeli, C. Ahn, M. Asheghi, K. E. Goodson, and H. S. P. Wong*
- 2023 Correlated Nano-Oxides for Electronic Phase Change Electronics  
*H. Tanaka*
- 2024 Entropy-Controlled Phase Change Memory With An Extraordinary Small Switching Energy  
*J. Tominaga, P. J. Fons, A. V. Kolobov, and S. Murakami*
- 2025 Special Electric Characteristics of Superlattice Phase Change Memory  
*T. Ohyanagi, M. Kitamura, and N. Takaura*

### **E6 - Photovoltaics for the 21st Century 9**

*Dielectric Science and Technology, Electrodeposition, Electronics and Photonics, Energy Technology, Industrial Electrochemistry and Electrochemical Engineering*

- 2026 Bulk-Heterojunction Solar Cells Based On Mixed Donors of P3HT and Phenylene–Thiophene Oligomer Derivative  
*T. Okukawa, S. Fujii, Z. Duan, Y. Otori, Y. Kaneko, G. Zhao, Y. Yanagi, A. Yoshida, M. Ohzeki, T. Yanagidate, Y. Arai, H. Kataura, and Y. Nishioka*
- 2027 Driving Energy for the Formation of Molecular Bulk Heterojunction in Small Molecule Based Organic Photodiode  
*H. Han, S. Sul, K. H. Lee, J. B. Park, Y. Jung, S. Byun, C. Jung, and K. S. Kim*
- 2028 Construction of Hierarchically Structured TiO<sub>2</sub> Nanotube Arrays for Efficient Dye-Sensitized Solar Cells  
*M. Ye, D. Zheng, M. Lv, C. Chen, Z. Lin, and C. Lin*
- 2029 Effect of Co-Evaporated Liq:Alq<sub>3</sub> Layer for Power-Conversion-Efficiency Enhancement of Polymer Photovoltaic Cells  
*J. H. Park, J. H. Kim, H. R. Lee, Y. H. Ko, J. S. Park, and J. G. Park*
- 2030 Nano-Ordering of Donor-Acceptor Interactions Using Metal-Organic Frameworks As Scaffolds  
*K. Leong, M. E. Foster, B. M. Wong, E. D. Spörke, D. Gough, J. C. Deaton, and M. D. Allendorf*
- 2031 Optimizing Light Harvesting and Charge Collection in Dye-Sensitized Solar Cells Based On ZnO  
*T. Pauporté*

- 2032 Flexible PTB7:PC70BM Bulk-Heterojunction Solar Cells with LiF Cathode Buffer Layer  
*T. Yanagidate, S. Fujii, M. Ohzeki, R. Nagata, D. Kaneto, T. Sato, T. Hoashi, Y. Yanagi, Y. Arai, T. Okukawa, A. Yoshida, H. Kataura, and Y. Nishioka*
- 2033 Highly Conductive PEDOT:PSS Electrode Treated With Polyethylene Glycol for ITO-Free Polymer Solar Cells  
*D. A. Mengistie, P. C. Wang, and C. W. Chu*
- 2034 Back Contact Chalcogenide Photovoltaics: CdSe/CdTe and CdS/CdTe  
*D. Josell, R. Debnath, C. Hangarter, J. Y. Ha, B. Yoo, D. U. Kim, M. A. Sahiner, J. Guyer, C. J. Reehil, and W. A. Manners*
- 2035 Physical Characterization of Thin Films of  $\text{Cu}_x\text{Zn}_y\text{S}_z$  for Photovoltaic Applications  
*F. Di Benedetto, S. Cinotti, A. Guerri, A. De Luca, A. Lavacchi, G. Montegrossi, M. Innocenti, F. Carla', and R. Felici*
- 2036 Rapid Thermal Processing in CdS/CdTe Thin Film Solar Cells By Intense Pulsed Light Sintering  
*R. Dharmadasa, O. K. Echendu, I. M. Dharmadasa, and T. Druffel*
- 2037 Cu(InGa)(SeS)<sub>2</sub> Electrodeposition From a Single Bath  
*M. A. Saeed and U. Landau*
- 2038 Three-Electrode Electrorefining for Ultrapure Solar-Grade Si  
*X. Han, B. Zhou, and M. Tao*
- 2039 Modelling of the Contact Resistance of Screen Printed Ag-Contacts to Si Emitters  
*A. M. Svensson, S. Olibet, E. Cabrera, J. Friis, K. Butler, and J. Harding*
- 2040 SEM Analysis As a Diagnostic Tool for Photovoltaic Cell Degradation  
*G. O. Osayemwenre and E. L. Meyer*
- 2041 Development of Amorphous Carbon-Based Variable Optical Gap Semiconductor Materials  
*K. Honda, K. Yoshinaga, and A. Nakahara*
- 2042 Semi Transparent Electrode of Au nano mesh on Flexible Substrates Fabricated by Transfer Printing Using Self-Organized Porous Polymer Mold  
*Y. Yanagi, H. Saito, S. Fujii, A. Yoshida, T. Okukawa, T. Yanagidate, M. Ohzeki, Y. Arai, Y. Ohori, D. Kaneto, R. Nagata, H. Kataura, and Y. Nishioka*
- 2043 Towards a Photoelectrochemical Tool for Comprehensive Quality Assessment of Solar Cell Absorber Layers  
*D. Colombara, A. Crossay, V. Depredurand, and P. J. Dale*
- 2044 Electrodeposition and Characterization of Hematite Films Obtained From DMSO Solution  
*G. Riveros, D. L. Ramírez Sr., E. Dalchiele, R. Marotti, L. Peter, P. Grez, F. Martín, and J. R. Ramos-Barrado*
- 2045 Electrochemical Deposition of Compact and Nanostructured Films of Doped ZnO  
*D. L. Ramírez Sr., K. N. Álvarez, G. Riveros, M. Tejos, and M. G. Lobos*

- 2046 Electrodeposition of Lead Sulfide Thin Film and Application As Counter Electrode for Quantum Dot Solar Cells  
*N. V. Le, T. T. Ha, H. T. Nguyen, and T. T. P. Nguyen*
- 2047 Electron Transport Kinetics in Solid State Dye-Sensitized Solar Cells Utilizing Polymer Electrolyte  
*W. Cho, Y. R. Kim, D. H. Song, and Y. S. Kang*
- 2048 High Efficient Inverted Polymer Solar Cells By Surface Treatment of Zinc Oxide  
*S. Woo, W. Kim, and H. K. Lyu*
- 2049 Dye Sensitized Solar Cell Based On Polyaniline - Carbon Nanotubes Composite  
*L. Saad, S. Ebrahim, M. Fetteha, M. Soliman, and T. M. Abdel-Fattah*
- 2050 Enhanced Absorption Using Gold Nanoparticles Deposited TiO<sub>2</sub> Photoanode for Dye-Sensitized Solar cells  
*J. Oh and H. Lee*
- 2051 Improved Photovoltaic Effects of Photonic Crystal Based Photoelectodes in Dye-Sensitized Solar Cell  
*J. Kang and H. Lee*

## **E7 - Processing, Materials, and Integration of Damascene and 3D Interconnects 5**

*Dielectric Science and Technology, Electrodeposition, Electronics and Photonics, High Temperature Materials*

- 2052 Some Strategic Tracks to Optimize Routing of High Speed Signal Transmission Between Memory and Logic in 3D-IC Stacks  
*J. Roullard, A. Farcy, S. Capraro, T. Lacrevez, C. Bermond, G. Houzet, P. Artillan, J. Charbonnier, C. Fuchs, C. Ferrandon, P. Leduc, and B. Flechet*
- 2053 Reliability Challenges of 3-D Stacked Chip Package With Through-Silicon-Via (Invited talk)  
*M. Suh*
- 2054 3D Integration and Reliability Challenges  
*M. Koyanagi, M. Murugesan, K. Lee, T. Fukushima, and T. Tanaka*
- 2055 3D Integration for An SOI Pixel Detector (Invited Talk)  
*M. Motoyoshi*
- 2056 Fabrication and Characterization of Grain Growth in Electroplated Cu for 3D IC Interconnect Applications  
*T. C. Liu, S. R. Wang, and M. Corey*
- 2057 Challenges for Scaled Damascene Interconnects  
*S. Armini, J. Swerts, N. Jourdan, Y. K. Siew, J. Boemmels, Z. Tokei, and H. Struyf*



- 2058 Nanoscale Wiring By Cu Electrodeposition in Supercritical Carbon Dioxide Emulsified Electrolyte  
*M. Sone*
- 2059 Characterization of Local Stress in Silicon Around Through-Silicon Via Interconnects By Using Micro Raman Spectroscopy  
*J. H. Kim*
- 2060 Reduction of Thermal Expansion Coefficient of Electrodeposited Copper for TSV  
*K. Kondo, S. Mukahara, T. Hayashi, M. Takeuchi, T. Saito, and N. Okamoto*
- 2061 TSV Filling By NiW Alloys Electroplating  
*H. W. Wang, H. M. Huang, and W. P. Dow*
- 2062 Using Graphene As a Conducting Layer for Through Silicon Via Filling  
*S. C. Chang and W. P. Dow*
- 2063 Simulation of Produced Cuprous Ion Concentration Distribution During Periodic Reverse Pulse Current waveform  
*T. Hayashi, K. Kondo, M. Yokoi, T. Saito, and N. Okamoto*
- 2064 Extreme Bottom-Up Filling of Through Silicon Vias  
*D. Josell and T. P. Moffat*
- 2065 A Study of Adopting Pure Tin Solder to Pillar Bump  
*U. H. Lee, M. Cho, W. Choi, H. Y. You, J. Choi, and J. Won*
- 2066 Kinetic Monte Carlo Simulation of Filling High-Aspect-Ratio Through Silicon Via - II  
*Y. Kaneko, Y. Fukiage, T. Hayashi, K. Kondo, K. Ohara, and F. Asa*
- 2067 Modeling the Bottom-Up Filling of Through-Silicon Vias Through Suppressor Adsorption/Desorption Mechanism  
*L. Yang, A. Radisic, J. Deconinck, and P. M. Vereecken*
- 2068 Copper Seed Layer Wet Etching for 3D Integration  
*L. Gabette, R. Kachtouli, R. Segaud, and P. Besson*
- 2069 Improvement of Adhesion Strength of Electroless Barrier Layer and Its Application to TSV Process  
*S. Nishizawa, S. Shingubara, T. Shimizu, and F. Inoue*
- 2070 Through-Silicon-Via (TSV) Filling By the Electro-Chemical Deposition of Cu With Modified Microstructures By Ultra-Fast Pulsed Current  
*S. Jin, G. Wang, and B. Yoo*
- 2071 A Novel Cu Plating Formula for Filling Through Holes  
*Y. T. Lin, J. J. Yan, and W. P. Dow*
- 2072 Effect On Aspect Ratio Dependence On Etch Rate: Experiment and Modeling  
*L. Meng*

- 2073 Thermomechanical Properties of Electroplated Cu and Its Effect On Beol Leakage for Logic Devices  
*H. Lee, J. An, D. Lee, K. Moon, S. Lee, B. L. Park, S. Choi, H. K. Kang, E. Chung, and I. Chung*
- 2074 Low Temperature Fusion Wafer Bonding for Wafer-Level 3D Integration Applications  
*J. Burggraf, J. Bravin, H. Wiesbauer, and V. Dragoi*
- 2075 Effect of Bath Chemistry On Electrodeposited Cu Morphology Using Thin PVD Cu Seed  
*J. Kelly, X. Lin, T. Nogami, O. van der Straten, J. Demarest, J. Li, R. Murphy, P. DeHaven, X. Zhang, C. Penny, Q. Huang, and D. Edelstein*
- 2076 Novel Alkaline Copper and Copper-Alloy Electroplating Processes Offering Extended Capabilities in Semiconductor Interconnect Metallization  
*A. Joi, R. Akolkar, and U. Landau*
- 2077 Mechanistic Study of Autocatalysis During Electroless Copper Deposition  
*R. Akolkar, L. Yu, L. Guo, and R. Preisser*
- 2078 Structural Features of Nano-Scale Damascene Copper Lines After Annealing in Wide Temperature Range  
*T. Konkova, S. Mironov, Y. Ke, and J. Onuki*
- 2079 Investigation On Pad Surface Conditioner to Control Dishing Amount in Cu Damascene Process  
*J. W. Kim*
- 2080 Investigation of Bomb Defects: Reducing the Defect From Perhydropolysilazane Layer On Semiconductor  
*C. J. Lee, Y. H. Kim, J. S. Kim, J. S. OH, and B. D. Choi*
- 2081 CVD/ALD-Mn(Nx) As Copper Diffusion Barrier For Advanced Interconnect Technologies  
*N. Jourdan*
- 2082 Positive Tone, Chemically Amplified, Cross-Linkable Dielectric  
*B. Mueller and P. A. Kohl*
- 2083 Triangular Voltage Sweep Measurements After Current-Ramp Temperature Stress  
*I. Ciofi, P. Lazzaro, S. Silipigni, Y. Barbarin, and K. Croes*
- 2084 Effect of Dynamic Electric Field On Dielectric Breakdown in Damascene Cu Interconnects  
*J. Y. Song, H. W. Yeon, J. Y. Bae, Y. C. Hwang, and Y. C. Joo*
- 2085 Analysis of Cu(I) Complexes in Copper Sulfate Electroplating Solution By Using Reaction Kinetics With a Chelate Reagent  
*H. Noma, T. Koga, C. Hirakawa, K. Nonaka, and K. Shobu*
- 2086 Cuprous Ion As An Accelerant of Copper Damascene Electrodeposition  
*K. Kondo*

- 2087 Screening Techniques for Selecting Improved Additives for Bottom-Up Copper Metallization  
*L. Boehme and U. Landau*
- 2088 Impurity-Induced Tin Incorporation During Copper Electrodeposition  
*S. Kitayaporn, M. Hopstaken, Q. Huang, and B. C. Baker-O'neal*
- 2089 Copper Plating Uniformity On Resistive Substrate With Segmented Anode  
*L. Yang, A. Radisic, J. Deconinck, and P. M. Vereecken*
- 2090 Diallylamine Levelers Side Chains Effect On Copper Via Filling  
*Y. Yamada, K. Kondo, M. Takeuchi, T. Saito, N. Okamoto, M. Bunya, and M. Yokoi*
- 2091 In-Situ Analysis of Peg Surface Adhesion On Cu  
*U. H. Lee, J. Choi, J. Won, H. J. Lee, H. J. Sohn, and T. Kang*
- 2092 Analysis of Additive Role for Copper Electroplating Using Microfluidic Channel  
*M. Hayase, Y. Agarita, and H. Egoshi*
- 2093 Combination of AC Voltammetry and Chemometric Classification for Diagnosis of Disturbances of Electrodeposition Process  
*A. Jaworski, H. Wikiel, and K. Wikiel*

**E8 - Semiconductor Cleaning Science and Technology 13 (SCST 13)**  
*Electronics and Photonics*

- 2094 (Keynote) Roadmap Of Future Devices and Related Cleaning Challenges/Opportunities  
*P. W. Mertens*
- 2095 (Invited) Particle Cleaning Technologies To Meet Advanced Semiconductor Device Process Requirements  
*H. F. Okorn-Schmidt, F. Holsteyns, A. Lippert, D. Mui, M. Kawaguchi, C. Lechner, P. E. Frommhold, T. Nowak, and R. Mettin*
- 2096 A Study of Nanoparticle Removal On Patterned Surfaces  
*A. Pacco, F. Holsteyns, and S. De Gendt*
- 2097 Evaluation of An Effective Wet Cleaning Method for Particle Removal on Various Thin Films  
*Y. S. Cho, H. H. Lee, M. S. Yun, H. Hwang, M. S. Kim, B. K. Kang, A. A. Busnaina, and J. G. Park*
- 2098 Surface Cleaning Using CO<sub>2</sub> Gas Cluster For Semiconductor Device  
*Y. Cho, H. Choi, and T. Kim*
- 2099 A Multi-Frequency Megasonic System for Nano-Particle Removal  
*H. Kim, Y. Lee, and E. Lim*

- 2100 Numerical Calculation MODEL Of SiO<sub>2</sub> Film Etching By HF Aqueous Solution Using Single Wafer Wet Etcher  
*H. Habuka, S. Ohashi, K. Mizuno, and T. Kinoshita*
- 2101 Si and Sige Alloys Wet Etching Using Tmah Chemistry  
*V. Loup, L. Gabette, M. C. Roure, R. Kachtouli, M. Jourdan, P. Besson, and S. Petitdidier*
- 2102 A Study On the Removal Method of Si Residue During Si Wet Etching  
*K. Ko, H. Jeon, M. Song, B. Yoon, C. Lee, and T. Kim*
- 2103 Effect of Surface Wettability On Frictional Conditions of PVA Roll Brushes  
*Y. Hara, T. Sanada, A. Fukunaga, and H. Hiyama*
- 2104 Use of a Simple Cavitation Cell Set-Up With Replaceable Single Band Filters for Analysis of Sonoluminescence Signal From Megasonic Irradiated Gasified Aqueous Solutions  
*S. Raghavan, Z. Han, M. Keswani, M. Beck, and E. Liebscher*
- 2105 Numerical Study of Single Bubble Dynamics in Megasonic Field for New Physical Cleaning Method  
*N. Ochiai and J. Ishimoto*
- 2106 Challenges and Solutions for 450mm FEOL Wet Clean Tool  
*B. Yu, F. Ku, C. Taft, A. S. Larrea, T. Hayashi, A. Morita, K. Arai, H. Naohara, and J. Lin*
- 2107 Chemical Improvement of Euv Ruthenium Capping Layer Against Active Oxygen and Hydroxyl Radicals  
*H. Lee, J. Choi, S. Koh, J. Kim, D. Kim, J. Choi, H. Kim, H. Ko, B. G. Kim, and C. U. Jeon*
- 2108 Feol and Beol Cleaning Challenges for 2x and Sub-20nm Technology Nodes  
*A. Sehgal*
- 2109 Evaluation of TaN as the Wet Etch Stop Layer during the 22nm HKMG Gate Last CMOS Integrations  
*H. Cui, J. Xu, J. Gao, J. Xiang, Y. Lu, Z. Tang, X. He, T. Li, J. Luo, X. Wang, B. Tang, J. Yu, T. Yang, J. Yan, J. Li, and C. Zhao*
- 2110 Lanthanum Interaction With Surface Preparations  
*P. Garnier, V. Joseph, and R. Krachewski*
- 2111 Integration of Wet Cleaning in 45 Nm Pitch Beol Processing  
*E. Kesters, Q. T. Le, F. Lazzarino, S. Decoster, C. Wilson, I. Simms, F. Holsteyns, and S. De Gendt*
- 2112 Effective Defect Control in TiN Metal Hard Mask Cu/Low-k Dual Damascene Process  
*A. Kabansky, S. S. H. Tan, E. A. Hudson, G. Delgadino, L. Gancs, and J. Marks*

- 2113 Inhibition of Copper Corrosion By Removal of H<sub>2</sub>O<sub>2</sub> From CO<sub>2</sub>-Dissolved Water Using Palladium Catalysts  
*D. Yano, M. Murayama, M. Takahashi, H. Kobayashi, and K. Yamanaka*
- 2114 Monitoring of Polymer Removal Process for Copper Interconnect  
*E. Shalyt, G. Liang, J. Wang, M. Pavlov, V. Dozortsev, P. Bratin, and C. Bai*
- 2115 (Invited) Wetting Behavior Of Aqueous Solutions On High Aspect Ratio Nanopillars With Hydrophilic Surface Finish  
*G. Vereecke, X. Xu, W. K. Tsai, H. Yang, S. Armini, T. Delande, G. Doumen, F. Kentie, X. Shi, I. Simms, K. Nafus, F. Holsteyns, H. Struyf, and S. De Gendt*
- 2116 Watermark Formation Mechanism By Evaporation of Ultra-Pure Water: Study the Effect of Ambient  
*A. H. Tamaddon, P. W. Mertens, G. Vereecke, F. Holsteyns, G. Doumen, S. De Gendt, and M. Heyns*
- 2117 Advanced Wafer Drying Technology for 1x Node and Beyond Using Surface Modification Method  
*T. Orii, T. Watanabe, T. Toshima, M. Nakamori, K. Egashira, Y. Ido, and N. Matsumoto*
- 2118 Contamination Control in Supercritical CO<sub>2</sub> Drying Process for Nano-Scale Memory Manufacturing  
*H. Hayashi, H. Okuchi, H. Tomita, Y. Ono, T. Nakamori, and H. Sugawara*
- 2119 All Wet Resist Strip for Improved Semiconductor Process and Product Improvement  
*M. Bashyam*
- 2120 Translation of Particles to Wafers During Spin Coating  
*C. W. Extrand, S. I. Moon, and L. Monson*
- 2121 Cryogenic Single-Component Micro-Nano Solid Nitrogen Particle Production Using Laval Nozzle for Physical Resist Removal-Cleaning Process  
*J. Ishimoto, U. Oh, T. Koike, and N. Ochiai*
- 2122 Effects of Plasma and Wet Processes on Si-Rich Anti-Reflective Coating to Address Selective Trilayer Rework for Sub-20nm Technology Nodes  
*O. Pollet, R. Sommer, L. Lachal, S. Barnola, C. De Buttet, C. Richard, and C. Jenny*
- 2123 Characterization of the Descum Process for Various Silicon Substrates  
*C. S. Tiwari, Y. S. Lim, R. Fulton, J. Srinivasan, M. Gisinger, P. Flynn, and L. H. Mak*
- 2124 TiN Metal Hard Mask Removal with Selectivity to Tungsten and TiN Liner  
*L. M. Chen, S. Lippy, B. Peethala, M. Sankarapandian, D. L. Rath, K. Boggs, and E. Kennedy*

- 2125 Selective Removal of Ashed Spin-On Glass  
*H. C. Wu and S. H. Tu*
- 2126 Non-Stiction Performance of Various Post Wet-Clean Drying Schemes On High-Aspect-Ratio Device Structures  
*H. W. Chen, R. Gouk, S. Verhaverbeke, and R. Visser*
- 2127 Influence of Geometry, Edges and Roughness On Liquid Penetration and Removal During Wet Cleaning  
*C. W. Extrand and S. I. Moon*
- 2128 Micro Unetched Oxide Defect During Buffered Oxide Etchant Process  
*S. LIM, D. Ahn, K. Kim, H. Jung, B. Lee, H. Lee, and H. Hwang*
- 2129 (Invited) A Novel Approach to Clean Surface for High Mobility Channel Materials With in-Situ Atomic Hydrogen Clean  
*J. PARK, J. G. Cruz, B. Zheng, J. Gelatos, M. Narasimhan, and P. K. Narwankar*
- 2130 Pcpuecrg"Gvej kpi "qh"KKX"Ugo leqpf vevqtu"lp"Cekf le"J<sub>4</sub>Q<sub>4</sub>"Uqmwkqpu  
*D. H. V. Dorp, S. Arnauts, D. Cuyppers, J. Rip, F. Holsteyns, and S. De Gendt*
- 2131 Ej go lecdRcuukc"vqp"qh"l cCu"\*322+"Wukpi "Cmepj kqu  
*P. Mancheno-Posso and A. J. Muscat*
- 2132 Study of InP Surfaces After Wet Chemical Treatments  
*D. Cuyppers, D. H. V. Dorp, M. Tallarida, S. Brizzi, L. Rodriguez, T. Conard, S. Arnauts, D. Schmeisser, C. Adelman, and S. De Gendt*
- 2133 Selective Ni Removal Deposited On Ge At Different Annealing Temperatures  
*M. Otsuji*
- 2134 Surface Processing for Area Selective Mist Deposition of Nanocrystalline Quantum Dot Films  
*J. H. Chao, A. Kshirsagar, and J. Ruzyllo*
- 2135 Trace Metal Analysis of Cleanroom Dry Wipers By Inductively Coupled Plasma – Mass Spectrometry  
*S. Liu and B. Liu*
- 2136 Quantitative Analysis of the Metallic Contamination On GaAs and InP Wafers By TXRF and ICPMS Techniques  
*H. Fontaine and T. Lardin*

## **E10 - Semiconductors, Dielectrics, and Metals for Nanoelectronics 11**

*Dielectric Science and Technology, Electronics and Photonics*

- 2137 Effects of N-Rich TiN Capping Layer on Reliability in Gate-Last High-k/Metal Gate MOSFETs  
*K. Bae, K. T. Lee, H. C. Sagong, M. Choe, H. Lee, S. Kim, K. S. Kim, J. Park, S. Pae, and J. Park*
- 2138 High Temperature Annealing of the Interface State Component of Negative-Bias Temperature Instability (NBTI) in MOSFET Devices  
*D. Nguyen, K. Kambour, C. Kouhestani, H. P. Hjalmarson, and R. A. B. Devine*
- 2139 Reliability of ALD  $\text{Hf}_{1-x}\text{Zr}_x\text{O}_2$  Deposited by Intermediate Annealing or Intermediate Plasma Treatment  
*M. Bhuyian, D. Misra, K. Tapily, R. Clark, S. Consiglio, C. Wajda, G. Nakamura, and G. Leusink*
- 2140 Multiphonon Processes as the Origin of Reliability Issues  
*W. Goes, M. Toledano-Luque, F. Schanovsky, M. Bina, O. Baumgartner, B. Kaczer, and T. Grasser*
- 2141 Similarities between Ionizing Radiation Effects and Negative-Bias Temperature Instability (NBTI) in MOSFET Devices  
*H. P. Hjalmarson, D. Nguyen, K. Kambour, C. Kouhestani, and R. A. B. Devine*
- 2142 SiC MOS Interface States: Difference between Si Face and C Face  
*T. Umeda, M. Okamoto, R. Kosugi, S. Harada, R. Arai, Y. Sato, T. Makino, and T. Ohshima*
- 2143 Reliability of La-Silicate MOS Capacitors with Tungsten Carbide Gate Electrode for Scaled EOT  
*S. Hosoda, K. Tuokedaerhan, K. Kakushima, Y. Kataoka, A. Nishiyama, N. Sugii, H. Wakabayashi, K. Tsutsui, K. Natori, and H. Iwai*
- 2144 Origins for Fermi Level Control in Metal/High-k/Si Stacks with Inserted Dielectric Layers  
*M. Eizenberg and L. Kornblum*
- 2145 Novel Graphene Devices  
*C. M. Corbet, M. Ramon, H. C. Movva, D. Reddy, S. Kang, S. F. Chowdhury, D. Akinwande, E. Tutuc, F. Register, and S. K. Banerjee*
- 2146 The Origin of Linear and Nonlinear Damping in Graphene Nanomechanical Resonators  
*M. Bockrath and T. Miao*
- 2147 Oxidation Models for Crystalline Silicon Nanowires  
*R. G. Mertens, V. H. Velez, and K. B. Sundaram*

- 2148 Resistivity of Ni Silicide Nanowires and Its Dependence On Ni Film Thickness Used for the Formation  
*J. Song, K. Matsumoto, K. Kakushima, Y. Kataoka, A. Nishiyama, N. Sugii, H. Wakabayashi, K. Tsutsui, K. Natori, and H. Iwai*
- 2149 III-V Nanowires for Optoelectronic Applications  
*H. Tan, N. Jiang, D. Saxena, Y. H. Lee, S. Mokkalapati, L. Fu, Q. Gao, H. J. Joyce, and C. Jagadish*
- 2150 Vertical III-V Nanowire-Channel on Si  
*K. Tomioka and T. Fukui*
- 2151 Nanoscale Heterogeneous Reactions and Interfaces in Ge/Si and for III-V on Si Integrated Devices  
*S. Dayeh, W. Tang, B. M. Nguyen, X. Dai, Y. Liu, Y. Hwang, and R. Chen*
- 2152 How to Dope a Semiconductor Nanocrystal?  
*Y. Amit, A. Fasut, O. Milo, E. Rabani, A. Frenkel, and U. Banin*
- 2153 Advanced Spectroscopic Ellipsometry Application for Multi-Layers SiGe At 28nm Node and Beyond  
*T. C. Hsuan, Y. C. Hu, S. Hsu, D. Z. Zhan, A. Lin, S. Yu, C. C. Chien, S. J. Chang, S. M. Chiu, C. J. Huang, C. Y. Cheng, J. Cheng, G. Raphael, Z. Jiang, Y. Carlos, and Z. Tan*
- 2154 Comparison of Strained SiGe-On-SOI and Condensed Sgoi p-Mosfet With Various Ge Concentrations  
*S. H. Song, D. Y. Lee, T. H. Kim, T. H. Shim, and J. G. Park*
- 2155 Integration of High-k Dielectrics on Epitaxial (100), (110) and (111) Germanium for Multifunctional Devices  
*M. K. Hudait, Y. Zhu, D. Maurya, and S. Priya*
- 2156 Effect of Precursor Entrance Sequence during Atomic Layer Deposition on the Al<sub>2</sub>O<sub>3</sub>/Ge Interface by X-ray Photoelectron Spectroscopy  
*J. Xiang, G. Wang, T. Li, H. Cui, X. Wang, G. Xu, J. Li, W. Wang, and C. Zhao*
- 2157 Resistive Switching in Metal Oxides: From Physical Modeling to Device Scaling  
*D. Ielmini, S. Ambrogio, and S. Balatti*
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*P. J. Dale, J. C. Malaquias, and M. Steichen*
- 2253 Electrochemical Synthesis of Metal Chalcogenides Nanostructures  
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- 2258 Structure and Dynamics of Imidazolium-based Ionic Liquids  
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- 2261 Influence of Incorporated Light Elements On Refining Process for High-Purity Silica Using Microchannel Device  
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- 2283 Electrochemical Deposition of Terbium From Molten Salts  
*D. Chidambaram and S. Rayaprolu*
- 2284 Degradation Mechanism of Lithium-Ion Battery in Charge and Discharge Cycling Tests  
*T. Hayashi, M. Kondo, E. Toda, R. Kuzuo, N. Oshimura, and J. Okada*

- 2285 Non-Line-of-Sight Deposition of Nanoscale Separator/Electrolytes for 3D All-Solid-State Batteries  
*M. B. Sassin, J. W. Long, and D. R. Rolison*
- 2286 Ultrafast Laser Spectroscopy of Electrode/Electrolyte Interfaces  
*J. Syzdek, V. Zorba, X. Mao, R. Russo, and R. Kostecki*
- 2287 A Technical and Operational Perspective On the DOE Energy Innovation Hub in Fuels From Sunlight, the Joint Center for Artificial Photosynthesis  
*N. S. Lewis*
- 2288 Photochemical Route for the Preparation of Complex Amorphous Water Oxidation Catalyst  
*R. D. L. Smith, S. Trudel, and C. P. Berlinguette*
- 2289 Composition and Structure Control of Copper Oxide (Cu<sub>2</sub>O and CuO) Nanowires Via Thermal Routes  
*F. Wu Sr. and P. Banerjee Sr.*
- 2290 Electrodeposition of High-Purity Continuous Indium Thin Films Towards Indium Phosphide Solar Cells  
*P. Lobaccaro, A. Raygani, A. Oriani, L. Magagnin, A. Javey, and R. Maboudian*
- 2291 Influence of Anodization Conditions On the Electronic Structure of TiO<sub>2</sub> Nanotubes  
*L. K. Tsui and G. Zangari*
- 2292 TiO<sub>2</sub> As Electron-Extraction-Layer in Reverse Type P3HT/Iciba Organic Solar Cells  
*N. Loew, S. Komatsu, H. Akita, K. Funayama, T. Yuge, T. Fujiwara, and M. Ihara*
- 2293 Graphene Oxide and Carbon Nanotubes As Gelators for Gel Electrolytes  
*J. Ouyang and C. Y. Neo*
- 2294 Electrochemical Liquid-Liquid-Solid Crystal Growth of Semiconductors  
*S. Maldonado*
- 2295 Electrochemical Reduction Behavior of Granular SiO<sub>2</sub> in Molten CaCl<sub>2</sub>  
*X. Yang, K. Yasuda, T. Nohira, R. Hagiwara, K. Ichitsubo, K. Masuda, and T. Homma*
- 2296 Electrolyte-Electrode Interfacial Study for Si Electrodeposition in Ionic Liquid  
*J. Komadina, Y. Ishibashi, Y. Tsuyuki, Y. Zhang, Y. Fukunaka, P. A. Pianetta, and T. Homma*
- 2297 Tuning Electrode Potential With Surface Chemistry  
*J. B. Rivest, G. Li, I. D. Sharp, J. B. Neaton, and D. J. Milliron*
- 2298 One-Step Fabrication of Nano-Structured Solid Oxide Fuel Cells By Electrostatic Spray Deposition  
*J. R. Selman*

- 2299 Silver-Ceria Composites for Oxygen Separation From Air  
*E. Ruiz-Trejo, P. Boldrin, A. Lubin, F. Tariq, N. P. Brandon, A. Atkinson, S. Fearn, R. Chater, S. Cook, J. Darr, and C. Tighe*
- 2300 Nano Structuring for Efficient Energy Conversion  
*S. F. Bent, T. M. Gur, and F. B. Prinz*
- 2301 Dynamic Response Characteristics of Distribution Network Including Distributed Generators and Power System Stability  
*Y. Shirai*

**F3 - Fundamentals and Applications of Electrophoretic Deposition**  
*Electrodeposition*

- 2302 New Developments in Electrophoretic Nanotechnology  
*I. Zhitomirsky*
- 2303 Toward Dynamic Control of Magnetic Nanoparticle Monolayers Fabricated By Electrophoretic Deposition: A New Path to Ordered Superlattices?  
*J. H. Dickerson II, A. Krejci, M. Darbandi, C. G. W. Thomas, and J. Mandal*
- 2304 Light Directed Electrophoretic Deposition: A New Technique for Patterning Materials in 3D  
*A. J. Pascall, F. Qian, G. Wang, Y. Li, and J. D. Kuntz*
- 2305 Electrophoretic Deposition of Polymerically Stabilized Silica Nanoparticles for Anti-Wetting Fabrics  
*Y. S. Joung and C. R. Buie*
- 2306 Electrophoretic Deposition of Cobalt Ferrite and Platinum Cobalt Nanoparticles As Electrocatalysts  
*R. Tanakit, W. Luc, and J. B. Talbot*
- 2307 Electrophoretic Deposition of Quantum Dots for Photovoltaic Applications  
*S. W. Lee, H. Hlaing, I. Kymissis, and I. P. Herman*
- 2308 Electrophoretic Deposition of Multi-Sized Titania Nanoparticles to Fabricate High Performance Electrodes for Dye-Sensitized Solar Cell Application  
*N. Parsi Benekohal and G. P. Demopoulos*
- 2309 Comparison of Electrophoretic Deposition of Nano- and Micron-Sized Ba<sub>2</sub>SiO<sub>4</sub>:Eu<sup>2+</sup> Phosphor Particles  
*J. I. Choi, M. Anc, A. Piquette, M. E. Hannah, K. C. Mishra, J. B. Talbot, and J. McKittrick*
- 2310 Nanoparticle Monolayers of Iron Oxide Fabricated Using Electrophoretic Deposition: A New Path to Superlattices?  
*A. Krejci, J. H. Dickerson II, and K. Yager*

- 2311 Fabrication of Ti/Al<sub>2</sub>O<sub>3</sub> Gradient Coating Layer Using Electrophoretic Deposition for Implant Abutment Application  
*H. Kim and C. S. Lee*
- 2312 Electrodeposition of Organic-Inorganic Films for Biomedical Applications  
*I. Zhitomirsky*
- 2313 Environmentally-Benign Electrochemical Method for Formation of Catalytic Metal Nanoparticles in a Chitosan Matrix On a Stainless Steel Electrode  
*G. P. Halada, M. Cuiffo, and P. Jha*
- 2314 Dispersion of Carbon Nanotubes in Aqueous Solutions of Ionic Surfactants  
*Y. S. Joung and C. R. Buie*
- 2315 Deposition of Vulcan XC-72 Coatings on Stainless Steel Bipolar Plates by Reverse Pulsed DC Voltage Electrophoretic Deposition (EPD) for Fuel Cell Applications  
*W. J. Pech-Rodriguez, D. Gonzalez-Quijano, G. Vargas-Gutierrez, and F. J. Rodriguez-Varela*
- 2316 Study of the Stability of Highly Oxidized Metals (Ir, Ti, Ta, Sn) in Ethanol-Water and Isopropanol-Water Dispersions Previous to Epd  
*M. T. Oropeza-Guzman, J. B. Talbot, and M. R. Perez-Garcia*
- 2317 Optimization of BiFeO<sub>3</sub> Suspensions Stabilization  
*C. Ponzoni, M. Cannio, R. Rosa, and C. Leonelli*
- 2318 Electrodynamics of Colloidal Nanoparticles in Non-Polar Solvents  
*E. Johnson, A. Tefera, M. Mochena, and J. H. Dickerson II*
- 2319 Hydrogen Sensing With Metal Nanoparticles Electrophoretically Deposited Onto Epitaxial Layers of III-V Semiconductors  
*J. Grym, R. Yatskiv, J. Lorincik, and O. Cernohorsky*
- 2320 Surface Charge Formation On Ligand – Dressed CdSe Nanoparticle in Hexane  
*A. Tefera, M. Mochena, E. Johnson, and J. H. Dickerson II*

#### **F4 - Fundamentals of Electrochemical Growth - From UPD to Microstructures 3** *Electrodeposition*

- 2321 Structural Analysis of Highly Durable Si-O-C Or Sn-O-C Composite Anodes for Lithium Secondary Battery By Means of Electrodeposition  
*T. Osaka, T. Yokoshima, H. Nara, and T. Momma*
- 2322 Electrodeposition in Ionic Liquids: From Nanoscale Processes to Macroporous Materials  
*F. Endres*
- 2323 Recent Advances in the Theory and Simulation of Underpotential Deposition  
*E. P. M. Leiva, M. Villarreal, O. A. Oviedo, P. Velez, L. Farigliano, A. Pinto, and L. Reinaudi*

- 2324 Electrochemical Deposition of Pt-(Fe, Co, Ni) Alloys: Self-Terminated Growth to Underpotential Co-Deposition  
*T. P. Moffat, Y. Liu, C. Hangarter, D. Gokcen, L. Y. Ou Yang, and U. Bertocci*
- 2325 Electrochemical Analysis of the Underpotential Deposition of Cadmium and Zinc On Different Substrates  
*R. Kowalik, P. Zabinski, and K. Mech*
- 2326 Lead UPD On Ru(0001)  
*Q. Yuan, S. Brankovic, and D. Wu*
- 2327 Lead Underpotential Deposition On Ru Sub-Monolayer Modified Au(111) Surface  
*S. Brankovic and Q. Yuan*
- 2328 Electrodeposition of Semiconductors Thin Films With Different Composition and Band Gap  
*M. Innocenti, I. Bencistà, L. Becucci, F. Di Benedetto, S. Cinotti, L. Wang, A. Lavacchi, M. V. Pagliaro, F. Vizza, C. Zafferoni, and M. L. Foresti*
- 2329 Dynamic Stress Analysis At Solid Electrodes  
*M. C. Lafouresse, U. Bertocci, and G. R. Stafford*
- 2330 Study of Pt Dissolution During Formic Acid Oxidation On Thin Films Deposited Via Surface Limited Redox Replacements  
*N. Vasiljevic, M. Fayette, J. Nutariya, and N. Dimitrov*
- 2331 In-Situ TEM Observation of Electrochemical Growth  
*Y. Oshima*
- 2332 Nucleation Study On Dendrite Suppressing Lithium-Sodium Electrolyte for Lithium Batteries  
*J. K. Stark and P. A. Kohl*
- 2333 Early Stages of Electrochemical Nucleation and Growth On Carbon Substrates: Nanocluster Aggregation, Coalescence and Recrystallization  
*J. Ustarroz, T. Altantzis, J. Hammons, A. Hubin, S. Bals, and H. Terry*
- 2334 Electrodeposition of Silver On Ultra Thin Polypyrrole Films. Approach to Unusual Nucleation of Metal  
*T. Rapecki, Z. Stojek, and M. Donten*
- 2335 Synthesis and Technological Application of Electrodeposited Semiconductors By EC-ALD  
*I. Bencistà, F. Borgatti, M. Cavallini, F. Di Benedetto, A. Lavacchi, and M. Innocenti*
- 2336 Next Experimental Confirmation of Validity of the Phenomenon of Phase Formation Through a Stage of Liquid State in Metals Being Electrodeposited  
*O. B. Girin*

- 2337 Effect of Organic Additives On Electrochemical Reduction Assessment Using SERS Analysis  
*M. Saito*
- 2338 *In Situ* X-Ray Characterizations of Bismuth Electrodeposition Under Different Nucleation Mechanisms  
*X. Huang, M. D. Plaza, J. Y. P. Ko, and J. D. Brock*
- 2339 Silver Electrodeposition From Ionic Liquids: Coatings Morphology and Mass Transport Issues  
*A. Lavacchi, S. Cinotti, M. Innocenti, L. Becucci, L. Wang, E. Banchelli, and L. Luconi*
- 2340 Study of Coni Electrodeposition Mechanism in a Glycine Bath Using Eqcm  
*V. P. Graciano*
- 2341 Electrodeposition of Supersaturated Cuag Alloys in Pyrophosphate-Iodide Electrolytes  
*R. Bernasconi, L. Nobili, and L. Magagnin*
- 2342 Electrodeposition of Binary Alloys Immiscible in the Bulk  
*G. Zangari*
- 2343 Electrochemical Formation of Brazing Alloys On Metal Substrates  
*F. Ulu, I. Karakaya, G. Demirci, M. S. Aras, and M. Erdogan*
- 2344 An Electrochemical Quartz Crystal Nano-Balance Study On Cu-Sn Codeposition From Methane Sulphonic Acid Electrolytes  
*S. Roy and N. Pewnim*
- 2345 DFT Analysis On Cathodic Reaction of Au Thiosulfate Complex At Au(111) Surface  
*M. Kunimoto, H. Nakai, and T. Homma*
- 2346 Effect of Additives On Dendritic Growth During Zinc Electrodeposition  
*S. J. Banik and R. Akolkar*
- 2347 Structural Accelerating Effect of Chloride On Copper Electrodeposition  
*Y. I. Yanson and M. J. Rost*
- 2348 Exploiting the H-Sorption Properties of Pd for the Epitaxial Deposition of Pt  
*B. C. Rawlings and N. Vasiljevic*
- 2349 *In Situ* STM Study of the Effect of Additives On Copper Bulk Electrodeposition  
*A. Taranovskyy, Y. I. Yanson, M. J. Rost, and J. W. M. Frenken*
- 2350 Effect of Cyanide Inhibition and Ultrasonic Waves On the Electrocrystallisation of Pure Au-Cu Alloys Prepared From An Alkaline Cyanide Bath  
*R. Botrel, F. Durut, E. Brun, C. Chicanne, V. Brunet, and V. Vignal*

- 2351 UPD Layer By Layer Growth of Semiconductor Thin Films On Ag Single Crystals: Effects of Substrate Orientation On Film Structure and Crystallinity  
*F. Carla', M. Innocenti, R. Felici, and M. L. Foresti*
- 2352 A Spontaneous Morphology Change on the Surface of Electrodeposited Single-Crystal Copper Films during Room-Temperature Aging  
*S. Nakahara, S. Ahmed, and D. N. Buckley*
- 2353 Comparison of Structural Properties of Copper Deposits From Sulfate and Pyrophosphate Electrolytes  
*B. Arslan, N. Ülgüdür, M. Erdogan, I. Imamoglu, and I. Karakaya*
- 2354 Electrochemically Induced Growth of Zinc Oxide On Microelectrodes  
*D. Schlettwein, M. Stumpp, and C. Lupo*
- 2355 Adherent Electroless Copper Deposition Using Inexpensive Sn/Ag Catalyst On Non-Roughened Epoxy Laminate Substrates  
*E. Uzunlar, Z. Wilson, and P. A. Kohl*
- 2356 In-Situ Studies Of Electrochemical Growth At The ID03 Beamline Of The Esrf  
*R. Felici, F. Carla', J. Drnec, and O. Balmes*
- 2357 Influence of Electrodeposition Conditions On the Properties of Samaria Films  
*I. Enculescu, E. Matei, M. Enculescu, C. Florica, and A. Costas*
- 2358 Design of Nanostructured ZnO Films By Electrochemical Deposition  
*T. Pauporté*
- 2359 Hierarchical Shape Evolution of Cuprous Oxide Nano and Micro-Crystals By Surfactant Assisted Electrochemical Deposition  
*S. Yoon, M. Kim, J. H. Lim, and B. Yoo*
- 2360 Electrochemical Growth of Copper Nanowires Inside of Semiconducting TiO<sub>2</sub> Nanotubes  
*S. J. Sitler and K. S. Raja*
- 2361 Contactless Electrodeposition and Micropatterning Via Bipolar Electrochemical Printing  
*T. M. Braun and D. Schwartz*
- 2362 Electrochemical Deposition of Gold Nanoparticles On Rough TiO<sub>2</sub> Surfaces  
*Y. Kimura, E. F. F. Mehdi, T. A. Miya, T. Tobe, R. Kojima, and M. Niwano*
- 2363 Porous Silicon With Deposited Iron Oxide As Vehicle for Magnetically Guided Drug Delivery  
*K. Rumpf, P. Granitzer, Y. Tian, G. Akkaraju, J. Coffler, P. Poelt, and M. Reissner*
- 2364 Electrodeposited Metal Nanotube/Nanowire Arrays in Mesoporous Silicon and Their Morphology Dependent Magnetic Properties  
*P. Granitzer, K. Rumpf, T. Ohta, N. Koshida, P. Poelt, and H. Michor*



## **F5 - Emerging Opportunities in Electrochemical Deposition for Nanofabrication**

*Electrodeposition, Physical and Analytical Electrochemistry*

- 2365 E-ALD of Pd On Au Single Crystals  
*J. L. Stickney, L. B. Sheridan, Y. G. Kim, D. Benson, K. Jagannathan, and D. B. Robinson*
- 2366 Conformal Electroless Deposition On monolayers for TSV Applications  
*M. Cervati, G. Carnevali, S. Armini, and L. Magagnin*
- 2367 Co-Deposition of Carbon Nanotubes With Copper  
*Y. Sun and L. Romankiw*
- 2368 Electroless Deposition On Self-Assembled Monolayers As a Method to Enable Fabrication of Advanced Interconnects  
*A. Maestre Caro, R. Chebiam, L. Teugels, S. Clendenning, and J. Clarke*
- 2369 Towards Molecular Electronics: Using Electroless Deposition to Deposit Nano-Objects  
*Z. Shi, K. Borner, A. Ellsworth, and A. V. Walker*
- 2370 Electrodeposition of Continuous Ultrathin Layers of Functionalized Nanoporous Catalyst On Glassy Carbon Electrodes  
*N. Dimitrov, L. Bromberg, M. Kamundi, J. Xia, R. Rooney, and M. Fayette*
- 2371 Negative Resist Monolayers of Thiols As Templates for Metal Electrodeposition  
*Z. She, A. DiFalco, G. Haehner, and M. Buck*
- 2372 Growth-Inhibited Nucleation of Ni Nanoparticles On TiN Substrates  
*J. Vanpaemel, M. van der Veen, S. De Gendt, and P. M. Vereecken*
- 2373 Electroless and Electrochemical Deposition of Zinc Oxide On Passive Metals As Electrodes in Textile-Based Dye-Sensitized Solar Cells  
*D. Schlettwein, M. Stumpp, S. Künze, and J. C. Falgenhauer*
- 2374 Electrical Properties of ZnO Nanowires Prepared By Templateless Electrodeposition  
*I. Enculescu, E. Matei, C. Florica, and A. Costas*
- 2375 Electroless and Electrolytic Deposition of Silver and Nickel for Solid Oxide Fuel Cells Anodes  
*E. Ruiz-Trejo, P. Boldrin, F. Tariq, N. P. Brandon, A. Atkinson, J. Darr, C. Tighe, and M. Millan-Agorio*
- 2376 Electrochemical Metal Chalcogenides for Electrocatalysis and Energy Storage  
*K. J. Stevenson and D. W. Redman*
- 2377 Templated Electrodeposition of Metal Nanorods Into TiO<sub>2</sub> Nanotubes  
*N. Liu, S. So, and P. Schmuki*

- 2378 Wide pH Range Electroless Copper Deposition At Room Temperature. Eqcm and CV Study of Autocatalytic Copper(II) Reduction By Cobalt(II)-Pentaethylenehexamine Complexes  
*E. Norkus, I. Stankeviciene, L. Tamasauskaite-Tamasiunaite, G. Stalnionis, K. Prusinskas, and A. Jagminiene*
- 2379 Self-Healing Electrostatic Shield Mechanism for Dendrite Control During Electrodeposition  
*J. G. Zhang, F. Ding, W. Xu, X. Chen, Y. Zhang, E. N. Nasybulin, G. L. Graff, and M. Sushko*
- 2380 Nonvolatile Resistance Switching in Electrodeposited Metal Oxide Thin Films  
*J. A. Switzer, J. A. Koza, and I. Schroen*
- 2381 Superconformal Film Growth: Challenges and Opportunities  
*T. P. Moffat, G. Liu, S. Zou, L. Richter, L. Y. Ou Yang, D. Wheeler, and D. Josell*
- 2382 The Advanced Monitoring of Organic Additives in Copper Electroplating Baths  
*M. Pavlov, E. Shalyt, P. Bratin, and X. Sun*
- 2383 Electrochemical Synthesis of Soft Ferromagnetic Thin Films and Nanostructures for Magnetic Recording and MEMS Application  
*S. Brankovic*
- 2384 Palladium-Free Surface Metallization of Polycarbonate Substrate By Inkjet-Printing Technology  
*H. F. Huang and W. P. Dow*
- 2385 Numerical Simulation of the Effect of Additives On Copper Electro-Deposition  
*L. Yin, Y. Jin, L. Wen, and X. Zhang*
- 2386 Influence of Polyalkyl Glycol Polymers On Copper Filling of Damascene Interconnects  
*K. Ryan, K. A. Dunn, J. van Eisdien, and J. D. Adolf*
- 2387 Extreme Bottom-Up Filling of Through Silicon Vias: Cu and Au  
*D. Josell and T. P. Moffat*
- 2388 Electrodeposition of Macroporous Materials and of Free Standing Nanowires From Ionic Liquids  
*F. Endres*
- 2389 Electrochemical Fabrication of Magnetic Nanostructures- Analysis, Control, and Design of Deposition Processes -  
*T. Homma, S. Wodarz, B. Jiang, M. Kunimoto, and M. Yanagisawa*
- 2390 Adhesion of Electroless Nib Film On Modified Polyimide With Aminosilane  
*T. Osaka, S. Matsui, K. Tadokoro, T. Hachisu, A. Sugiyama, I. Matsuda, and T. Yokoshima*

- 2391 Electrochemical Processing of Carbon Nanostructures  
*P. M. Vereecken, A. Radisic, and D. J. Cott*
- 2392 Near-Surface Atomic and Electronic Structural Effects in Layer-By-Layer Derived Core-Shell Catalysts  
*F. M. Alamgir*
- 2393 Superconformal Deposition of Au in a Sulfite Electrolyte  
*D. Josell and T. P. Moffat*
- 2394 Electrodeposition of Cobalt-Tungsten Alloys From An Alkaline Citrate-Containing Bath As Barrier Layers in Electronic Application  
*N. dadvand, G. jarjoura, and G. J. kipouros*
- 2395 Cu Electroless Deposition By Using Cu Nanoparticles As Catalysts for a Printed Circuit Board Metallization  
*Y. C. Chung and W. P. Dow*
- 2396 Electroless Co-B-P-W Deposition Using Dmab As reducing Agent  
*E. Norkus, A. Jagminiene, I. Stankeviciene, L. Tamasauskaite-Tamasiunaite, and Z. Sukackiene*
- 2397 The Application of Nico Alloy Electroforming On Products With Microstructure  
*H. J. Chen*
- 2398 Towards An Atomistic Understanding of the Activation of Plating Additives At the Copper/Electrolyte Interface  
*H. Nguyen, T. M. T. Huynh, A. Flügel, M. Arnold, D. Mayer, and P. Broekmann*
- 2399 Using Vibrational Spectroscopy and Electrochemical Stress Measurements to Interrogate Metal Electrode Surfaces  
*A. Gewirth, J. Oberst, K. Schmitt, and H. Tavassol*
- 2400 Optimization of Leveler Concentrations in Copper Via Filling for Deduction of Contamination  
*J. H. Lee and K. T. Kim*
- 2401 Effects of Anodizing Parameters On the Formation of Titanium Dioxide Nanotubes  
*Z. Bolukoglu, I. Karakaya, and M. Erdogan*

### **G1 - Alkaline Electrolyzers**

*Industrial Electrochemistry and Electrochemical Engineering, Battery, Energy Technology, Physical and Analytical Electrochemistry*

- 2402 Effect of Bubbles Coverage in Gas Evolving Rotating Disk Electrodes  
*L. A. Diaz, M. Muthuvel, and G. G. Botte*

- 2403 Self-Sustainable Production Of Hydrogen and Chemicals From Renewable Alcohols By Alkaline Electrolysis  
*H. A. Miller, F. Vizza, A. Lavacchi, J. Filippi, W. Oberhauser, M. Bevilacqua, A. Marchionni, M. Innocenti, and L. Wang*
- 2404 Electrocatalytic Oxidation Mechanism of Urea On Ni/Co Hydroxide Catalyst in Alkaline Medium  
*V. Vedharathinam and G. G. Botte*
- 2405 Well-Defined NiFeAlO<sub>4</sub> Inverse Spinel As Efficient Alkaline Water Oxidation Catalyst  
*J. Y. C. Chen, A. Serov, P. Atanassov, and S. S. Stahl*
- 2406 Efficient Water Oxidation Using Nickel-Hydroxide As An Electrocatalyst  
*M. Gao and Y. Yan*
- 2407 Towards Accurate *Ab-Initio* Prediction of ORR/ Oer Activity of LaBO<sub>3</sub> (B=Cr,Mn) Perovskites – Role of Hubbard *U* and Stable Surface Coverage  
*M. Gadre, Y. L. Lee, Y. Shao-Horn, and D. Morgan*
- 2408 Enhanced Oxygen Evolution At ‘Aged’ Hydrous Nickel Oxide Electrodes in Alkaline Solution: Kinetics and Mechanism  
*I. Godwin and M. E. G. Lyons*
- 2409 Investigation of the Alkaline Interface for Non-PGM Electrocatalysts in AEM Water Electrolysis  
*M. Bates and S. Mukerjee*
- 2410 Mixed Metal Mixed Oxides Electrocatalyst for Water Electrolysis  
*R. Kamaraj, D. Jonas Davidson, S. Vasudevan, G. Sozhan, and S. Ravichandran*
- 2411 Hydrogen Production By Alkaline Membrane Water Electrolysis  
*J. Parrondo, C. G. Arges, and V. K. Ramani*
- 2412 Durability and Activity of Modified Nickel Anode for Alkaline Water Electrolysis  
*H. Ichikawa, K. Matsuzawa, Y. Kohno, Y. Sunada, I. Nagashima, Y. Nishiki, A. Manabe, and S. Mitsushima*

**G2 - Synthesis and Electrochemical Engineering General Session**  
*Industrial Electrochemistry and Electrochemical Engineering*

- 2413 Performance Analysis of Syngas Fueled Solid Oxide Electrolysis Cells  
*P. Kazemipoor and R. J. Braun*
- 2414 Microbial Reverse-Electrodialysis Electrolysis Chemical-Production Cell for H<sub>2</sub> Production and CO<sub>2</sub> Sequestration  
*X. Zhu, M. C. Hatzell, and B. E. Logan*
- 2415 Ammonia Synthesis From Urea Using An Electrochemical Approach  
*F. Lu*

- 2416 PEM Electrolysis Model With Experimental Validation  
*D. L. Fritz III*
- 2417 Current and Voltage Efficiency of High Pressure PEM Water Electrolyzers  
*M. Schalenbach*
- 2418 Effect of Cerium Doping On Morphology and Physical Properties of  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> films Prepared By Hydrothermal Electrodeposition  
*C. Yilmaz and U. Unal*
- 2419 Electrochemical Performance of Ultrafine Bubble Water  
*Y. Ueda, T. Zushi, and Y. Tokuda*
- 2420 Electrochemical Carboxylation of Olefins to Form Monocarboxylic Products By Using 12CaO•7Al<sub>2</sub>O<sub>3</sub> Electrude Cathode  
*J. Li, T. Fuchigami, S. Inagi, H. Hosono, and S. Ito*
- 2421 Electrochemical Reduction of Tungsten Oxide in Molten LiCl-KCl Using a Novel Fluidised Bed Electrode Approach  
*R. Abdulaziz, L. D. Brown, D. Inman, S. J. R. Simons, P. R. Shearing, and D. J. L. Brett*
- 2422 Nickel Phosphide As Hydrogen Evolution Reaction Electrocatalysts  
*H. Li, S. Gu, Z. Zhuang, Q. Fang, P. Liu, J. Chen, and Y. Yan*
- 2423 Anodes Based On Platinized Ebonex<sup>®</sup>  
*A. Velichenko, O. Kasian, and T. Luk'yanenko*
- 2424 The Effect of Gas Compositions On the Performance and Durability of Soecs  
*S. D. Kim, D. W. Seo, S. K. Woo, and J. H. Yu*
- 2425 Mo/TiN Novel Composite Powder for An Alkali Metal Thermal to Electric Converter (AMTEC) Electrode  
*S. D. Kim, S. Y. Kim, J. H. Joo, M. S. Seo, and S. K. Woo*
- 2426 Removal of Radioactive Cs Using Aqueous Sodium Metasilicate With Reduced Volumes of Waste Solution  
*Y. Ueda, Y. Tokuda, H. Goto, T. Kobayashi, and Y. Ono*
- 2427 Influence of the sp<sup>2</sup> Content On Boron Doped Diamond Electrodes Applied in the Textile Dye Electrooxidation  
*F. L. Migliorini, M. D. Alegre, S. A. Alves, M. R. Baldan, M. R. V. Lanza, and N. G. Ferreira*
- 2428 Nitrate Removal By Electrolysis Using Cu/BDD Electrode Cathode  
*M. C. E. Ribeiro, A. B. Couto, N. G. Ferreira, and M. R. Baldan*

## H1 - Carbon Nanostructures 4 - Fullerenes to Graphene

*Fullerenes, Nanotubes and Carbon Nanostructures, Dielectric Science and Technology, Energy Technology, Physical and Analytical Electrochemistry, Sensor*

- 2429 Large Surface Area Graphene-Si Anodes for Li-Ion Batteries  
*G. Radhakrishnan, P. M. Adams, J. D. Cardema, and M. V. Quinzio*
- 2430 Novel and Simple Electrografting Monomer Method to Exfoliate HOPG for Lithium-Ion Batteries  
*A. Aqil, F. Ouhib, C. Jérôme, C. Detrembleur, and A. Vlad*
- 2431 CVD Synthesis of Graphene/Carbon Nanofiber Hybrids and “Square” Graphene Domains  
*K. Vinodgopal, G. P. Dai, and M. H. Wu*
- 2432 Graphene Growth On Electrodeposited Polycrystalline Copper and Ruthenium  
*D. Pigliafreddo, L. Magagnin, L. Nobili, C. Carraro, and R. Maboudian*
- 2433 Interfacial Charge Induced Phenomena in Porous Graphene-Based Bulk Materials  
*J. Biener, M. A. Worsley, E. Montalvo, P. G. Campbell, B. C. Wood, T. Ogitsu, M. Bagge-Hansen, J. R. I. Lee, M. Stadermann, M. M. Biener, S. Dasgupta, L. Shao, R. K. Kalluri, A. V. Hamza, A. Striolo, J. Weissmueller, H. Hahn, and T. F. Baumann*
- 2434 Thick, Binder-Free Carbon Nanotube-Based Electrodes for High Power Applications  
*M. A. Worsley, M. Merrill, S. Charnvanichborikarn, S. O. Kucheyev, M. Stadermann, T. F. Baumann, and J. Biener*
- 2435 Carbon and Composite Nanostructured Materials for Energy Applications  
*A. Serov, N. Andersen, K. Artyushkova, and P. Atanassov*
- 2436 Indene Bisadduct of Fullerenes As High Efficiency Acceptor for Polymer Solar Cells  
*Y. Li*
- 2437 Platinum Nanoparticles Immobilized On CVD-Grown Graphene As a Transparent and Efficient Counter Electrode Materials for Dye-Sensitized Solar Cells  
*V. D. Dao, J. K. Lee, and H. S. Choi*
- 2438 Synthesis, Structure, and Properties of C<sub>60</sub>-Pd Spherical Nanoparticles  
*K. Winkler, E. Brancewicz, and E. Gradzka*
- 2439 Electrochemically Generated Highly Fluorescent Boron-Doped Graphene Quantum Dots for Fluorescent Crystal, Sensors and Bioimaging  
*L. Fan and Z. Fan*
- 2440 Application of Positively Charged Carbon Nanotubes to Layer-By-Layer Assemblies of Dehydrogenase Enzymes for Molecular Bioelectronic Devices  
*B. Kowalewska, M. Dzwonek, and P. J. Kulesza*

- 2441 Controlled Deposition of Carbon Nanotubes Within a Smectite Nanoclay By Means of a Modified Langmuir-Schaefer Approach  
*A. Kouloumpis, P. Zygouri, K. Spyrou, T. A. Tsoufis, P. Stathi, P. Rudolf, and D. Gournis*
- 2442 Electrocatalytic Features of Selectively Attached Microperoxidase-11 On to Nano-Carbon Structures  
*S. Kariate and S. Krishnan*
- 2443 Controllable Synthesis of Heteroatom-Doped Carbon Nanotubes As Efficient Catalysts for Electrochemical Detection of Dopamine  
*T. J. Li, K. Ho, and W. H. Chiang*
- 2444 Networked Graphitic Structures Grown From Dense Microemulsions As High Performance Electrode Material  
*E. Negro, M. Dieci, G. Koper, and D. Sordi*
- 2445 Evaluation of MEAs Prepared By Pt/C Catalysts With Improved Durability Through the Heat Treatment  
*X. Zhao, A. Hayashi, Z. Noda, and K. Sasaki*
- 2446 Hydrogen-carbon Bond on the Nanostructured Graphite for Hydrogen Sensor  
*Y. Zhang*
- 2447 Comparative Study of the Growth of CNTs On Stainless Steel With and Without the External Catalyst  
*M. Hashempour, A. Vincenzo, and M. Bestetti*
- 2448 Enhanced Photocatalytic Activity of ZnO-Rgo Nanocomposites in Degradation of Gaseous Acetaldehyde  
*Y. C. Chen, K. I. Katsumata, and Y. J. Hsu*
- 2449 Preparation of Graphene-ZnO Nanocomposites Using a Facile, Green Antisolvent Method  
*W. C. Hu and Y. J. Hsu*
- 2450 Fabrication of Graphene By Electrochemical Exfoliation in Alkaline Electrolytes  
*L. C. Chang, Y. C. Hsieh, Y. M. Chen, P. W. Wu, and J. F. Lee*
- 2451 Charge Selective Ion Transport Through Graphene Oxide Based Membranes  
*J. Nham, S. H. Ha, Y. S. Jeong, J. H. Kim, and Y. J. Lee*
- 2452 Novel Dendrimer Intercalated Graphene-Based Materials  
*T. A. Tsoufis, F. Katsaros, Z. Sideratou, O. Ivashenko, P. Rudolf, and M. A. Karakassides*
- 2453 Supercapacitors Based On High-Surface-Area Graphene  
*X. Zhou and Y. Lian*

- 2454 Oxygen Reduction Reaction On Glassy Carbon Electrodes Modified With Amino-functionalized Carbon Nanotubes and Iron Phthalocyanines  
*P. Cañete-Rosales, J. F. Silva Sr., and J. H. Zagal Sr.*

## **II - Physical and Analytical Electrochemistry Division General Session**

### *Physical and Analytical Electrochemistry*

- 2455 The Wedge Scheme, a General Framework for Incorporating H-Bonding Into Proton-Coupled Electron Transfer Reaction Mechanisms  
*D. K. Smith, L. A. Clare, and A. Pham*
- 2456 Iodide Effect On the Conduction Band Edge of ZnO Nanomaterials  
*P. Chhetri, N. Perera, and M. A. Alpuche-Aviles*
- 2457 The Incorporation of Bovine Serum Albumin Into a Polypyrrole Film in One Simple Step  
*A. Hamilton and C. Breslin*
- 2458 X-Ray Acceleration On Electrochemical Reaction  
*J. Liu, M. Roberts, R. Younesi, M. Dahbi, J. Zhu, T. Gustafsson, and K. Edström*
- 2459 Nitric OXIDE Reduction and Oxidation ON Polycrystalline Platinum: Differential Reflectance Spectroscopic Studies  
*D. A. Scherson and A. Jebaraj*
- 2460 Nanostructured Monolayer Films Electrografted On Carbon Substrates. Application to the Electrochemical Preparation of Surfaces With Reversible Photo-Switchable Properties  
*Y. Leroux and P. Hapiot*
- 2461 Can Electron Tunneling Occur in a Hundred-Nanometer Thick Nafion Film and be Utilized to Image Nafion/Electrode Interfaces With An Angstrom Level Resolution?  
*X. Zhou*
- 2462 Operation of Scanning Ion Conductance Microscopy (SICM) At Short Tip to Sample Distances  
*N. Sa, W. Shi, M. A. Derylo, and L. A. Baker*
- 2463 Finite-Elements Simulation of Etch Front Propagation in Silicon Electropolishing Process  
*A. Ivanov, U. Mescheder, and P. Woias*
- 2464 Investigating the Mechanism of Thylakoid Direct Electron Transfer for Photocurrent Generation  
*M. J. Rasmussen and S. D. Minteer*
- 2465 Increased Dissociation of Water Due to Large Electric Fields  
*N. P. Craig and J. Newman*



- 2466 Simple Instabilities in the Potentiostatic Oxidation of High Conducting Formic Acid/Formate Solutions  
*M. Schell*
- 2467 Combined ATR-FTIR and IRAS Study of Dissociation and Oxidation of Alcohols At Palladium Electrode in Alkaline Media  
*Y. Y. Yang and W. B. Cai*
- 2468 Electrochemical Behavior of Organics Oxidation On Palladium-Based Nanocatalysts Synthesized From Bromide Anion Exchange  
*K. B. Kokoh, Y. Holade, C. Morais, T. W. Napporn, and K. Servat*
- 2469 Electrochemical Properties and Applications of Graphene Nano Platelets  
*Q. Wan, M. Han, Y. Liu, and N. Yang*
- 2470 Distance-Dependent Electron Transfer At Passivated Electrodes Decorated By Gold Nanoparticles  
*A. Barfidokht, S. Ciampi, E. Luais, N. Darwish, and J. J. Gooding*
- 2471 The Effects Of Internal Pressure Evolution On The Ageing Of Commercial Li-Ion Cells  
*A. Matasso, D. Wetz Jr., A. H. Salehi Gilani, and F. Liu*
- 2472 Electrode Materials: The Decision Makers of the Electrochemical Properties of Immobilized Human Liver Microsomes  
*S. Krishnan, C. Walgama, and R. Nerimetla*
- 2473 Magnetron Sputtered Ptnp/MWCNT Composite Electrocatalysts for Oxygen Reduction Reaction  
*K. Tammeveski, K. Jukk, J. Kozlova, P. Ritslaid, V. Sammelseg, and N. Alexeyeva*
- 2474 Effects of Axial Ligation and Electron Donors On Oxygen Reduction Catalysis By Metalloporphyrins  
*J. Chlistunoff and J. M. Sansiñena*
- 2475 Electrodeposited Nickel-Based Electrocatalysts for Oxygen Evolution Reaction (OER)  
*Y. Cai and A. T. Bell*
- 2476 Applications of Fourier Transformed Large Amplitude Ac Voltammetry for Kinetics Studies At Stationary and Rotating Disc Electrodes  
*J. Zhang, A. M. Bond, K. Bano, and G. F. Kennedy*
- 2477 Optimizing 3D Amperometry for Analyte Identification in Liquid Chromatography  
*J. Cheng, P. Jandik, Y. Liu, and C. Pohl*
- 2478 Bromide Oxidation On a Polycrystalline Platinum Rotating Disk Electrode in Aqueous Solutions  
*D. A. Scherson and J. Xu*

- 2479 Electrochemical Analysis of Antioxidants Using Bicontinuous Microemulsion  
*E. Kuraya, S. Nagatomo, K. Sakata, S. Uemura, and M. Kunitake*
- 2480 A Highly Sensitive Hybrid Film Sensor for Voltammetric Detection of Calcium Antagonist Cilnidipine  
*R. Jain and D. Kumar*
- 2481 Studies of Adiponitrile As An Electrochemical Solvent  
*G. T. Cheek*
- 2482 Characterization of a Conductive Agar Electrolyte  
*J. Kagan*
- 2483 Quinone Electrochemical Mysteries: Thick Cyclic Voltammograms and Tiny Redox Waves  
*P. A. Staley, L. A. Clare, E. M. Lopez, and D. K. Smith*
- 2484 Electroactive Monolayers On n-Type Silicons  
*J. J. Gooding, M. H. Choudhury, S. Ciampi, X. Lu, and C. Zhao*
- 2485 Characterization of Flow-Through Porous Electrodes for Microfluidic Electrochemical Cells  
*M. A. Goulet and E. Kjeang*
- 2486 X-Ray Absorption Spectroscopy Study of Water Molecules At the Water/Electrode Interfaces  
*C. Wu, J. J. Velasco-Velez, and M. B. Salmeron*
- 2487 Electrooxidation of *Para*-Chloroaniline At Gold Electrode  
*I. U. Haque*
- 2488 Thermodynamics in Porous Electrodes for One- and Two-Component Electrolytes  
*K. Kiyohara and K. Asaka*
- 2489 A Grand Canonical Ensemble Model for Electrolytes Confined in Mesoporous Domains  
*M. Kobra*
- 2490 Directed Immobilization of a Heme Protein On Nanostructured Electrodes  
*C. Walgama, R. Nerimetla, and S. Krishnan*
- 2491 Preparation and Physicochemical Characterisation of Novel Ru-Based Catalyst for Oxygen Reduction Reaction  
*A. Dobrzyniecka*
- 2492 Physico-Chemical Properties of Ionic Liquid Analogous Based On Magnesium Chloride Hexahydrate and Dimethylformamide  
*Y. Jing, H. Wang, Y. Jia, D. Yue, Y. Yao, X. Wang, and J. Ma*

- 2493 Influence of Aromatic and Unsaturated Substituents On Physical and Electrochemical Properties of Phosphonium Ionic Liquids  
*K. Tsunashima, S. Kikuchi, C. Nagai, Y. Sakai, and M. Matsumiya*
- 2494 Quasi-Solid-State Dye-Sensitized Solar Cells Assembled With Polymer Electrolyte Containing Core-Shell Structured Polymeric Ionic Liquid  
*S. G. Jo and D. W. Kim*
- 2495 Dye-Sensitized Solar Cells Assembled With Polymeric Ionic Liquid and Poly(3,4-ethylenedioxythiophene) Counter Electrode  
*N. Jeon, S. G. Jo, D. K. Hwang, S. Im, and D. W. Kim*
- 2496 The Electrolytic Dissociation of 1,3-Cyclopentanedicarboxylic Acids  
*E. Kvaratskhelia, R. Kvaratskhelia, and R. Kurtanidze*
- 2497 Catalytic Oxidation of Liquid Fuels On Palladium Nanoparticles Loaded Carbon Nanotubes  
*Q. Wan, M. Han, H. Liao, and N. Yang*
- 2498 Electrode Surface Fouling for Sensitive Electroanalytical Determination of Phenols  
*A. N. M. Kawde*
- 2499 Heavy Metal Extraction and Electroseparation From Wastewater By Acidic Solutions  
*Y. Addi*
- 2500 Electrochemical Determination of Copper and Thiourea in the Presence of An Animal Glue From Strongly Acidic Solutions Employed in the Electrorefining Processes of Copper  
*M. G. Lobos, D. L. Ramirez Sr., G. Riveros, P. Diaz, and H. Gomez*
- 2501 Degradation Route for Amaranth Dye By Sonoelectrochemical Process Using BDD Anode  
*A. D. J. Motheo, J. R. Steter, M. R. V. Lanza, and W. R. P. Barros*

## **12 - Invitational Symposium in Honor of Adam Heller on his 80th Birthday**

*Physical and Analytical Electrochemistry, Battery, Energy Technology, Organic and Biological Electrochemistry*

- 2502 At 80: The Joy of Uncovering Truths and Building People-Serving Products  
*A. Heller*
- 2503 A Long-Life, High-Rate Lithium/Sulfur Cell  
*M. K. Song, Y. Zhang, and E. J. Cairns*
- 2504 Electrochemical Tuning of Metabolisms of Photosynthetic Microbes  
*K. Hashimoto, Y. Lu, and S. Nakanishi*
- 2505 Electrochemical/Enzymatic Amplification Schemes for the Sensitive Detection of Pathogens in Electrochemically Activated Capillaries  
*O. Msehli, S. Molina, B. Teixeira-Dias, and I. Katakis*

- 2506 Doping in Organic Semiconductors and Solar Cells  
*B. Gregg*
- 2507 (2013 ECS Europe Section Heinz Gerischer Award Lecture) Multiple Exciton Generation from Single Photons in Semiconductor Nanocrystals, Quantum Dot Solar Cells, and via Singlet Fission in Molecular Chromophores: Applications to Next Generation Solar Photon Conversion to PV and Solar Fuels  
*A. J. Nozik*
- 2508 Photooxidation of Chloride By Oxide Minerals: Implications for Perchlorate On Mars  
*B. A. Parkinson*
- 2509 (2013 ECS Fellow Inductee) Preparation and Electrochemistry of Atomic Metal Electrodes  
*M. Josowicz, A. P. Jonke, I. T. Schwartz, and J. Janata*
- 2510 Mechanism of the Anodic Oxidation of Platinum  
*D. D. Macdonald and F. Mao*
- 2511 All-Solid Semiconductor-Sensitized Solar Cells Made By Electrodeposition  
*C. Levy-Clement, J. Elias, and V. Ivanova*
- 2512 Enzyme-Catalyzed Direct Electron Transfer: An Inspiration for Electrocatalyst Design  
*P. Atanassov*
- 2513 Functionalization of Multi Walled Carbon Nanotubes with Pyrene-based Groups for Enhanced Oxygen Reduction by Laccase  
*F. Giroud and S. D. Minteer*
- 2514 Development of Non-Gassing Electroosmotic Pump and Its Application for Drug Infusion System  
*W. Shin*
- 2515 Sacrificial dye electrode for non-gassing electro-osmotic pumps  
*R. K. Nagarale*
- 2516 Design of Redox Polymers for Reagentless Biosensors, Biofuel Cells, and Photobioelectrochemistry  
*W. Schuhmann*
- 2517 Redox Mediators Coupled to Surfaces and Supports: Operation of Enzymatic Biofuel Cells in Physiological Buffers, Human Saliva and Blood  
*P. O Conghaile, D. MacAodha, M. Falk, S. Shleev, L. Gorton, and D. Leech*
- 2518 Optimizing the Electrocatalytic Oxidation of NADH At Nitrogen-Doped Carbon Nanotubes  
*J. M. Goran, C. A. Favela, and K. J. Stevenson*
- 2519 Metabolic Control Analysis of Bioelectrodes for Multistep Oxidation of Biofuels  
*S. Calabrese Barton, B. Piering, and S. D. Minteer*

- 2520 Improving Implanted Glucose Sensor Performance - Designing the Next Generation of Sensors  
*M. Pishko*
- 2521 Impedance Biosensors: Remaining Technical Challenges  
*I. I. Suni and R. Radhakrishnan*
- 2522 Design, Synthesis and Characterization of Polyoxometalates for Use As Electrochemical Labels for Detection of Single Nucleotide Polymorphisms Using Electrochemical Array Based Primer Extension  
*C. O Sullivan*
- 2523 Wireless Communication By An Autonomous Self-Powered Cyborg Insect  
*J. J. Matic, M. J. Rasmussen, A. J. Pollack, W. Weeman, I. Lee, M. A. Willis, S. Garverick, R. E. Ritzmann, and D. A. Scherson*
- 2524 Wired Microbe Electrodes  
*D. Boyd, J. Erickson, N. Lebedev, J. Roy, R. M. Snider, S. Strycharz-Glaven, L. Tender, and S. Tsoi*
- 2525 Improvement of Interdigitated Array Electrodes for the Investigation of Electron Transfer Through Biofilms of *Geobacter Sulfurreducens* mutants  
*R. M. Snider and D. R. Bond*
- 2526 Structural Transition of Alkylthiol/Au(111) Interface During Self-Assembly Process  
*K. Uosaki and T. Kondo*
- 2527 Electrochemical Communication Between thylakoid Membranes and Osmium Redox Polymers Modified Electrodes  
*L. Gorton, K. Hasan, H. Hamidi, S. C. Emek, Y. Dilgin, D. Leech, H. E. Åkerlund, and P. Albertsson*
- 2528 Photoelectrochemical Energy Conversion: From Efficient Planar Structures to Nanotopographic Devices  
*H. J. Lewerenz*
- 2529 Series Circuit of Organic Thin-Film Solar Cells for Electrochemical Conversion of Water Into Hydrogen  
*A. Aoki, T. Hori, M. Naruse, and T. Abe*
- 2530 Potential of Copper Indium Selenide for Solar Absorbers in Various Energy Conversion Devices  
*S. Menezes and Y. Li*
- 2531 Bioinspired Photoelectrochemistry  
*K. Rajeshwar, C. Janaky, and N. Myung*

### **I3 - Photoelectrochemistry and Photoassisted Electrocatalysis**

#### *Physical and Analytical Electrochemistry*

- 2532 (Invited) Critical Metrics and Limiting Physical Parameters in Electrolytic and Photoelectrochemical Solar to Hydrogen Production Technologies  
*E. L. Miller, S. Dillich, D. Peterson, and K. Randolph*
- 2533 (Invited) III-V Nitrides and Tandem Cells for Photoelectrochemical Water Splitting  
*J. A. Turner*
- 2534 (Invited) Scalably Manufacturable Solar-Fuels Generators  
*C. Koval*
- 2535 (Invited) Mechanisms of (Photo)Electrochemical Reduction of Carbon Dioxide From First Principles  
*E. A. Carter*
- 2536 (Invited) Photochemical Charge Transfer in Niobium Oxide Nanocrystal Films Studied With Surface Photovoltage Spectroscopy  
*F. E. Osterloh and J. Zhao*
- 2537 (Invited) Oxygen Evolution At Vertically Aligned Core-Shell Iron-Iron Oxide Nanowire Arrays  
*G. Wittstock, G. Denuault, S. Mátéfi-Tempfli, H. Bültel, M. Mátéfi-Tempfli, A. Lesch, I. Schmidt, C. Dosche, M. Ahlf, K. Al-Shamery, A. Fanget, and L. Forro*
- 2538 Synthesis and Characterization of Highly-Ordered Doped Titania Nanotubes for Solar Hydrogen Generation  
*S. Karimi and R. Cuello*
- 2539 Composite WO<sub>3</sub>/TiO<sub>2</sub> Nanotubes for Solar Photo-Conversion and Electrochromic Applications  
*D. B. Robinson and K. Reyes*
- 2540 (Invited) Materials Aspects Of Hematite-Based Photoelectrochemical Water Splitting  
*D. Wang*
- 2541 Design, Synthesis, and Characterization of Hematite Nanotubes for Photoelectrochemical Water Splitting  
*T. Mushove, S. Blodgett, and L. T. Thompson*
- 2542 Nanostructured Hierarchical Hematite Photoanode From Hydrothermal Synthesis for Efficient Solar Water Oxidation  
*H. Y. Kang, T. Y. Yang, K. Jin, J. H. Lee, U. Sim, H. Y. Jeong, Y. C. Joo, and K. T. Nam*
- 2543 (Invited) Modified Copper Tungstate Photoanodes For Efficient Solar Driven Water Oxidation  
*A. M. Herring, S. K. Pilli, J. A. Turner, T. G. Deutsch, and T. E. Furtak*



- 2557 Spectroelectrochemical Investigation of ZnCr<sub>2</sub>O<sub>4</sub> for High Photovoltage p-Type Sensitized Solar Cells  
*V. V. Nair and M. Law*
- 2558 Critical Factors of Dye-Sensitized Solar Cell Using TiO<sub>2</sub> Nanotubes  
*S. So, N. Liu, and P. Schmuki*
- 2559 (Invited) Cold Gas Sprayed Semiconductor-Based Electrodes For The Photo-Induced Water Oxidation  
*I. Herrmann-Geppert, H. Gutzmann, P. Bogdanoff, T. Emmler, P. Hillebrand, M. Schieda, F. Gaertner, and T. Klassen*
- 2560 (Invited) Metal-Insulator-Semiconductor Photoelectrodes As a Platform For Efficient and Stable Photoelectrochemical Water Splitting  
*D. V. Esposito, Y. Lee, A. A. Talin, and T. P. Moffat*
- 2561 Oxide Thin-Films for Protection and Functionalization of Photocathodes in Tandem Water-Splitting Devices  
*P. C. K. Vesborg, B. Seger, I. Chorkendorff, and O. Hansen*
- 2562 Solar Water Splitting By Transition Metal Oxide – Silicon Photoanodes Prepared Under Cathodic Electrochemical Conditions  
*M. Lublow, T. Schedel-Niedrig, and A. Fischer*
- 2563 Electrodeposited Zinc Oxide Nanorods ALD-Coated With Iron Oxide: Their Photocatalytic and Photoelectrochemical Properties  
*T. Ahmed, M. Fondell, M. Boman, and J. Zhu*
- 2564 (Invited) Photovoltaic Designs For Integrated and Spontaneous Solar Water Splitting  
*J. W. Ager III*
- 2565 (Invited) An Autonomous Solar-To-Chemical Energy Conversion System  
*S. M. Jawahar Hussaini, N. Singh, J. Lee, G. Stucky, M. Moskovits, and E. McFarland*
- 2566 Optimal Band Gap Combinations of Light Absorbers for Integrated Photoelectrochemical Water-Splitting Systems  
*S. Hu, C. Xiang, S. Haussener, A. Berger, and N. S. Lewis*
- 2567 Nanowire-Based Device Integration for Direct Solar Water Splitting  
*C. Liu, J. Tang, H. M. Chen, B. Liu, and P. Yang*
- 2568 Tandem Junction Si Microwire Based Devices for Water Splitting  
*M. Shaner, K. Fountaine, S. Ardo, R. Coridan, Y. Park, K. S. Choi, H. Atwater, and N. S. Lewis*
- 2569 (Invited) Correlation Among Band Structure, Charge Transfer and Photocatalytic/Photoelectrochemical Performance Of Semiconductors  
*N. Wu*



- 2570 Photo/Electrocatalytic Properties of the Hydrogenated TiO<sub>2</sub>  
*K. Bienkowski and P. J. Kulesza*
- 2571 Effect of the Heterogeneous Catalyst Attachment Method On O<sub>2</sub> Production of WO<sub>3</sub> Photoanodes in Acidic Aqueous Electrolyte  
*J. M. Spurgeon and J. M. Velazquez*
- 2572 Structure-Activity Relationship in Mixed (Fe,Ni) Oxyhydroxide Catalysts for Electrochemical Oxygen Evolution  
*D. Friebel, K. E. Sanwald, A. Bodin, A. M. Wise, D. Sokaras, R. Alonso-Mori, T. C. Weng, R. Davis, J. Bargar, M. Louie, Y. Cai, M. Bajdich, A. T. Bell, J. A. Lercher, and A. Nilsson*
- 2573 Molybdenum Sulfides Materials As Hydrogen Evolution Catalysts and Surface Protecting Layers for Highly Active and Stable Silicon-Based Water Splitting Photocathodes  
*J. D. Benck, J. Kibsgaard, and T. F. Jaramillo*
- 2574 (Invited) A Study Of Interfacial Processes Between Metal Oxide Nanostructured Thin Films and Ionic Liquids For Potential Applications In Photoelectrochemistry  
*C. Santato, J. Pison, D. Isik, Y. Sivalingam, and J. Sayago*
- 2575 Influence of Surface Structure Geometry On the Performance of Electrodes for Photoactivated Hydrogen Generation  
*M. Schieda, A. Rzeszutek, I. Herrmann-Geppert, A. C. Bronneberg, D. L. Olynick, and T. Klassen*
- 2576 Controlling the Energetics and Activity of Nanocrystal Metal Oxide Water Splitting Catalysts With Potential Determining Ions  
*F. E. Osterloh and R. L. Chamouis*
- 2577 Stochastic Photoelectrochemistry of Colloidal Semiconductor Nanoparticles  
*M. A. Alpuche-Aviles, A. Fernando, and S. Parajuli*
- 2578 (Invited) Investigation Of Plasmonic Ag@Ag<sub>3</sub>(PO<sub>4</sub>)<sub>1-x</sub>/ZnO Nanoarchitectures For Solar-Hydrogen Application  
*Y. G. Lin, Y. K. Hsu, L. C. Chen, and K. H. Chen*
- 2579 Highly Stable, Efficient, Visible-Light Driven Water Photoelectrolysis System With Use of Nanocrystalline Semiconducting Oxides  
*R. Solaraska, K. Bienkowski, P. J. Kulesza, and J. Augustynski*
- 2580 High Surface Area Transparent Conductive Oxide As Effective Scaffolds for Nanostructured Metal Oxide Photoelectrochemical Electrodes  
*P. Chakthranont, A. J. Forman, B. A. Pinaud, and T. F. Jaramillo*
- 2581 Solution Phase Growth and Photoelectrochemical Energy Conversion of Indium Phosphide Nanowires  
*N. Nikolay Kornienko and P. Yang*

- 2582 Temperature Assisted Tuning of CdTe Nanocrystal Deposits On TiO<sub>2</sub> Nanotubes Under Solvothermal Conditions  
*S. Sarker, B. Mukherjee, E. Crone, and V. Subramanian*
- 2583 Electrochemical Characteristics of the Mixture of 1-Ethyl-3-Methyl Imidazolium Tetrafluoroborate and 1-Ethyl-3-Methylimidazolium Iodide  
*C. Siimenson, L. Siinor, and E. Lust*
- 2584 Improvement in Photo-Potential Characteristics of TiO<sub>2</sub> electrode Assembling to Marine Microbial Fuel Cell  
*S. Tamura, M. Morita, S. Motoda, S. Uematsu, and T. Shinohara*
- 2585 Aqueous Synthesis of CdSe Quantum Dots  
*S. Parajuli and M. A. Alpuche-Aviles*
- 2586 Design Principles for Artificial Photosynthetic Cells Across the pH Spectrum  
*A. Berger, M. A. Modestino, K. Walczak, R. A. Segalman, and J. Newman*
- 2587 Reaction Scheme for the Electrochemical Treatment of Alachlor in Water By the Photoassisted Process Photoelectro-Fenton With BDD and Pt Anodes  
*A. R. F. Pipi, A. R. De Andrade, E. Brillas, and I. Sirés*
- 2588 δ-MnO<sub>2</sub> Supported On Carbon Nanotubes for Photocatalytic Water Splitting  
*M. Nakayama, S. Mito, K. Yoshimura, Y. Mohri, and M. Shamoto*
- 2589 Electrochemical Preparation of Polyaniline-Photosystem I Composite Films for Biohybrid Solar Energy Conversion  
*E. A. Gizzie, G. LeBlanc, and D. E. Cliffler*
- 2590 Re-Annealing Effect On the Structure and Photo-Electrochemical Character of the Annealed Hematite Nanorods Fabricated By Electrochemical Etching  
*M. C. Huang, C. C. Wu, T. H. Wang, W. S. Chang, J. C. Lin, W. H. Lan, Y. C. Lee, and K. L. Hsueh*
- 2591 Titania Based Mixed Oxide Photoanode for Photoelectrochemical Water Oxidation  
*R. Venkatkarthick, D. Jonas Davidson, S. Vasudevan, G. Sozhan, and S. Ravichandran*
- 2592 Titanium Oxide Electrodeposition On Diamond/Ti Electrodes With Different Boron Dopings  
*A. B. Couto, F. L. Migliorini, M. R. Baldan, and N. G. Ferreira*
- 2593 Highly Efficient Photoelectrochemical Hydrogen Production Using CdS/CdSe Co-Sensitized TiO<sub>2</sub> Nanorod Array Photoelectrode  
*H. S. Han, S. Shin, J. S. Kim, I. S. Cho, and K. S. Hong*
- 2594 Photo-Electrochemical Communication Between Cyanobacteria and Osmium Redox Polymer Modified Electrodes  
*K. Hasan, H. B. Yildiz, E. Sperling, M. A. Packer, D. Leech, C. Hägerhäll, and L. Gorton*

- 2595 Curcumin-Ru Complex for Dye-Sensitized Photoelectrochemical Water Splitting  
*R. Vedarajan, Y. Morita, and N. Matsumi*
- 2596 The Influence of Polysulfide Electrolyte On CdSe QDs  
*L. A. King, H. Tellez Lozano, and J. D. Riley*
- 2597 Photocathodic Activity of Poly(3-Hexylthiophene) in Aqueous Acid  
*S. Holdcroft, G. M. Suppes, and E. Ballard*
- 2598 Synthesis and Preliminary Photoelectrochemical Study of Silver Antimony Sulfide Semiconductor  
*S. Parajuli, P. Chhetri, W. L. Stephenson, and M. A. Alpuche-Aviles*

#### **I4 - Physical and Analytical Electrochemistry in Ionic Liquids 3**

*Physical and Analytical Electrochemistry, Battery, Electrodeposition, Sensor*

- 2599 Improving Magnesium Electrochemistry in Ionic Liquids Through Enhanced Solvation  
*T. S. Watkins and D. A. Buttry*
- 2600 Electrochemical Capture of Carbon Dioxide in An Ionic Liquid Using N-Methyl-4,4'-Bipyridinium Cation  
*P. Singh and D. A. Buttry*
- 2601 Chemical Reactivity of Alkyl Thiolates Used in Electrochemical CO<sub>2</sub> Capture in Ionic Liquids  
*M. Hasani and D. A. Buttry*
- 2602 Liquid Metal Salts: High Current Density Electrodeposition of Cu-Sn-Zn Metal Stacks From Ionic Liquids for Kesterite Based Thin Film Photovoltaics  
*M. Steichen, N. R. B. Brooks, M. Arasimowicz, J. C. Malaquias, P. J. Dale, L. Van Meervelt, J. Fransaer, and K. Binnemans*
- 2603 Voltammetry for Quantitative Analysis of Actinides in Molten Salts  
*M. M. Tylka, J. L. Willit, M. A. Williamson, and J. Prakash*
- 2604 Electrochemistry of Ferrocene-Modified Redox Ionic Liquids  
*B. Gélinas, J. Forgie, and D. Rochefort*
- 2605 Electrochemical Studies of 9-Fluorenone Complexation By Aluminum in Ionic Liquids  
*G. T. Cheek*
- 2606 'Polymeric Ionic Liquid/Carbon Black' composite as a Green Supporting Electrolyte  
*S. J. Yoo and R. D. Little*
- 2607 Silylamine Reversible Ionic Liquids As Electrochemical Solvents  
*E. J. Biddinger, S. Kattecola, and T. K. Shillingford*
- 2608 Ionic Liquids for Ammonia Electrosynthesis and Energy Storage  
*J. M. Sansiñena, J. Chlistunoff, N. C. Tomson, J. M. Boncella, and F. H. Garzon*

- 2609 Enhanced Electrical Conductivity of Carbon-Based Nanoparticles in Ionic Liquid Electrolytes  
*P. F. Salazar, S. Kumar, and B. Cola*
- 2610 Supported Nanoparticle Stability, Assembly and Extended Charge Neutralization in Deep Eutectic Solvents  
*J. Hammons*
- 2611 Gas Diffusion Electrodes and Ionic Liquid Electrolytes for Secondary Zinc-Air Batteries: Electrochemical Characterization  
*A. Westphal, D. Fenske, I. Bardenhagen, and O. Yezerska*
- 2612 Mixture of 1-Ethyl-3-Methylimidazolium Tetrafluoroborate and 1-Ethyl-3-Methylimidazolium Iodide: A New Potential High Capacitance Electrolyte for Edles  
*L. Siinor, C. Siimenson, K. Lust, and E. Lust*
- 2613 Spectroelectrochemical Study of Multi-Electron Transfer in Ionic Liquids  
*A. Atifi and M. D. Ryan*
- 2614 Hysteresis of Potential-Dependent Changes in Ion Density and Orientation of Ionic Liquids On An Au Electrode: An Surface-Enhanced Infrared Study  
*K. Motobayashi, K. Minami, N. Nishi, T. Sakka, and M. Osawa*
- 2615 Galvanostatic Pulse Plating of Al Metal in Room-Temperature Chloroaluminate Ionic Liquids  
*L. H. Chou*
- 2616 Heterogeneous and Homogeneous Electron Transfer Kinetics of the  $[\text{CeCl}_6]^{3-/2-}$  redox Reaction in the 1-Butyl-3-Methylpyrrolidinium Bis(trifluoro-methylsulfonyl)Imide Ionic Liquid  
*L. H. Chou*
- 2617 Amperometric Gas Sensors With Ionic Liquid Electrolytes  
*M. T. Carter, J. R. Stetter, M. W. Findlay, and V. Patel*

### **15 - Processes 8**

#### *Physical and Analytical Electrochemistry, Energy Technology*

- 2618 A Self-Healing Phenomenon of Thin  $\delta\text{-MnO}_2$  Film in the Oxidative Decomposition of Hydrogen Peroxide  
*M. Nakayama and A. Sato*
- 2619 Electrolytic Formation of Pt-Li Alloy and Its Excellent Electrocatalysis for Formic Acid Oxidation  
*Z. Awaludin, T. Okajima, and T. Ohsaka*
- 2620 Photo-Assisted Boosting of Formic Acid Electrooxidation On  $\text{TiO}_2$  Nanotube-Pt Electrode  
*N. Mojumder, S. Sarkar, S. Abbas, and V. Subramanian*

- 2621 Activity and Stability Trends for Oxygen Evolution Reaction Electrocatalysts  
*N. Danilovic*
- 2622 Electrochemical SERS Study On Well-Defined Catalytic Metal Surfaces Using Hybridized Plasmon Modes  
*K. Ikeda, J. Hu, and K. Uosaki*
- 2623 Potential Dependent Structures At Pt(111) Single Crystal Electrode/Perchloric Acid Electrolyte Interface Studied By Surface X-Ray Scattering  
*T. Kondo, K. Uosaki, N. Aoki, and T. Masuda*
- 2624 Modeling of Magnetic Enhancement of Homogeneous Electron Transfer Reactions  
*H. C. Lee, S. D. Minteer, and J. Leddy*
- 2625 Nanoscale Electrochemical Processes On Cu(111) Surface Using Periodic DFT and Quantum/Classical Simulations  
*A. Sumer, M. Losada, and S. Chaudhuri*
- 2626 Factors That Influence the Reduction of Organic Halides At Silver Cathodes  
*L. M. Strawsine and D. G. Peters*
- 2627 Structural and Compositional Control of Mesoporous Thin Film Electrocatalysts  
*J. D. Snyder, N. Markovic, and V. R. Stamenkovic*
- 2628 Electrocatalytic Oxygen Reduction and Water-Oxidation On Transition Metal Ions-Doped MnO<sub>2</sub>, RuO<sub>2</sub> and IrO<sub>2</sub> in Alkaline Aqueous Solutions  
*A. J. Jeevagan, G. Saravanan, T. Onobuchi, Y. Suzuki, E. Murakoshi, S. Kaneko, G. Kobayashi, and F. Matsumoto*
- 2629 Direct Electrolytic Reduction of Hematite Pellets in Alkaline Electrolyte for Iron Production  
*G. M. Haarberg and B. Yuan*
- 2630 Tin Oxide and Nickel Ferrite Anodic Behaviour in Molten Chlorides  
*G. M. Haarberg, E. Kvalheim, and A. M. Martinez*
- 2631 An All-Inorganic Responsive Surface: Electrochemical Switching of Boron Nitride Nanomesh Corrugation  
*S. F. L. Mertens, A. Hemmi, S. Muff, R. K ung, S. De Feyter, J. Osterwalder, and T. Greber*

## J1 - Sensors, Actuators, and Microsystems General Session

### *Sensor*

- 2632 Quantitative Decoding of Ammonia-Hydrocarbon Mixtures Using Zirconia-Based Mixed Potential Sensors  
*C. R. Kreller, J. Tsitron, P. K. Sekhar, R. Mukundan, F. H. Garzon, A. V. Morozov, and E. L. Brosha*
- 2633 Chloride-Sensitivity Improvements By Nitrogen Plasma Immersion Ion Implantation On Samarium Oxide Membrane  
*Y. R. Ye, Y. H. Lin, C. S. Lai, J. C. Wang, C. Chang, A. T. Cho, J. J. Chang, and M. F. Chiang*
- 2634 MEMS Gas Chromatograph for Explosive Marker Compounds: Temperature and Flow Rate Effects On Sensor-Array Detector Responses and System Performance  
*L. K. Wright, W. R. Collin, G. Serrano, and E. T. Zellers*
- 2635 Response Characteristics of Fuel Cell Type Alcohol Sensor Using Nafion Membrane  
*M. Sudoh and K. Kamiya*
- 2636 Hydrazine Sensor for Quantitative Determination of High Hydrazine Concentrations for Direct Hydrazine Fuel Cell Vehicle Applications  
*S. Babanova, U. Martinez, K. Asazawa, H. Tanaka, and P. Atanassov*
- 2637 Amperometric Gas Sensors in Agricultural Applications  
*M. T. Carter, J. R. Stetter, M. W. Findlay, and V. Patel*
- 2638 Synthesis and Hydrogen Gas Sensing Performance of Pd-Functionalised Nanostructures  
*K. Y. Kok, I. K. Ng, N. U. Saidin, L. Lombigit, S. H. Ilias, C. Z. Che Abd Rahman, and T. F. Choo*
- 2639 Detection of Cancer Biomarker With Surface-Enhanced Raman Scattering Biosensor  
*N. Wu and M. Li*
- 2640 Novel Plasmonic SERS Sensor and Its Application to Chemical Analysis for Solid/Solid Interfaces  
*M. Yanagisawa*
- 2641 Drug Screening Arrays At Protein/Protein Interfaces in Cancer  
*S. Krishnan*
- 2642 Tuning and Control of Surface Plasmon Resonance Sensing Using Grating-Based Nanostructures  
*A. C. Hillier, W. H. Yeh, and J. W. Petefish*
- 2643 Regularities of Electroless Deposition of Silver On Porous Silicon for Fabrication of SERS-Active Substrates  
*K. Artsemyeva, H. Bandarenka, A. Panarin, S. N. Terekhov, and V. P. Bondarenko*

- 2644 Soft Actuators Prepared By Electrochemical Copolymerization of Pyrrole and Methyl 1H-Pyrrole  
*J. Yamasaki, S. Ogihara, T. Kadoyama, F. Tsumuji, S. Takamiya, and Y. Nishioka*
- 2645 Green-Sensitive Organic Photodetector With High Spectral Sensitivity for Image Sensor Application  
*K. H. Lee, D. S. Leem, C. Jung, K. B. Park, S. J. Lim, X. Bulliard, K. S. Kim, Y. W. Jin, S. Lee, and S. Y. Park*
- 2646 Ultra-Narrow, High Aspect Ratio Trenches for Use in Miniaturized Poly-SiGe Accelerometers  
*A. Ray Chaudhuri, P. Helin, S. Severi, R. V. Hoof, B. Du Bois, H. Tilmans, L. Francis, and A. Witvrouw*
- 2647 Reaction of the Electrogenerated Superoxide Species With Binding-Materials in Commercial Pt Screen-Printed Electrodes, and Its Implication in Amperometric O<sub>2</sub>-Gas Sensing  
*J. Lee, K. Murugappan, D. W. M. Arrigan, and D. S. Silvester*
- 2648 Metallic Atom-Scale Junction for Chemical Noise Detection: Study of Surface Molecular Adsorption/Desorption Kinetics Using Fluctuation Spectroscopy  
*T. W. Hwang and P. W. Bohn*
- 2649 Supermolecule Functionalized Graphene and Application in Electrochemical Sensor  
*G. Diao and M. Chen*
- 2650 Preparation and Characterization of Microcomposite Based On Environmentally Sensitive Microgel and Conducting Polymer  
*M. Karbarz, M. Mackiewicz, T. Rapecki, and Z. Stojek*
- 2651 Hydrogen Resistivity Sensors From Nanoparticle Assemblies: Palladium Versus Platinum  
*K. Rajoua and F. Favier*
- 2652 Characterization of Mediator-Less Sugar/Oxygen Enzymatic Fuel Cells in Vitro  
*P. Lamberg, S. Shleev, R. Ludwig, and T. Ruzgas*
- 2653 Electrochemical Reduction of 2,4,6-Trinitrotoluene On Vanadium Dioxide  
*M. C. Casey, A. J. Raubach, J. I. Ziegler, R. F. Haglund, and D. E. Cliffl*
- 2654 Synergistic Effects of Graphene Based Nano Hybrid Materials for the Electrochemical Sensing Applications  
*T. Soundappan, S. De, V. Ramadesigan, and V. R. Subramanian*
- 2655 Electrochemical Characterization of Screen Printed Au Electrodes  
*Q. Huang, B. Baker-O'Neal, and S. Ahmed*
- 2656 Engineering An Electrochemical Sensor for the Characterization of Bond Vibration Frequencies of a Chemical Analyte  
*C. Gupta, S. Chang, and R. T. Howe*

- 2657 Electrochemical Mass Immunosensor for Insulin Detection in Human Serum  
*V. Singh and S. Krishnan*
- 2658 Voltammetric Glucose Sensor Using POLY(2,5 DIMETHOXY ANILINE) As A Polymer Support  
*P. Balakrishnan and S. Chinnaiah*
- 2659 A Novel Electrochemical Immunosensor for Mirnas Detection Using Reduced Graphene Oxide Electrodes  
*C. M. Pham, H. V. Tran, B. Piro, S. Reisberg, D. T. Huynh, and D. Stollar*
- 2660 Glucose Detection At Films Composed of Ir Oxide Nanoparticles On Carbon Supports  
*H. B. Campbell and V. Birss*
- 2661 Electrochemical Interference in a Catechol-Modified Chitosan Redox Cycling Amplification System for Clozapine Detection  
*T. E. Winkler, H. Ben-Yoav, S. E. Chocron, E. Kim, D. L. Kelly, G. F. Payne, and R. Ghodssi*
- 2662 Tapered Optical Fibers for Biosensing Applications  
*B. King, I. Idehenre, P. E. Powers, A. M. Sarangan, J. W. Haus, and K. M. Hansen*
- 2663 Bioimaging Using LSI-Based Amperometric Biosensing System With 400- Electrodes  
*K. Y. Inoue, K. Ino, M. Sen, M. Nakano, K. Takara, R. Kubo, M. Matsudaira, A. Suda, R. Kunikata, H. Shiku, and T. Matsue*
- 2664 Electrochemically Actuated, Screen Printed, Capillarity-Driven Microsystems for Food Safety and Clinical Analysis  
*S. Molina, A. Washe, O. Msehli, B. Teixeira-Dias, and I. Katakis*
- 2665 Characteristics of Fully Screen-Printed Paper-Based Chromatographic Electrochemical Biosensor  
*I. Shitanda, T. Yamaguchi, Y. Hoshi, and M. Itagaki*
- 2666 Two-Step Microwave Synthesis of Highly Dispersed Ordered Intermetallic Pt<sub>3</sub>Pb Nanoparticles On Carbon Black  
*A. J. Jeevagan, N. Sawano, G. Saravanan, T. Gunji, S. Usui, T. Kojima, S. Kaneko, G. Kobayashi, and F. Matsumoto*
- 2667 Preparation and Voltammetric Behavior of a Hybrid Silsesquioxane Chemically Modified With 4-Amino-5-(4-pyridyl)-4H-1,2,4-Triazole-3-Thiol (APTT) and Copper Hexacyanoferrate(III): A Sensor of Nitrite  
*D. R. Do Carmo*
- 2668 Intelligent Detector of Internal Combustion Engine Cylinder Pressure and Sensitivity Temperature Coefficient Compensation  
*B. R. Zheng, C. Zhou, X. M. Pan, and W. Xue*



- 2669 Internal Stress Effect On Nonlinearity of Absolute Pressure Sensor Fabricated With Single-Sided Surface-Micromachining Processes  
*Q. Wang, Y. M. Zhang, W. Mao, and D. Ge*
- 2670 Development of a Bifunctional Pt/Au Platform Microelectrode Modified With Glucose Oxidase for Glucose Determination  
*T. R. L. Dadamos, L. F. Sgobbi, and S. A. S. Machado*
- 2671 Voltammetric Determination Of Dipyrone Using Graphite Paste Electrode Modified With Nanoparticles Of Nickel Hexacyanoferrate  
*U. O. Bicalho*
- 2672 Effect of Amyloid Conformation On the Response of Field Effect Transistor Biosensor to Sup35NM Protein  
*S. Hideshima, S. Wustoni, S. Kuroiwa, T. Nakanishi, A. Koike-Takeshita, and T. Osaka*
- 2673 Label-Free Detection of Alanine Aminotransferase Using a Low Operation Voltage and Single Reaction Step of Graphene Field-Effect Biosensor  
*T. M. Pan, K. S. Wang, C. Cheng, C. C. Lin, F. H. Ko, and L. Chi*
- 2674 Improved Hydrogen Sensing Characteristics of Flat Type Micro Catalytic Hydrogen Gas Sensor of Smaller Size  
*C. H. Han and S. D. Han*
- 2675 Electrochemical Determination of Hormones Using Sensor Based On Graphene Nanosheets  
*F. H. Cincotto, P. A. Raymundo-Pereira, F. C. Moraes, and S. A. S. Machado*
- 2676 Effect of Hydrogen Treatment On Characteristics of Titanium Oxide Nanotube Micro Hydrogen Gas Sensors  
*T. Tobe, R. Kojima, Y. Kimura, and M. Niwano*
- 2677 Study of Ultrathin TiO<sub>2</sub> Metal Oxide Gas Sensor Deposited By Atomic Layer Deposition for Environmental Monitoring  
*S. C. Mills, B. Lee, and V. Misra*
- 2678 Electrochemically Active Graphene oxide used as an electrochemical Indicator for Biosensor  
*K. Kim and D. Choi*
- 2679 Impedimetric Hg<sup>2+</sup> Analysis By Employing Thrombin Label  
*K. Kim and H. Ko*
- 2680 The I-V Characteristics of a Termination-Controlled Borondoped polycrystalline Diamond Field Effect Transistor pH Sensor for Using At Harsh Environment  
*Y. Shintani*
- 2681 Toxic Gas Sensors Using Ionic Liquids  
*A. Nauber and P. Tschuncky*

- 2682 Reduced Graphene Oxide and Single-Walled Carbon Nanotubes Composite Material for Electrocatalytic Oxidation of NADH  
*T. Y. Huang, K. Ho, and C. W. Chu*

## **J2 - Impedance Techniques, Diagnostics, and Sensing Applications**

*Sensor, Corrosion, Industrial Electrochemistry and Electrochemical Engineering, Physical and Analytical Electrochemistry*

- 2683 The Influence of Coupled Faradaic and Charging Currents On Impedance Spectroscopy  
*S. L. Wu, M. E. Orazem, B. Tribollet, and V. Vivier*
- 2684 The Role of the Reference and Counter Electrodes in Electrochemical Impedance Measurement  
*P. Vanyšek, H. Tavassol, and K. L. Pilson*
- 2685 Investigation of Transport/Insertion Processes in Mixed and Ionic Conducting Thin Films By Ac Electrogravimetry  
*L. K. To, O. Sel, C. Gabrielli, and H. Perrot*
- 2686 Diffusion Impedance of Microband Electrode Array By FEM  
*Y. Hoshi, M. Ohya, I. Shitanda, and M. Itagaki*
- 2687 Carbon Nanotube Coated Paper Sensor for Damage Diagnosis Using Electrical Impedance Tomography  
*B. Kim, Y. Lu, T. Kim, J. W. Han, M. Meyyappan, and J. Li*
- 2688 (2013 ECS Fellow Inductee) Information from Noise  
*J. Janata and R. West*
- 2689 Impedance Analysis of Copper Alloys At the Corrosion Potential in Seawater  
*I. Frateur, B. E. Torres Bautista, M. L. Carvalho, and B. Tribollet*
- 2690 Study of Pickling and Over-Pickling Mechanisms of Silicon High Alloyed Steel Grade By Electrochemical Impedance Spectroscopy  
*A. A. Mouyad, M. E. Orazem, E. Sutter, B. Tribollet, and A. Koltsov*
- 2691 Galvanic Deposition of Mo Atop Al 6061 Alloy  
*B. D. Falola, A. Krishnamurthy, R. Radhakrishnan, and I. I. Suni*
- 2692 Phosphate Adsorption On Thin Films Made of Transition Metal Oxides, As Measured By Electrochemical Impedance Spectroscopy  
*R. E. Pérez-Roa, R. E. Moss, J. Ma, D. R. Noguera, and M. A. Anderson*
- 2693 Applications of AC Impedance Spectroscopy As Characterization and Diagnostic Tool in Rechargeable Energy Storage Devices  
*V. Lvovich*

- 2694 Impedance Behavior of Binderless Ni-Mo Composite Cathode for a Li-O<sub>2</sub> Battery Via Impedance Spectroscopy  
*R. Nelson, M. H. Weatherspoon, J. Kosivi, E. E. Kalu, and J. P. Zheng*
- 2695 Impedance As a Diagnostic Tool to Characterize Mixed-Potential Sensor Response  
*C. R. Kreller, P. K. Sekhar, D. Spornjak, W. Li, P. Palanisamy, E. L. Brosha, R. Mukundan, and F. H. Garzon*
- 2696 Role of Porosity in Impedancemetric NO<sub>x</sub> Gas Sensors Using Yttria-Stabilized Zirconia (YSZ) Electrolyte and Au-Based Electrodes  
*L. Woo, R. Glass, R. Novak, J. Visser, J. Fitzpatrick, K. Allmendinger, J. Steppan, V. Wang, B. Henderson, and A. Lourdhusamy*
- 2697 Mixed Ion and Electron Conducting Ceramics for Gas Sensors  
*V. Thangadurai, S. Mulmi, and R. Kannan*
- 2698 Pd Decorated TiO<sub>2</sub> Nanotube Arrays Schottky Barrier Diodes for Efficient Hydrogen Sensing Application  
*Y. Ling*
- 2699 AC Impedance Characterization of Microbes in Skim Milk  
*M. Smiechowski and K. Klopfer*
- 2700 Covalent Immobilization of Thiolated Oligonucleotide Onto Glassy Carbon: A Cost-Effective Alternative for Genosensor Fabrication  
*C. O Sullivan*
- 2701 Development of Novel Routes for Surface Functionalisation With Diazonium Derivatives and Their Application in Electrochemical Genosensing  
*C. O Sullivan*
- 2702 Characterization of Tau Protein Films On Surfaces  
*S. Martic and H. Trzeciakiewicz*
- 2703 Immobilization of Protein Aptamers On Binary SAM for Protein Sensing Applications  
*H. Feyzizarnagh, N. Reaver, D. S. Kim, and B. D. Cameron*
- 2704 Equivalent Electrical Circuits of Impedances of Pt, Ir and Ni Electrodes Under Anodic Polarization  
*E. Baranova, O. Kuznetsov, and A. Allagui*
- 2705 Investigation of Oxygen Reactions in a Screenprinted Pt/YSZ-Model Electrode System  
*Y. Zheng, U. Sauter, L. Kunz, M. Streeb, G. Oehler, K. Sahner, and R. Moos*
- 2706 Analysis of Electrochemical Characteristics of Organic-Inorganic Hybrid Titanophosphite membranes  
*Y. Ueda, Y. Tokuda, H. Nagai, H. Masai, and T. Yoko*

### **J3 - Luminescence and Display Materials - Fundamentals and Applications**

#### *Luminescence and Display Materials*

- 2707 Development of Phosphors for White Emitting Near UV LEDs  
*J. Han, M. E. Hannah, J. I. Choi, A. Piquette, M. Anc, J. B. Talbot, K. C. Mishra, and J. McKittrick*
- 2708 Blue Light Excitable Red-Emitting Oxide Phosphor  
*K. Toda, S. W. Kim, T. Hasegawa, K. Uematsu, T. Ishigaki, and M. Sato*
- 2709 Looking for Red Line-Phosphors for LED-Based Systems  
*A. A. Setlur, J. Murphy, R. Lyons, F. Garcia-Santamaria, P. K. Nammalwar, and N. Karkada*
- 2710 "UV Or Blue LEDs With Phosphors: An Interesting Way to Develop Smart Lighting."  
*G. Chadeyron*
- 2711 Synthesis of Green-Emitting  $\text{La}_2\text{O}_2\text{s:Tb}^{3+}$  Phosphors By Two-Step Flux Method  
*S. W. Kim, T. Abe, K. Seki, K. Toda, K. Uematsu, T. Ishigaki, and M. Sato*
- 2712 Photoluminescence of  $\text{Li}^+$  and  $\text{Eu}^{3+}$  Co-Doped  $\text{NaAl}(\text{WO}_4)_2$  As Near-UV Excited Red Phosphors  
*Y. Liu, Y. Y. Gu, and Z. G. Lu*
- 2713 Luminescence Characteristics of Color Tunable  $\text{Eu}^{2+}$  Activated  $\text{KSrPO}_4\text{-(Ba,Sr)}_2\text{SiO}_4$  Phosphors for Near-UV Light Emitting Diode Applications  
*J. Han, M. E. Hannah, A. Piquette, J. B. Talbot, K. C. Mishra, and J. McKittrick*
- 2714 Oxyfluoride Phosphors for Lighting  
*T. Vogt*
- 2715 Efficient Luminescence in  $\text{Eu}^{2+}$  Activated  $(\text{Ba,Ca})_2\text{Si}_5\text{N}_8$  phosphor  
*P. K. Nammalwar, D. G. Porob, S. K. Manepalli, and A. Setlur*
- 2716 Publishing Luminescence and Display Materials Content in ECS Journals: Past, Present, and Future  
*D. W. Hess*
- 2717 Interconfigurational d-f Luminescence of  $\text{Ce}^{3+}$  and  $\text{Pr}^{3+}$  in Double Phosphate Hosts  
*M. Bettinelli*
- 2718 Optical Spectroscopy of Six Coordinated  $\text{Eu}^{2+}$  and  $\text{Ce}^{3+}$  in  $\text{M}^{2+}\text{Al}_2\text{B}_2\text{O}_7$  ( $\text{M}^{2+}=\text{Ca, Sr, Ba}$ )  
*S. J. Camardello and A. Srivastava*
- 2719 Systematic Crystal Field Studies of  $\text{Mn}^{4+}$ -Doped Perovskites  
*A. Srivastava and M. G. Brik*
- 2720 The Sensitization of the  $\text{Pr}^{3+}$  Photon Cascade Emission in  $\text{YF}_3$   
*S. J. Camardello and A. Srivastava*

- 2721 Interesting Theoretical Problems in Luminescence From Solids  
*K. C. Mishra, K. H. Johnson, and A. Piquette*
- 2722 Development of All-Solid Thin Film Electro-Chromic Devices and Applications  
*C. J. Panchal and A. Khosla*
- 2723 Synthesis of Conjugated Materials for Organic Photovoltaics and Luminescence  
*D. Výprachtický, V. Pokorná, I. Kmínek, V. Dzhabarov, and V. Cimrová*
- 2724 Photophysical and Electrochemical Properties of Novel Luminescent and Photoconductive Copolymers  
*V. Cimrova, D. Výprachtický, I. Kmínek, V. Dzhabarov, and V. Pokorná*
- 2725 Mixed Electron and Lithium Ion Conduction in Nanocrystal-Polymer Composites for Electrochromic Applications  
*E. Runnerstrom, G. Garcia, R. Buonsanti, A. Llodes, B. A. Helms, and D. J. Milliron*
- 2726 Glycothermal Synthesis and Characterization of YAG:Ce<sup>3+</sup> Nanophosphors  
*T. Isobe*
- 2727 Effect of Synthesis Methods On the Powder Characteristics and Luminescence Properties of Nanophosphors  
*J. Han, J. I. Choi, J. B. Talbot, J. S. H. Lee, and J. McKittrick*
- 2728 Thermal Quenching in II-VI Semiconductor Nanocrystals: What Causes It and How to Eliminate It  
*D. F. Kelley, X. Cai, K. Gong, J. E. Martin, and L. S. Rohwer*
- 2729 Quantum Dots for LED Downconversion in Display Applications  
*S. Coe-Sullivan, W. Liu, P. Allen, and J. S. Steckel*
- 2730 Synthesis Of Fluorescent Nanocomposites Constituted Of GdPO<sub>4</sub>:Eu<sup>3+</sup> and Tb<sup>3+</sup> Nanowires Embedded In A Silicon Polymer  
*D. Boyer, A. Garrido Hernandez, A. Potdevin, G. Chadeyron, A. García Murillo, F. de J. Carrillo Romo, and R. Mahiou*
- 2731 Combined Crystal Field and First Principles Studies of the Y<sub>2</sub>O<sub>2</sub>S Phosphor Doped With Yb<sup>3+</sup> and Er<sup>3+</sup>  
*A. K. Gangadharan, M. Pokhrel, M. G. Brik, D. K. Sardar, and C. G. Ma*
- 2732 Improved Multiplet Energy Diagrams for D<sup>3</sup> Ions in Oxides Based On Correlation Corrections  
*K. Ogasawara, F. Alluqmani, and M. Novita*
- 2733 Prediction of Pressure Dependence of R-Line Emission for d<sup>3</sup> Ions in α-Al<sub>2</sub>O<sub>3</sub> Based On First-Principles Calculations  
*M. Novita and K. Ogasawara*

- 2734 Enhanced Luminescent Properties of Europium Complex By Replacement of Water Molecules By 2, 2'-Bipyridine  
*R. K. Lather*
- 2735 First-Principles Calculations of 4f-5d Transition Spectra for Ce<sup>3+</sup> in Silicate Garnets  
*E. Haji, M. Novita, and K. Ogasawara*
- 2736 A Comparison of Excitation and Emission Properties of Pr-Doped. LiNbO<sub>3</sub>, CaNbO<sub>3</sub>, and CaTiO<sub>3</sub>  
*J. Collins, J. Tsehay, and S. Velupillai*
- 2737 Synthesis and Photoluminescent Properties of Ba<sub>2</sub>V<sub>2</sub>O<sub>7</sub>:Eu Phosphors  
*S. Lohra*
- 2738 Synthesis and Optical Properties of Tb<sup>3+</sup>- Doped LaSrAl<sub>3</sub>O<sub>7</sub> phosphors  
*R. Langyan*
- 2739 Fabrication and Spectral Investigation of Y<sub>2</sub>O<sub>3</sub>:Nd<sup>3+</sup> Nano-Particles  
*J. Collins, B. Di Bartolo, and G. Bilir*
- 2740 Crystallinity and Photoluminescence Improvement of YAG:Ce Phosphor Ceramics By Solid State Reaction With Silica Addition  
*Y. T. Nien*
- 2741 The Photoluminescence Properties of Ce<sup>+3</sup> Doped Nano Sized SiO<sub>2</sub> for Transparent Coating Application  
*B. Becer, Z. Yesil, N. Kiraz, and M. Asiltürk*
- 2742 Blue-Emitting Metal Chloride Phosphor: High Color Purity Phosphor in Near-UV for White LED Applications  
*S. J. Gwak and W. B. Im*
- 2743 Enhanced Photoluminescence of Spray Pyrolysis Deposited Y<sub>2</sub>O<sub>3</sub>: Er<sup>+3</sup> Thin Films By Li<sup>+</sup> Co-Doping  
*A. Meza, E. Huerta, E. Zaleta-Alejandre, Z. Rivera-Álvarez, and C. Falcony*
- 2744 Luminescent Characteristics of Polyethylene Terephthalate (PET) Thin Films Deposited By Spray Pyrolysis Using Rare Earths (RE<sup>3+</sup>) As Dopants  
*S. Carmona-Tellez, M. A. Aguilar-Frutis, G. Alarcón-Flores, M. García-Hipolito, E. Zaleta-Alejandre, A. Meza.Rocha, Z. Rivera-Álvarez, R. Martínez-Martínez, and C. Falcony*
- 2745 Critical Overviews About Conventional Ideas for White-LED (Oxy)Nitride Phosphors: Covalency and *Stiffness*  
*M. Mikami*
- 2746 Discovery of Novel Oxynitride Phosphors for Use in LEDs  
*K. S. Sohn*

- 2747 Phosphor Crystals for Tailored Spectrum LEDs  
*P. S. Dutta*
- 2748 Effect of Flux On Luminescence of  $\text{Eu}^{2+}$  Activated Yellow Oxynitride Phosphor  
*P. K. Nammalwar, S. K. Manepalli, D. G. Porob, and A. A. Setlur*
- 2749 Novel Synthesis Methods for Luminescent Materials: Spark Plasma Sintering (SPS) and Micro Arc Oxidation (MAO)  
*S. H. Hong and E. H. Kang*
- 2750 Microstructure and Optical Properties of An Oxynitride Ceramic Phosphor  
*M. H. Rauf, M. E. Hannah, D. Johnston, J. Montaner, Z. Yu, S. Tragl, A. Rucki, V. Klueppel, E. Jones, X. Zhou, M. Wang, and S. Gradecak*
- 2751 Spectral Tuning in Nitride Phosphors By Compositional Tailoring  
*R. J. Xie, N. Hirotsuki, T. Takeda, and T. Suehiro*
- 2752 Synthesis of Yellow-Emitting  $\text{NaAlSiO}_4:\text{Eu}^{2+}$  Phosphors Using  $\text{SiO}_2$  Powder As a Silica Source  
*K. Toda, T. Abe, T. Ishigaki, S. W. Kim, K. Uematsu, M. Sato, T. Masaki, and D. H. Yoon*

#### **J4 - Microfluidic MEMS/NEMS, Sensors and Devices**

*Sensor, Physical and Analytical Electrochemistry, New Technology Subcommittee*

- 2753 Plenary Talk--Nanosensor Systems. e-Bra, e-Band and Wireless Electronics for Monitoring and Control of Cardiovascular Diseases and Neurological Disorders  
*V. K. Varadan*
- 2754 Keynote--Recent Biomedical Applications of Dielectrophoresis  
*R. Pethig*
- 2755 Distinguished Invited Speaker--Spectroelectrochemistry in Low-Dimensional Nanofluidic Devices for Chemical and Biochemical Sensing  
*J. Zhao, N. M. Contento, D. A. Grismer, L. P. Zaino III, S. Poliseti, and P. W. Bohn*
- 2756 An Automated Electrochemical Immunosensing System for Detection of Cortisol At Point-of-Care (POC)  
*S. Bhansali*
- 2757 Real Time Diagnostic Point of Care By Amperometric Immuno-Biosensor Kit By Flow Technology  
*H. E. Braustein, K. Levkov, I. E. Braustein, Y. E. Bezalel, M. E. Abo Zaid, G. Fleminger, and J. Rishpon*

- 2758 Keynote--Microsphere-Based Detection of Biological Toxins and Signaling Molecules Using Renewable Surface Microfluidic Platforms With Enhanced Mass Transport and Capture  
*J. W. Grate, C. Bruckner-Lea, M. G. Warner, R. M. Ozanich, and N. Anheier*
- 2759 Distinguished Invited Speaker--3D Printing of Intricate Soft and Wet Systems  
*H. Furukawa*
- 2760 RFID Corrosion Sensors  
*W. H. Smyrl*
- 2761 Chip Based Amplification and Detection of Influenza C Virus Using Dielectrophoresis  
*K. V. I. S. Kaler, R. Prakash, R. Tellier, K. Pabbaraju, and S. Wong*
- 2762 Stochastic Microsensors Based On Nanostructured Materials Used in the Screening of Whole Blood for Hepatitis B  
*R. I. Stefan-van Staden and I. Moldoveanu*
- 2763 Separation and Preconcentration Of Viable Pathogens By Chemotaxis  
*J. Xu and P. J. Hesketh*
- 2764 Keynote--Long-Term Viability of DNA-Based Bionanoelectronics: Studies in Transient Effects On Electrical Property of DNA Molecular Wires  
*S. Kassegne*
- 2765 Distinguished Invited Speaker--Inkjet-Printed Carbon Nanotube Electrodes for Electrochemical Sensor Applications  
*R. P. Tortorich, E. Song, and J. W. Choi*
- 2766 Electrochemical Alloying-Dealloying in Ionic Liquids for Fabricating Nanoporous Microelectrodes  
*J. Jiang*
- 2767 Redox cycling at nanowire-based interdigitated comb electrodes: Enhanced electrochemical sensitivity and electrode kinetics  
*A. O' Riordan*
- 2768 Centrifugal Microfluidic Platform With Real-Time Electrochemical Detection  
*A. L. Brogger, S. Z. Andreasen, F. G. Bosco, K. B. Andersen, D. Kwasny, W. E. Svendsen, and A. Boisen*
- 2769 Carbon-MEMS Based Multi-Sides Electrode Array Fabric for Neural Sensing and Recording  
*N. W. Vahidi, S. Kassegne, and T. McDowell*
- 2770 Non-enzymatic electrochemical sensor technology based on vertically aligned 3-D nanowire array platform  
*K. Razeeb*



- 2771 Electrochemical Characterization of DNA Attachment On Graphitic Carbon Microelectrodes for Bionanoelectroics Platforms  
*M. Hirabayashi, B. Mehta, S. Kassegne, and A. Khosla*
- 2772 Dynamic Contact Angles in Low Voltage Electrowetting-On-Dielectric Systems  
*M. Mibus, X. Hu, C. Knospe, M. L. Reed, and G. Zangari*
- 2773 Distinguished Invited Speaker--Patch Type Glucose Sensor for Low-Invasive Glucose Monitoring  
*M. Yasuzawa, S. Sato, and K. Edagawa*
- 2774 Electrochemical Sensors for Point-of-Care Measurements of Metals  
*I. Papautsky*
- 2775 Electrochemical Screening of Peptides for Targeting CD13  
*S. Martic, K. Kaur, and R. Soudy*
- 2776 Probing the Three Phase Interface to Understand Electrochemical Screening of Gas Phase Pollutants  
*P. K. Sekhar and K. Subramanian*
- 2777 A Polyaniline Nanowire Network With Catalytic Nanoparticles for Chemical Sensing  
*E. Song and J. W. Choi*
- 2778 Tunable Surface Area Electrochemical Biosensors Through Self-Assembly  
*B. D. Gates, M. T. Y. Paul, and B. Kinkead*
- 2779 Distinguished Invited Speaker--Self-Assembly of Nanostructures On Electron Beam Lithographically Patterened Templates for Biomedical and Nanoelectronic Sensor Applications  
*A. K. Pradhan*
- 2780 Graphene Based Microsensors for the Assay of Adenine, Guanine and Epinephrine  
*J. F. VAN Staden, J. F. VAN Staden, R. Georgescu, and R. I. Stefan-VAN Staden*
- 2781 Design and Simulation of Sensors to Detect Methanol  
*S. Chittur Krishnaswamy, M. S, V. Guruviah, and S. Bollepalli*
- 2782 Keynote--Review of Polymer Magnetic Nanocomposites for Microfluidics Applications  
*B. L. Gray*
- 2783 Distinguished Invited Speaker--Micromolding of Nife and Ni Thick Films for 3D Integration of MEMS  
*J. Moulin, M. Woytasik, O. Garel, T. H. N. Dinh, Y. Zhu, M. Souadda, and E. Lefevre*
- 2784 Monolithic Integration of An Optical Microfluidic System for the Detection of Flurophore Tagged Recombinant Bovine Somototropin  
*M. Packirisamy and J. Ozhikandathil*

- 2785 Sm-Co Thick Films Micromolding  
*J. Moulin, M. Woytasik, D. Belghiti, and K. Chouarbi*
- 2786 Fabrication and application of world's smallest polymer bonded permanent rare earth micro-magnets for MEMS/NEMS Devices  
*A. Khosla, S. Kassegne, M. Hirabayashi, and M. Silvestro*
- 2787 Si Fabrication Technologies for Biomedical Applications: Double Stranded DNA Separation  
*B. Majeed, L. Zhang, N. Tutunjan, D. S. Tezcan, and P. Fiorini*
- 2788 Rapid Detection of Total Coliform and *E. Coli* in Contaminated Water Using Chemically Modified Microwells  
*N. S. Gunda, S. Naicker, M. Ghoraiishi, S. Bhattacharjee, T. Thundat, and S. Mitra*
- 2789 A Review of Single-Cell Manipulation Techniques for Microfluidic Lab-On-a-Chip Systems  
*S. F. Romanuik and B. L. Gray*
- 2790 Microfluidic Platform for Specific Capture, Release, and Impedance Based Quantification of Microparticles for Protein and Cellular Quantification  
*M. Javanmard, J. Mok, R. W. Davis, and M. Mindrinos*
- 2791 Keynote--Using Experience From Explosives Detection in Development of Biosensors Based On Nanomechanical Responses  
*A. Boisen*
- 2792 Distinguished Invited Speaker--Capillary-Based Assay for Cardiac Markers With Cantilever Platform  
*N. S. Gunda and S. Mitra*
- 2793 Polymer Nanobridge On a Microfabricated Quartz Tuning Fork  
*S. Jeon, S. Lee, and M. Yun*
- 2794 Electrochemical Synthesis of Polymer Nanostructures for Thermal Management  
*B. Cola*
- 2795 Transient Thermal Response of Micro TCD for Identification of Gases  
*A. Mahdaviifar, M. Navaei, R. Aguilar, P. J. Hesketh, G. Hunter, M. W. Findlay, and J. R. Stetter*
- 2796 Electrochemically Controlled Capillarity of a Liquid Metal Alloy for Shape Reconfigurable Microsystems  
*M. R. Khan, C. Trlica, C. B. Eaker, and M. D. Dickey*
- 2797 Design and Modeling of a Novel Two Dimensional Nano-Scaled Force Sensor Based On Silicon Photonic Crystal  
*L. Li, T. Li, W. Song, G. Zhang, and Y. Li*

- 2798 Electropolishing of n-Type Polycrystalline 3C-Silicon Carbide  
*N. Ballarin, C. Carraro, R. Maboudian, and L. Magagnin*
- 2799 Application Of Highly Flexible Conductive Nanocomposite Polymer Electrode Array To Tissue Electrical Impedance Scanning (EIS)  
*D. Chung, A. Khosla, B. L. Gray, A. M. Parameswaran, R. Ramaseshan, and K. Kohli*
- 2800 Nanocomposites, Microfluidics, MEMS and Nems  
*A. Khosla*
- 2801 Determination of Liquid Viscosity With Microfabricated Diaphragm Resonating Sensors for the Biomedical Application  
*K. S. Hwang, H. J. Kim, M. S. Chae, Y. K. Yoo, and J. H. Lee*
- 2802 Vapor-Solid Growth of Highly Oriented SnO<sub>2</sub> Nanorods for Chemical Sensing Applications  
*C. G. Carvajal, A. K. Pradhan, and C. S. Davis*
- 2803 Nano-Pored Three-Dimensional PDMS Microchip  
*J. H. Lee, S. I. Han, and Y. K. Yoo*
- 2804 In Vivo Evaluation Of Fine Needle Type Glucose Sensors Implanted In Rabbit Blood Vessel  
*K. Edagawa and M. Yasuzawa*

### **J6 - Sensors for Agriculture**

#### *Sensor, Physical and Analytical Electrochemistry*

- 2805 Current Sensor Research and Future Needs in Agriculture, Natural Resources, and Food Systems  
*D. Schmoldt*
- 2806 Hyperspectral Imaging Techniques for Quality and Safety Inspection of Agro-Food Products  
*M. S. Kim, K. Chao, A. Lefcourt, and D. Chan*
- 2807 Nanobiosensing Technology for Foodborne Pathogen and Toxin Detection  
*B. Park*
- 2808 Vj g'P UH'Dkugpukpi "Rtqi tco  
*A. Revzin*
- 2809 Cp"Kf wux { }u'Lqwtpg{ "vq" Tgf weg'Hqqf dqtpg"Kipguu  
*B. Fernandez-Fenaroli*
- 2810 Microcantilever Sensors Loaded With Sensing Nanomaterial for On-Site Detection and Monitoring of Trace-Level Bio/Chemical Molecules  
*X. Li*

- 2811 A Cost-Efficient Microfluidic Device for Study of Chemotaxis and Bacteria Separation Purposes  
*A. Mahdaviifar, J. Xu, and P. J. Hesketh*
- 2812 Single-Walled Carbon Nanotubes for Enantioanalysis of Malic Acid in Wines  
*I. Comnea, R. I. Stefan-van Staden, J. F. VAN Staden, and I. Moldoveanu*
- 2813 Characterization and Validation of Phage Oligopeptide Probes for Detection of *Salmonella Enterica* serotypes Using a Magnetoelastic Sensor  
*J. M. Barbaree*
- 2814 Self-Powered Herbicide Biosensor Utilizing Thylakoid Membranes  
*M. J. Rasmussen and S. D. Minter*
- 2815 Micron-Scale Phage-Based Magnetoelastic Biosensors for the Enhanced Detection of *Salmonella Typhimurium* On Fresh Spinach Leaves  
*S. Horikawa, Y. Chai, D. F. Dyer, and B. A. Chin*
- 2816 Microfabricated Coil Detector for Bacteria Detection With Magnetoelastic Biosensors  
*Y. Chai*
- 2817 A Pulse System With Cascade Amplifier for Detection of *Bacillus Anthracis* Spores On Micron-Scale, Phage-Immobilized Magnetoelastic Biosensors  
*H. Xie, K. Weerakoon, S. Horikawa, Y. Chai, and B. A. Chin*
- 2818 Complementary RNA-Based Biosensors for Rapid Detection of RNAs Derived From a Single Pathogenic Bacterial Cell  
*J. Wower, I. K. Wower, and C. Zwieb*
- 2819 Instant Detection of Pathogens Using Programmable RNA Aptamer Networks  
*J. Wower, I. K. Wower, and C. Zwieb*
- 2820 Aptamer-Based Microfluidic Biosensor for Rapid Detection of RNA Degrading Agents in Challenging Environments  
*J. Wower, M. Hamon, J. Dai, and J. W. Hong*
- 2821 Improving the Phage-Displayed Oligopeptide:Magnetoelastic Particle Biosensors  
*S. J. Suh, Z. Tong, and L. A. Silo-Suh*
- 2822 Magnetostrictive Biosensors With Sampling Capability  
*Z. Y. Cheng*
- 2823 Fabrication of Nano-Biosensors Using Nano-Sized Magnetostrictive Resonator  
*Z. Y. Cheng*
- 2824 Strategies for Isolation of Phage Displayed Oligopeptide Probes for Rapid Detection of Pathogenic *Salmonellae*  
*Z. Tong, L. A. Silo-Suh, and S. J. Suh*

- 2825 Microbeads for Sampling and Mixing in a Complex Sample  
*D. Owen, W. Mao, M. Ballard, A. Alexeev, and P. J. Hesketh*
- 2826 Highly Selective VOCs Sensor Fabrication Via Combinatorial ZnO and Graphene Oxide Solution  
*H. Ahn, J. C. Joo, H. Park, and D. J. KIM*
- 2827 Detection of Heavy Metals With Fluorescent Biosensors  
*P. Zheng, N. Wu, and M. Li*
- 2828 Micro Gas Chromatography System for detection of Volatile Organic Compounds Released By Fungi  
*M. Navaei, J. Xu, P. J. Hesketh, R. Wallace, and G. McMurray*
- 2829 A Step Towards a Discriminative Neurotoxin Biosensor: Guarding of Acetylcholinesterase From Organophosphate Compounds  
*Y. Zhang, J. Kirsch, M. Arugula, and A. Simonian*
- 2830 Electrochemical Interfaces in Plants  
*V. F. Forde - Tuckett, A. G. Volkov, and V. S. Markin*
- 2831 Lytic Phage in Biosensing  
*V. Vodyanoy, I. Sorokulova, R. Guntupalli, E. Olsen, L. Globa, and O. Pustovyy*
- 2832 Lytic Phage for Foodborne Pathogens Detection  
*I. Sorokulova, E. Olsen, L. Globa, J. M. Barbaree, and V. Vodyanoy*
- 2833 Citrus Greening (huanglongbing): Fast Electrochemical Detection and Phytomonitoring of Tree Diseases  
*A. G. Volkov and C. R. Brown*
- 2834 A Biosensor Based On Magnetic Resonance Relaxation  
*M. Sullivan and B. Prorok*
- 2835 Magneto-Mechanical MEMS Sensors for Bio-Detectiop  
*B. Prorok and M. Sullivan*
- 2836 Gene Direct Identification By Site-Specific Enzyme Cutting Double-Strand DNA On a Resonant-Cantilever  
*X. Li, T. Xu, and D. Zheng*
- 2837 AlGa<sub>N</sub> High Electron Mobility Transistor Based DNA Sensor  
*M. Park, R. Thapa, F. Tong, M. Kim, M. Bozack, and A. Son*
- 2838 SiO<sub>2</sub>-Coated Magnetostrictive Biosensors for *Campylobacter Jejuni* Detection  
*L. Zhang, O. Wang, T. S. Huang, and Z. Y. Cheng*

- 2839 Electrochemical Ethylene Sensor for Fruit Monitoring Based On An Ionic Liquid Electrolyte  
*J. F. M. Oudenhoven, M. A. G. Zevenbergen, W. Knoben, D. Wouters, and R. van Schaijk*
- 2840 Electronic Nose Fabricated From Compositionally Gradient Oxides for Agriculture Applications  
*D. J. KIM, H. Park, Y. Chung, and H. Ahn*
- 2841 Development of a SMART Trap for Asian Ambrosia Beetles  
*D. J. KIM, H. Park, A. Gorzlaneyk, J. Jeong, Y. Chung, and D. Held*
- 2842 The Establishment of Sensitive and Rapid Pathogenic Bacteria Detection Method Using Magnetic Nanoparticle Clusters and Optical Nanoparticle Probes  
*D. Kwon, C. Yim, and S. Jeon*
- 2843 *Salmonella* detection in Soil Using Phage-Based Magnetoelastic Biosensors  
*M. K. Park*
- 2844 Magnetic Propulsion of Magnetoelastic Sentinels  
*H. C. Wickle III*