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Meeting Abstracts 2015-02

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Meeting Abstracts —MA2015-02

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[419A Lattice-Boltzmann Model of Mass Transport in the Diffusion Layers of Vanadium Redox Flow Batteries](#)

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[421 Composition Optimization of the Lithium-Rich  \$\text{Li}\_3\text{OCl}\_{1-x}\text{Br}\_x\$  Anti-Perovskite Superionic Conductors](#)

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[422 Enhanced Lithium Ion Conductivity in Lithium Lanthanum Titanate Solid Electrolyte Nanowires Prepared By Electrospinning](#)

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[423 All Solid-State Electrolytes for Lithium Microbatteries: Fabrication of an Ionic Liquid-Based Membrane](#)

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[424 Relationship Between the Rate Performance of Rechargeable Lithium-Sulfur Batteries and the Local Viscosity Change at the Interface Between the Electrode and Li\[N\(CF<sub>3</sub>SO<sub>2</sub>\)<sub>2</sub>\]-Glyme Solvate Ionic Liquid](#)

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[425 Effect of Cation Structure Modification of Ionic Liquids for Lithium-Ion Batteries](#)

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[426 Nucleation and Growth Behavior of Electrodeposited Lithium in Ionic Liquid](#)

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[Thomas Vogl, Sebastian Menne, Andrea Balducci](#)

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[430 In Situ XPS and FTIR Studies of Electrochemically Polarized Carbide Derived Carbon and Other Carbon Electrodes in RTILs](#)

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[431 Thermotropic Ionic Liquid Crystalline Polymers for Lithium-Ion Battery Electrolytes](#)

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432([Invited](#)) [Li Rich FCC Materials As High Capacity Cathodes](#)

[Shuhua Ren, Ruiyong Chen, Maximilian Fichtner](#)

433[Fluoride-Doped Layered-Spinel Hybrid Lithium-Rich Cathode Material for Lithium Ion Battery](#)

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434[High Capacity Li-Rich Cathode Materials](#)

[Kun Luo, Matthew Roberts, Rong Hao, Peter G Bruce](#)

435[Re-Entrant Lithium Local Environments and Defect Driven Electrochemistry of Li- and Mn-Rich Li-Ion Battery Cathodes](#)

[Baris Key, Fulya Dogan, Brandon R. Long, Jason R. Croy, Kevin G. Gallagher, Hakim Iddir, John Russell, Mahalingam Balasubramanian](#)

436[Charging Voltage Limit Effects on the Electro-Chemical Behavior of High Capacity Manganese-Rich Cathode in Lithium Ion Batteries](#)

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437[Origins of the DC-Resistance Increase in HCMR<sup>TM</sup> Cathodes](#)

[Robert Kostecki, Vince Battaglia, Guoying Chen, Wei Chen, Gao Liu, Daniel Membreno, Kristin A Persson, Alpesh Khushalchand Shukla, Lydia Terborg, Tanghong Yi](#)

438([Invited](#)) [Advances in Cathode Materials for High Energy Density Lithium-Ion Batteries](#)

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439 Structural Ambiguity in Li- and Mn-Rich Transition Metal Oxides: Trigonal, Monoclinic, or Both?

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440 Structural Evolution of High Capacity Li-Rich  $0.5\text{Li}_2\text{MnO}_3 \cdot 0.5\text{LiMO}_2$  (M=Mn, Ni and Co) Cathode Materials during Electrochemical Cycling

Jatinkumar Rana, Richard Kloepsch, Jie Li, Gerhard Schumacher, Martin Winter, John Banhart

441 Layered Cathode Materials with Controlled Particle Assembly for High Energy Lithium-Ion Batteries

Feng Lin, Yuyi Li, Dennis Nordlund, Yijin Liu, Tsu-Chien Weng, Huolin Xin, Marca Doeff

442 Degradation Mechanism of Nickel Manganese Cobalt Oxide-Type Commercial Lithium-Ion Cells By Long-Term Cycle Tests

Tomoyuki Matsuda, Keisuke Ando, Masao Myojin, Masashi Matsumoto, Takashi Sanada, Naoki Takao, Hideto Imai, Daichi Imamura

443 (Invited) Surface Modification Effect on the First Charging Process over 4.5 V and the Enhancement of Energy of  $\text{LiNi}_{1/3}\text{Co}_{1/3}\text{Mn}_{1/3}\text{O}_2$

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444 High-Voltage, Lithium-Ion Research for Transportation Applications

Jason R. Croy, Kevin G. Gallagher, Steven G. Rinaldo, Brandon R. Long, Mahalingam Balasubramanian, Joong Sun Park, Fulya Dogan, Zhenzhen Yang, Eungie Lee, Anthony K. Burrell

445 Composite "Layered-Layered-Spinel" Electrodes for High Energy Lithium-Ion Batteries

Joong Sun Park, Jason R. Croy, Brandon R. Long, Eungje Lee, Michael M. Thackeray

446 Synthesis of  $\text{LiCoO}_2$  and  $\text{LiNi}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$  2D Nanosheets By Osmotic Swelling for High Performance Lithium-Ion Batteries

Qian Cheng, Candace K. Chan

447 Investigating Synthetic Effects on Ni-Based Oxide As a Cathode Material for Li-Ion Batteries

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448 (Invited) Understanding Surface and Structural Changes in High Energy Density Electrodes By NMR and Computational Studies

Clare P Grey, Alison Michan, Michal Leskes, Ieuan Seymour

449 Operando Imaging of Electrochemical Phase Transitions in  $\text{LiNi}_{0.8}\text{Co}_{0.15}\text{Al}_{0.05}\text{O}_2$  secondary Particles

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450 Layered-to-Spinel Phase Transformations Inhibited By ALD Coatings on NMC Cathodes to Mitigate Voltage Fade in Lithium-Ion Cells

Kevin Dahlberg, Debasish Mohanty, Myongjai Lee, Erik Anderson, Vishal Mahajan, Joel Stanley, David M King, David L Wood, Fabio Albano

451 Diffusion in the Layered Li-Ni-Mn-Co Oxide Based Core-Shell/Gradient Materials during Sintering Simulated with Pellets in Contact

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452 Aging Analysis of  $\text{LiNi}_{1/3}\text{Mn}_{1/3}\text{Co}_{1/3}\text{O}_2$ -Graphite Cells Via X-Ray Diffraction

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[453\(Invited\) Effects of Crystalline Structure on the Electrochemical Properties of High Voltage Spinel Cathode Materials](#)

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[454High Energy X-Ray Used to Investigate the Synthesis of Full Concentration Gradient Cathode](#)

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[455The Effect on Electrochemical Properties By the Content of Mn<sup>3+</sup> of High-Voltage Spinel LiNi<sub>0.5</sub>Mn<sub>1.5</sub>O<sub>4</sub> Cathode Material for Highly Stable Lithium-Ion Batteries](#)

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[456Influence of Using Additives in Spray Drying Process on Structural and Electrochemical Properties of LiNi<sub>0.5</sub>Mn<sub>1.5</sub>O<sub>4</sub> cathode Material](#)

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[459Electrochemical Properties of Li<sub>2</sub>FeP<sub>2</sub>O<sub>7</sub>/C Nanocomposites Prepared from LiH<sub>2</sub>PO<sub>4</sub> and Fe\(NO<sub>3</sub>\)<sub>3</sub>·9 H<sub>2</sub>O used As a Precursor](#)

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[471Low-Temperature Prepared Lithium-Cobalt-Nickel-Oxide Spinel](#)

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[472Intrinsic Electrochemical Properties of LiNi<sub>0.5</sub>Mn<sub>1.5</sub>O<sub>4</sub> Synthesized By Flux Method for High Energy Density Li-Ion Batteries](#)

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[473Use of Swents to Increase the Energy Density of Li-Ion Batteries](#)

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[474Improvement of Electrochemical Properties of Pyroxene-Type LiFeSi<sub>2</sub>O<sub>6</sub>](#)

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[475\(Invited\) Li Intercalation into Multi-Layers Transition Metal Carbides and Carbonitrides "Mxenes" in Li-Ion Batteries](#)

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[476Physical and Electrochemical Characterization of  \$\text{Li}\_2\text{FeP}\_2\text{O}\_7/\text{C}\$  Nanocomposites Prepared By a Combination of Spray Pyrolysis and Wet Ball Milling Followed By Heat Treatment](#)

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[477The Mechanisms of Lithium Insertion into Quaternary Lithium Metal Fluorides  \$\text{LiM}^{\text{II}}\text{M}^{\text{III}}\text{F}\_6\$  \( \$\text{M}^{\text{II}} = \text{Ca, Ni, Mn}\$  and  \$\text{M}^{\text{III}} = \text{Fe}\$ \)](#)

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[481 \$\text{Li}\_4\text{MeWO}\_6\$  \(Me=Ni, Mn, Co\) As Positive Electrode Materials for Li-Ion Batteries](#)

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[483High Performance Pillared Vanadium Oxide Xerogel Cathode for Lithium Ion Batteries](#)

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[485\(Invited\) Improving Cycle Life of High Capacity Alloy Anodes for Li-Ion and Na-Ion Batteries](#)

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[486Interrogation of Active Battery Material Intrinsic Properties](#)

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[487Mixed Metal Phosphorous Oxides: Prospects for Secondary Lithium Based Batteries](#)

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[489Influence of Core and Shell Properties in Core-Shell Positive Electrode Materials for Li Ion Batteries](#)

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[490\(Invited\) Type I and Type II Silicon Clathrates As Novel Anodes for Lithium Batteries](#)

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[491Interfacial Effects of Electrochemical Lithiation of Epsilon-VOPO<sub>4</sub> and Evolution of the Electronic Structure](#)

[Nicholas F. Quackenbush, Linda Wangoh, Bohua Wen, Ruiho Zhang, Youngmin Chung, Natasha Chernova, Zehua Chen, Shawn Sallis, Yuh-Chieh Lin, Shyue Ping Ong, M. Stanley Whittingham, Louis F.J. Piper](#)

492 [The Use of Reduced Cost and Purity Precursors in the Melt Preparation of LiFePO<sub>4</sub>](#)

[Majid Talebi-Esfandarani, Steeve Rousselot, Michel Gauthier, Pierre Sauriol, Guoxian Liang, Mickeal Dollé](#)

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[Naoaki Yabuuchi, Mitsue Takeuchi, Shinichi Komaba, Masanobu Nakayama, Hiromasa Shiiba, Kei Sato, Masahiro Ogawa, Keisuke Yamanaka, Toshiaki Ohta](#)

494 [Dilatometric Study of the Electrochemical Intercalation of Bis\(trifluoromethanesulfonyl\) Imide and Hexafluorophosphate Anions into Carbon-Based Positive Electrodes](#)

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[Yoji Sakurai, Shuhei Kawashiri, Masahiro Utagawa, Takao Tsuda, Tomohiro Tojo, Ryoji Inada](#)

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[498 Ternary Type I Silicon Clathrates for Lithium-Ion Battery Anodes](#)

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[503 Operando high-Energy Synchrotron X-Ray Diffraction and Modeling of Alpha-MnO<sub>2</sub> Battery Materials upon Heat Treatment](#)

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[504 \(Invited\) Ti-Substituted Li\[Li<sub>0.26</sub>Mn<sub>0.6-x</sub>Ti<sub>x</sub>Ni<sub>0.07</sub>Co<sub>0.07</sub>\]O<sub>2</sub> Layered Cathode Material with Improved Structural Stability and Suppressed Voltage Fading](#)

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[506 Domain Modeling of Lithium-Rich Manganese Nickel Oxide By Reverse Monte Carlo Method](#)

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[507 \(Invited\) Mechano-Electro-Chemical Coupling in Lithium Intercalation Compounds](#)

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[508 Change of Average and Local Crystal Structure and Electronic Structure of Li-Rich Solid Solution Cathode Material  \$0.4\text{Li}\_2\text{MnO}\_3\text{-}0.6\text{LiMn}\_{1/3}\text{Ni}\_{1/3}\text{Co}\_{1/3}\text{O}\_2\$  during Charge-Discharge Process Using First-Principles Calculations and Neutron Beam and Synchrotron X-Ray Sources](#)

[Yasushi Idemoto, Yusuke Sera, Naoya Ishida, Naoto Kitamura](#)

[509 Bulk Structure and Surface Properties of Lithium- and Manganese-Rich Layered Oxides and Their Impact on Electrochemical Performance](#)

[Guoying Chen, Saravanan Kuppan, Alpesh Khushalchand Shukla](#)

[510 Biwedge Octahedron-Shaped Li-Excess Nickel-Manganese Oxide Cathode Showing Remarkably Suppressed Potential Fade](#)

[Nae-Lih Wu, Wen-Chin Chen, Hung-Chun Wu](#)

## **A07-Intermetallic Anodes**

Battery

[511 Impact of Electrolyte on the Cycling of Si-Based Materials](#)

[Vincent L Chevrier, Connor Aiken, Remi Petibon, Xiaohua Ma, Dinh Ba Le, Jeff R Dahn, Kevin W Eberman, Larry J Krause](#)

[512 Micron-Sized  \$\alpha\$ -Silicon-Fe-Cu Ternary Composite Anode Material for High Energy Libs](#)

[Sujong Chae, Jaephil Cho](#)

[513 Failure Mechanisms of SiO<sub>x</sub>- Vs. SiFe- Graphite Composite Anodes in Li-Ion Batteries](#)

[Soojin Sim, Jaephil Cho](#)

[514 Dimensionally Stable and Fast-Charging Graphite-Silicon Planar Composite Anode for Li-Ion Batteries](#)

[Nae-Lih Wu, Nai-Hsuan Yang, Yu-Shiang Wu, Jackey Chou](#)

[515 Rapid Milling of Alloy Anodes](#)

[Timothy Hatchard, Alon Genkin, Mark N Obrovac](#)

[516 Study of Molecular Layer Deposition Coating for Silicon-Based Lithium-Ion Anodes](#)

[Chunmei Ban, Daniela Molina Piper, Jonathan J. Travis, Younghee Lee, Seoung-Bum Son, Steven M. George, Sehee Lee](#)

[517 Pulsed Laser Deposited SnS-SnSe Composite Thin Film As a New Anode Material for Lithium Storage](#)

[Xiaojiang Liu, Jiabing Liu, Yanhua Cui](#)

[518 Multiwalled Carbon Nanotubes Functionalized Magnetic FePd Alloy with Enhanced Activity for Ethanol Oxidation Reaction](#)

[Yiran Wang, Qingliang He, Huige Wei, Jiang Guo, Suying Wei, Zhanhu Guo](#)

[519 Identification of Multiple Failure Mechanisms in Si-Based Electrodes for Li-Ion Batteries](#)

[Shane D Beattie, Melanie Loveridge, Bryant J Polzin, Michael J Lain, Irene Rubio](#)

[520Impact of the Film Storage Conditions on the Performance of Si-Based Anodes for Li-Ion Batteries](#)

[Cuauhtemoc Reale Hernandez, Zouina Karkar, Dominique Guyomard, Bernard Lestriez, Lionel Roué](#)

[521FeSn<sub>5</sub>@Graphene Anodes for Li-Ion and Na-Ion Batteries](#)

[Weiqliang Han, Fengxia Xin, Huajun Tian](#)

[522Ni<sub>x</sub>Si<sub>1-x</sub> Alloy Negative Electrodes for Li-Ion Batteries](#)

[Zhijia Du, Richard A Dunlap, Mark N Obrovac](#)

[523Pre-Lithiated Silicon As the Anode Material for the Next Generation of Lithium Ion Batteries](#)

[Yongan Yang, Xuemin Li](#)

[524Nanoporous Structure Formation in Dealloying of Li Alloys](#)

[Qing Chen, Ke Geng, Karl Sieradzki](#)

[525Electrochemical Insertion Process of Li into n-Si\(111\)](#)

[Toshihiro Kondo, Nana Aoki, Kohei Uosaki](#)

[526A New Design and Fabrication of Si-C Composite for Lithium-Ion Batteries Anodes](#)

[Ken Ogata, Koichi Takei, Byoung-Sun Lee, Kang Hee Lee, Tae-Hwan Yu, Seokgwang Doo](#)

## **A08-Materials and Cell Designs for Flexible Energy Storage and Conversion Devices**

Battery/Energy Technology

[527Foldable Paper-Based Lithium-Ion Batteries](#)



[Candace K. Chan](#)

[528 Design, Fabrication and Characterization of Flexible Thin Film Rechargeable Lithium Ion Batteries](#)

[Sami Oukassi, Cédric Giroud-Garampon, Séverine Poncet, Raphaël Salot](#)

[529 Dually Li Ion/Electron-Conductive Materials for Polymer-Based, Printable Lib Electrodes](#)

[Michael Blaine McDonald, Paula T Hammond](#)

[530 A Stable Nanostructured Li-Deficient Oxide Thin-Film Electrode for Advanced Lithium-Ion Batteries](#)

[Guoqiang Tan, Feng Wu, Jun Lu, Khalil Amine](#)

[531 Flexible, Foldable and Multi-Functional Paper-Based Electronics](#)

[Jr-Hau He, Po-Kang Yang, Der-Hsien Lien, Chun-Ho Lin](#)

[532 Performance of Si-Integrated Li-Ion Microbatteries with Side-By-Side Electrodes: A Geometry Study](#)

[Katrin Hoepfner, Marc Ferch, Piotr Mackowiak, Biswajit Mukhopadhyay, Andreas Froebe, Robert Gernhardt, Sebastian Roder, Krystan Marquardt, Robert Hahn](#)

[533 Prussian Blue Analog Batteries on Thread Substrates for Wearable Electronic Applications](#)

[Andrew Kim, Shaurjo Biswas, Tanya Gupta, Daniel A Steingart](#)

[534 Flavine Mediated Electro-Oxidation of 1,4-Dihydronicotinamides Using Photogalvanic Cell](#)

[Jun Yano, Akira Kitani](#)

[535Package-Limitation of Cathode Material in Composite Electrode for Lithium-Ion Batteries](#)

[Koji Kitada, Haruno Murayama, Katsutoshi Fukuda, Hajime Arai, Yoshiharu Uchimoto, Zempachi Ogumi, Eiichiro Matsubara](#)

[536Pyro-Synthesis of Nanostructured Spinel ZnMn<sub>2</sub>O<sub>4</sub>/C As Negative Electrode for Rechargeable Lithium-Ion Batteries](#)

[Jeonggeun Jo, Jihyeon Gim, Jinju Song, Sungjin Kim, Muhammad Hilmy Alfaruqi, Sukyeung Nam, Soundhar Rajan, Joseph Paul Baboo, Jaekook Kim](#)

[5373D Paper-Based Lithium-Ion Batteries Using Origami Folding Principles](#)

[Qian Cheng, Candace K. Chan](#)

[538Activated Carbon Fiber Treated at Different Temperatures as Supercapacitor Electrodes: Electrochemical Characterization](#)

[Dalva Alves Lima Almeida, Andrea Boldarini Couto, Mauricio Ribeiro Baldan, Neidenei Gomes Ferreira](#)

[539Flexible&Stretchable Micro Lithium Ion Batteries for Implantable, Wearable and Embedded Electronics](#)

[Muhammad M. Hussain, Arwa T Kutbee](#)

[540Aerospace Applications of Conductive Polymers](#)

[Patrick Kinlen, Wayne Schuette](#)

[541Proton-Conducting Polymer Electrolytes for Solid Flexible Supercapacitors](#)

[Han Gao, Keryn Lian](#)

[542Synthesis of MoO<sub>2</sub> and Nitrogen-Doped Carbon Nanotubes Composite Materials By Electrodeposition As Binder-Free Electrode for Lithium-Ion Batteries](#)

Yanhua Cui, Hui Zhang

543A Soft Approach for Energy Storage and Mobile Healthcare

Sheng Xu

544Pyro Synthesis of Functional Nanocrystals for Energy Storage Devices

Jihyeon Gim, Jinju Song, Sungjin Kim, Vinod Mathew, Seokhun Kim, Younpyo Oh, Muhammad Hilmy Alfaruqi, Jaekook Kim

545Influence of Charge Transportation in Nitroxyl-Radical Polymer Gel on Charging Characteristics for Organic Radical Batteries

Shigeyuki Iwasa, Takanori Nishi, Terumasa Shimoyama

546Design and Performances of Three-Dimensional Lithium-Ion Battery

Ho-Jung Yang, Hwi-Yeol Park, Kyung-Hoon Cho, Jin S. Heo, Seunghoon Nam, Huisu Jeong

547Bio-Templated and Bio-Tethered Materials for a Flexible Lithium Ion Battery

Mark A Allen, Scott J. Riley, Evgenia Barannikova, Alexander Winton

548Improving Lto Performance: Gassing, Impedance and Cycling Study

Carine L Margez, Bing Tan, Saori Tokuoka, Thomas A Greszler

549A Low-Losses Topology for Vrfb Stacks

Dario Maggiolo, Davide Fauri, Stefano Da Lio, Alberto Bertucco, Davide Del Col, Massimo Guarnieri

550Effect of Glass Transition Temperature on the Energy Storage Properties of Nitroxide Radical Containing Polymers

[Wade A. Braunecker, Barbara Katherine Hughes, David C. Bobela, Thomas Gennett](#)

[551Preparation and Electrochemical Characterization of Polyaniline/Carbon Fiber Binary Composite Film Obtained with Carbon Fiber Treated at Different Temperatures](#)

[Dalva Alves Lima Almeida, Carla Polo Fonseca, Neidenei Gomes Ferreira](#)

[552A Study on the Conductivity and Selectivity of Lithiated Nafion Membranes in Non-Aqueous Electrolytes](#)

[Liang Su, Robert M. Darling, Kevin G. Gallagher, Wei Xie, Jacob L. Thelen, Nitash P. Balsara, Fikile R. Brushett](#)

[553Baseline Si Electrode Fabrication and Performance for the Battery for Advanced Transportation Technologies Program](#)

[Zhe Jia](#)

[554Developing Emulsion-Templated Silicon/Carbon Anodes with Reduced Graphene Oxide for Lithium Ion Batteries](#)

[Yuzi Zhang, Yue Pan, Yanjing Chen, Chu Chen, Brett L Lucht, Arijit Bose](#)

## **A09-Recent Advances in Supercapacitors**

Energy Technology/Battery/Dielectric Science and Technology

[555\(Invited\) Novel Asymmetric Supercapacitor with Electrochemical Polymerized Conjugated Polymer and Vertically Aligned CNT](#)

[Yu Zhu](#)

[556Pseudocapacitive Carbon Nanofibers Using Sodium Chloride \(a.k.a common salt\)](#)

[Richa Singhal, Vibha Kalra](#)

[557Electrochemical Properties of Ordered, Two-Dimensional, Double Transition Metals Carbides \(MXenes\)](#)

Majid Beidaghi, Babak Anasori, Yury Gogotsi, Michel W. Barsoum

558Enhanced Performance of TiO<sub>2</sub> Based Supercapacitor By MnO<sub>2</sub> Modification

Yu-Ting Weng, Tzu-Yang Huang, Jyh-Fu Lee, Hwo-Shuenn Sheu, Nae-Lih Wu

559The Cycling Behaviour of MnO<sub>2</sub> as Investigated By Synchrotron XRD, Stepped Potential Electrochemical Spectroscopy (SPECS) and Cycling on the Electrochemical Quartz Crystal Microbalance (EQCM)

Scott W Donne, Andrew J Gibson, Ross Wood, Madeleine F Dupont

560Porous Titania conformal Coating on Carbon Nanotubes As Energy Storage Materials

Litao Yan, Meng Zhou, Gen Chen, Hongmei Luo

561FeWO<sub>4</sub> As Electrode Material for High Volumetric Capacitance Supercapacitors

Thierry Brousse, Frederic Favier, Nicolas Goubard, Olivier Crosnier, Christophe Payen

562Effect of Meso- and Micro-Porosity in Carbon Electrodes on Atomic Layer Deposition of Pseudocapacitive V<sub>2</sub>O<sub>5</sub> for High Performance Supercapacitors

James S. Daubert, Hannah N. Gotsch, Neal P. Lewis, J. Zachary Mundy, David N. Monroe, Elizabeth C. Dickey, Mark D. Losego, Gregory N. Parsons

563Designing Polyoxometalate Thin Films on Carbon Nanomaterials for Pseudocapacitive Electrodes

Matthew Genovese, Yee Wei Foong, Keryn Lian

564Nitrogen Doped Hydrothermal Carbon for Supercapacitors

Scott W Donne, Kenneth Latham

565Electrochromic Nanocomposites with Endured Energy Storage Properties

[Zhanhu Guo, Huige Wei, Yiran Wang, Jiang Guo, Xingru Yan](#)

[566Redox-Active Xerogels As Pseudocapacitive Electrodes with Excellent Cycling Performance](#)

[Muhammad Boota, Matthieu Bécuwe, Yury Gogotsi](#)

[567An Investigation into the Deposition Mechanism and Capacitive Behaviour of Thin Films of Manganese Oxides Deposited from  \$\text{KMnO}\_4\$](#)

[Scott W Donne, Andrew J Gibson](#)

[568Probing the Mechanical Deformation of 2D Titanium Carbide \(MXene\) upon Cation Intercalation at the Nanoscale](#)

[Jeremy Come, Jennifer Black, Michael Naguib, Maria R. Lukatskaya, Majid Beidaghi, Yury Gogotsi, Sergei V. Kalinin, Nina Balke](#)

[569Functionalized Carbon Nanotube Supported By Nickel Nanowire Array with Improved Rate Capability for High Power Electrochemical Capacitors](#)

[Hosein Monshat, Shan Hu](#)

[570\(Invited\) Three-Dimensional Freestanding Nanofiber Electrodes for Electric Double Layer and Pseudo-Capacitors](#)

[Vibha Kalra](#)

[571Active Material Arrangement and Its Effect on Electronic Conductivity in a Suspension Electrode](#)

[Kelsey B. Hatzell, Jens Eller, Yury Gogotsi](#)

[572Separating the Faradaic and Non-Faradaic Charge Storage Mechanisms in Electrochemical Capacitors Using Step Potential Electrochemical Spectroscopy](#)

[Scott W Donne, Madeleine F Dupont](#)

[573Capacitive Deionization Process Via Nano-Titanium Carburizing Electrode](#)

[Li Wang, Yun Zhou](#)

[574Supercapacitors Performance Evaluation](#)

[Sanliang Zhang](#)

[575Quaternized Graphene Oxide-Based Supercapacitor Electrode](#)

[Omar Movil-Cabrera, John A Staser](#)

[576Low-Temperature Chemical Passivation Routes for Integration of Supercapacitors Directly into Silicon Solar Cells](#)

[Andrew S Westover, Thomas Metke, Jeremiah Afolabi, Keith Share, Rachel E. Carter, Adam P Cohn, Landon Oakes, Cary L. Pint](#)

[577Increasing the Energy Storage Capability of Porous Silicon Electrochemical Capacitor Devices](#)

[Donald S. Gardner, Charles W. Holzwarth, Yang Liu, Scott B. Clendenning, Wei Jin, Bum Ki Moon, Zhaohui Chen, Tomm Aldridge, Eric C Hannah, Chunhui Chen, Chunlei Wang, Ermei Mäkilä, John Gustafson](#)

[578Novel Asymmetric Capacitors Using Intercalated Metal-Organic Framework Negative Electrodes](#)

[Nobuhiro Ogihara, Yuka Ozawa, Osamu Hiruta, Chikaaki Okuda, Yoshihiro Kishida, Nobuko Ohba](#)

[579Solid-State Planar Edlc Design Enabled By Hydroxide-Conducting Polymer](#)

[Keryn Lian, Han Gao, Jak Li, John R. Miller, Ronald A Outlaw, Sue M. Butler](#)

[580Carbon Dioxide Activated SiC-CDC: Attractive Material for Supercapacitor Electrodes](#)

Alar Jänes, Ester Tee, Indrek Tallo, Thomas Thomberg, Enn Lust

581 (Invited) Dynamic Behaviour of Electric Double Layer Capacitors

Ganesh Madabattula, Sanjeev Kumar

582 Highly Porous Carbon Nanospheres and Carbon Foams for Supercapacitors Using Facile Spray Pyrolysis and One-Pot Reaction

Chengwei Wang, Michael J. O'Connell, Candace K. Chan

583 The Influence of Conductive Salt Ion Selection on the Performance of High Voltage Edlcs

Andrea Balducci, Sebastian Pohlmann, Claudia Ramirez-Castro, Christoph Schütter

584 Design and Testing of Supercapacitors for High Temperature Operation

Erik J. Brandon, Simon C. Jones, Abhijit V. Shevade, Keith J. Billings, Jasmina Pasalic, Charlie C. Krause, Victoria K. Davis, Keith B. Chin, Bugga V. Ratnakumar

585 Structure-Directed CNT Arrays As Micro-Supercapacitor Electrodes and the Effect of Geometry on Electrolyte Selection

Katherine T Nicol, Justin J Hill

586 Performance Enhancement of Activated Carbon Based Supercapacitors By Incorporation of Fullerene Self-Assemblies

Deepak Sridhar, Kaushik Balakrishnan, Srinu Raghavan, Krishna Muralidharan

587 Activated Carbon Derived from Hemp and Its Use in Electrochemical Capacitors

Wei Sun, Stephen M Lipka, Fuqian Yang

588 Freestanding Graphene/Carbide Derived Carbon Films As High-Performance Electrodes for Electrochemical Capacitors



Mohamed Alhabeb, Majid Beidaghi, Katherine L Van Aken, Yury Gogotsi

589 Ionic Liquid Mixtures As Electrolytes for Electrochemical Capacitors

Katherine L Van Aken, Majid Beidaghi, Yury Gogotsi

590 The Effect of Self-Discharge on the Performance of Symmetric Electric Double Layer Capacitors: Insights from Mathematical Modeling and Simulation

Innocent Sunday Ike

591 New Generation High Performance Lithium-Ion Capacitor Laminate Cells

Wanjun Cao, Xujie Chen

592 Environmental Friendly Electrode Preparation for Hybrid Battery-Supercapacitors Based on  $\text{Li}_3\text{V}_{1.95}\text{Ni}_{0.05}(\text{PO}_4)_3/\text{C}$  and Activated Carbon

Carmen Meuser, Hai-Yen Tran, Marco Secchiaroli, Sonia Dsoke, Margret Wohlfahrt-Mehrens

593 Unveiling the Pseudocapacitance of  $\text{Ti}_2\text{C}$  Monolayer for High Performance Electrochemical Capacitor: a First-Principles Study

Xiao Ji, Jianjun Jiang

594 Facile Hydrothermal Synthesis of Feather-like Nickel Phosphite As Cathode Materials for Supercapacitors

Yunjun Ruan, Jianjun Jiang, Houzhao Wan

595 Solvothermal Synthesis of Copper Ferrite-Graphene Nanocomposite As a Supercapacitor Electrode Material

Yuanzhe Piao

**B01-Carbon Nanostructures: Fullerenes to Graphene**

Nanocarbons/Dielectric Science and Technology/Physical and Analytical  
Electrochemistry

596 [Fullerene Biomaterials for PDT or MRI: Effects of Derivatization on Activities](#)

[Yoko Yamakoshi, Elisha Gabrielle V. Tiu, Safwan Aroua](#)

597 [Graphite-Based Non Precious Metal Catalyst for Oxygen Reduction Reaction](#)

[Joseph H Dumont, Ulises Martinez, Aditya Mohite, Geraldine M Purdy, Plamen Atanassov, Piotr Zelenay, Gautam Gupta](#)

598 [Non-Chromatographic Isolation of Mixed-Metal Nitride Clusters in Larger Carbon Cages](#)

[Steven Stevenson](#)

599 [Easily Fabricated Carbon Nanotube Electrodes for Low-Ppb-Level Chromium\(VI\) Detection](#)

[Chengwei Wang, Michael J. O'Connell, Candace K. Chan](#)

600 [Preparation and Characterization of Porous CNTs@Fe-C Pellets](#)

[Su-ju Hao, Yue-jun Hao, Hua-qiang Hao, Wu-feng Jiang, Yu-zhu Zhang](#)

601 [Resonant Raman Scattering Studies of SWCNT Templated Extreme Nanowires of HgTe and PbTe](#)

[David Christopher Smith, Joe Spencer, Jeremy Sloan, Eric Faulques](#)

602 [The Origins and Characteristics of the Threshold Voltage Variability of Quasi-Ballistic Single-Walled Carbon Nanotube Field-Effect Transistors](#)

[Qing Cao](#)

603 [Isolation of Adsorbent-Free Long Semiconducting Single-Walled Carbon Nanotubes Using a Hydrogen-Bonding Supramolecular Polymer](#)

[Naotoshi Nakashima, Fumiyuki Toshimitsu](#)

604 [Engineering Chemical Functionality in Graphene](#)

[Sandra Catalina Hernandez, Paul Sheehan, Stanislav Tsoi, Pratibha Dev, Jeremy Robinson, Chad Junkermeier, Keith Whitener, Woo Lee, Thomas Reinecke, Scott Walton](#)

605 [Improvement of Surface Enhanced Raman Spectroscopy By Analyte Molecules Covering with Graphene](#)

[Ksenya Girel, Hanna Bandarenka, Nikolai Kovalchuk, Ivan Komissarov, Vitaly Bondarenko](#)

606 [In Situ Synchrotron X-Ray Diffraction Characterization of the Synthesis of Graphene Oxide and Reduced Graphene Oxide](#)

[Mie Møller Storm, Rune E. Johnsen, Poul Norby](#)

607 [Nondestructive Production of Magnetic Graphene Towards Energy Applications](#)

[Toyoko Imae, Mahmoud Mohamed Mahmoud Ahmed, Masaki Ujihara](#)

608 [Graphene Quantum Dots Prepared from Graphene Hydrogels Basing on Hydrothermal Method](#)

[Hongyi Qin, Tao Gong, Jingling Liu, Yinhua Jin, Yujin Cho, Cheolmin Shin, Changgu Lee, Taesung Kim](#)

609 [Graphene Synthesis on Electrodeposited Substrates and Its Integration in MEMS for Sensor Applications](#)

[Lorenzo Pedrazzetti, Roberto Bernasconi, Luca Nobili, Luca Magagnin](#)

610 [Graphene-Supported ' Core-Shell ' □ Carbon Nitride Fe- and Sn-Based Electrocatalysts for the Oxygen Reduction Reaction \(ORR\)](#)

[Antoine Bach Delpuech, Enrico Negro, Ketì Vezzù, Graeme Nawn, Federico Bertasi, Gioele Pagot, Vito Di Noto](#)

[611Structure-Dependent Thermal Defunctionalization of Single-Walled Carbon Nanotubes](#)

[Saunab Ghosh, Fang Wei, Sergei M. Bachilo, Robert Hauge, W. E. Billups, R. Bruce Weisman](#)

[612Nonvolatile Memory Based on Polymer-Suspended Graphene Nanoplatelets with Fractional and Integer Quantum Conductance at 300K and Zero Magnetic Field](#)

[Yuhong Kang, Hang Ruan, Marius K Orlowski](#)

[613Nanostructured Carbon Fibers for the Oxygen Reduction Reaction](#)

[Ulises Martinez, Silas Simotwo, Joseph H Dumont, Aditya Mohite, Vibha Kalra, Gautam Gupta](#)

[614Impedance Spectroscopy of a Nanocomposite Fabric Thermistor to Determine Its Dielectric Sensing Structure](#)

[Nathaniel J. Blasdel, Chelsea N. Monty](#)

[615Nanostructured Carbon As Electrocatalyst Supports for Solid Acid Fuel Cells](#)

[Ramez A. Elgammal, Gabriel M Veith, Beth L Armstrong, Wesley Daniel Tennyson, Ondrej Dyck, Ilia N. Ivanov, Gerd Duscher, Thomas A. Zawodzinski, Alexander B. Papandrew](#)

[616Surface Tailored Acetylene Black for High Voltage Lib Application](#)

[Takashi Sonoda, Yuki Nako, Tatsuya Nagai, Akira Yoda, Tetsuya Itoh, Yutaka Takeuchi, Hiroshi Yokota](#)

[617Fabrication and Characterization of Pyrrole/Multi-Walled Carbon Nanotubes Composite Electrodes](#)

[Thomas Dushatinski, Tarek M Abdel-Fattah](#)

**C01-Corrosion General Poster Session**

Corrosion

618 [Non-Destructive Evaluation Method to Measure the Degree of Sensitization](#)

[Tomomi Koketsu](#)

619 [Inhibitory and Bactericidal Properties of a Number of Dihydroxyazo Compounds](#)

[Vladimir Vigdorovich, Liudmila Tsygankova, Tamara Nazina, Marina Esina, Natalia Shel](#)

620 [Constant-Phase Element Characteristics Caused By Resistivity Distribution in High Performance Anti-Corrosion Organic Coating Applied to Oil Storage Tank](#)

[Koya Tokutake, Haruki Nishi, Daisuke Ito, Shinji Okazaki, Yukitaka Serizawa](#)

621 [The Effect of Atomic Hydrogen on the Kinetics of Iron Passivation in Neutral Solutions](#)

[Alevtina Rybkina, Andrey Marshakov](#)

622 [Degradation of Anticorrosive Organic Coating Applied to Inner Bottom Plate of Oil Storage Tank By a Large Scale Earthquake](#)

[Takashi Konishi, Naoya Kasai, Shinji Okazaki, Tsutomu Kondo](#)

623 [Corrosion Inhibition of Carbon Steel By Some Nonionic Surfactants in 1M H<sub>2</sub>SO<sub>4</sub>](#)

[Florina Branzoi, Viorel Branzoi, Catalina Pacuretu, Angela Stanca](#)

624 [Corrosion Protection of Silicon Micro Systems with Ultra-Thin Barrier Films for Miniaturized Medical Devices](#)

[Jorge Mario Herrera Morales, Jean-Charles Souriau, Gilles Simon](#)

625 [Hydrogen Entry into Steel Under an Aqueous NaCl Droplet](#)

[Saya Kaneko, Eiji Tada, Atsushi Nishikata](#)

[626Evaluation of Dezincification Corrosion of Brass By Complex Capacitance](#)

[Kozue Tabei, Yoshinao Hoshi, Isao Shitanda, Masayuki Itagaki](#)

[627Corrosion Behavior of Casing Steels in Cement Synthetic Pore Solution Exposed to High Pressure CO<sub>2</sub> and H<sub>2</sub>S](#)

[Ruishu Feng, Justin Beck, Derek M. Hall, Aysel Buyuksagis, Margaret Ziomek-Moroz, Serguei N. Lvov](#)

[628Anticorrosive and Morphological Properties of Polyaniline/Polyvinyl Chloride Blend on AA7075-T6](#)

[Rafael Marinho Bandeira, Fábio Augusto de Souza Ferreira, Ubirajara Pereira Rodrigues Filho, Germano Tremiliosi-Filho](#)

[629A Novel Coupling Between Atomic Emission Spectroelectrochemistry and Electrochemical Impedance Spectroscopy: Application to Zn, Zn-Cu and Zn-Al-Mg Alloys](#)

[Kevin Ogle, Viacheslav Shkirskiy, Polina Volovitch, Peng Zhou, Alina Maltseva](#)

[630Effect of Tropical Atmosphere on Corrosion of Different Metals: Corrosivity Measurements of Singapore](#)

[Sudesh Lakshitha Wijesinghe, Zixi Tan](#)

## **C02-Coating and Surface Modification for Corrosion Protection**

Corrosion

[631\(Keynote\) Corrosion Protection of Galvanized Steel Using Smart-Release Inhibitive Pigments Containing Organic Anions](#)

[Geraint Williams, Patrick Dodds, Phil Ansell](#)

[632Intelligent Self-Healing Coatings: Investigating the Role of Self-Healing Kinetics at the Delaminating Interface](#)

Michael Rohwerder

633High-Resolution Microscopy of Substrate/Coating Interfacial Regions of a Non-Chromate Organic Coating System on AA2024-T3 after Blister Formation

Kerrie Holguin, Frank Scheltens, Gerald Frankel

634A Rapid Assessment of Non-Chromate Primers for Zn/Ni Plated Steel By Electrochemical Techniques

Weilong Zhang, Mike A Kryzman, Mark R Jaworowski, George S Zafiris

635Inhibition of Corrosion-Driven Organic Coating Delamination on Zinc By Graphene Nano-Pigments

Hamilton Neil McMurray, Geraint Williams, Carol Frances Glover, Calvin Richards

636Inhibition of Corrosion-Driven Organic Coating Delamination on Cold-Rolled Steel By Graphene Nanoplatelets

Carol Frances Glover, Raman Subramanian, Calvin Richards, Geraint Williams, Hamilton Neil McMurray

637The Effects Functionalized Graphene Nano-Particles Have on the Corrosion Inhibition of Iron and Galvanised Steel

Calvin Richards, Carol Glover, Hamilton Neil McMurray, Geraint Williams

638Micron Scale Cathodically Coated Graphene Impedes Corrosion on Ti, Cu, and Stainless Steel

Patrick Andrew Staley, Joy Metzger, Danielle Griffo, Emily Simmons, Chris Griffo, Mark Bennahmias, Russel Kurtz, Diane K. Smith

639A Comparative Study of Mussel Adhesive Proteins As Flash Rust Inhibitors on High Strength Low Alloy Steel

Douglas C. Hansen, William F Nelson

[640 Fabrication and Characterization of Superhydrophobic Poly\(vinylidene fluoride-co-hexafluoropropylene\)/TiO<sub>2</sub> Nanocomposite Coating for Corrosion Protection Applications](#)

[Ahmed Bahgat, Aboubakr Moustafa Abdullah, Adel M. A. Mohamed, Mariam Almaadeed](#)

[641 Non-VOC Water-Based Nanocomposite Sol-Gel Thin Films for Corrosion Protection of Commercial Magnesium Alloys](#)

[Federico Garcia-Galvan, Antonia Jiménez-Morales, Sebastian Feliu Jr, Juan Carlos Galván](#)

[642 A Study of Anticorrosion Coatings for Surface Modification of Biodegradable Magnesium Alloy](#)

[Jing Wang](#)

[643 \(Keynote\) The Pretreatment of 2000 Series Al Alloy: In Situ Measurement of the Selective Dissolution & Film Formation](#)

[Kevin Ogle, Oumaïma Gharbi](#)

[644 Al<sub>2</sub>O<sub>3</sub> Coatings Deposited By ALD on Al Alloys](#)

[Philippe Marcus, Jun Tao, Jolanta Swiatowska, Sandrine Zanna, Antoine Seyeux, Emma Harkonen, Mikko Ritala](#)

[645 Atmospheric Corrosion of Zinc Coated Steel- Results from a Worldwide Outdoor Exposure Program](#)

[Dominique Thierry, Dan Persson](#)

[646 Corrosion Protection of Low Carbon Steels By Electrodeposited Aluminum Alloys](#)

[Andreas Bund, Adriana Ispas, Codruta Aurelia Vlaic, Andrea Foerg, Patrick J. Masset](#)

[647 The Photogenerated Cathodic Protection of Steel Using the Thin Layers of Photoactive Nanocomposite Fabricated By Electrophoretic Deposition](#)



[Ji Hoon Park](#)

648[Photocathodic Protection of TiO<sub>2</sub> Composite Material on 304 Stainless Steel](#)

[Xiutong Wang, Hong Li, Qinyi Wei, Qiaoxia Zhang, Baorong Hou](#)

649[Copper Nanoparticles Effect on the Corrosion Behavior of Different Types of Nickel-Based Super Alloys](#)

[Aboubakr Moustafa Abdullah, Adel M. A. Mohamed, Mostafa H Sliem](#)

650[Electrical Resistance-Emission Spectroscopy for Determining the Electrochemical Behavior of Anodized Aluminum in Aqueous Solutions](#)

[Khaled Habib](#)

651[The Effects of Hydrophobic Coatings on an Insulative Skirt Layer to Decouple Galvanic Corrosion Between Mechanically-Coupled Aluminum Alloy and Carbon-Fiber Reinforced Polymer-Matrix Composites](#)

[Raghu Srinivasan, Lloyd H. Hihara, Jeffrey Nelson](#)

652[Reaction Mechanism of Lanthanide Zirconate Thermal Barrier Materials in Exposure to CMAS](#)

[Honglong Wang, Xingxing Zhang, Emily Tarwater, Victor Agubra, Jeff W. Fergus](#)

653[RF Sputtering Thermal Barrier Coating for Enhance Corrosion Efficiency of Aero-Engines Components](#)

[Jamnie Yazmin Achem Calahorra, Hilda Esperanza Esparza Ponce, Jose Angel Cabral Miramontes, Facundo Almeraya Calderón, Citlalli Gaona Tiburcio](#)

### **C03-Contemporary Aspects of Corrosion and Protection of Magnesium and Its Alloys**

Corrosion

654[Gravimetric Measurement of Hydrogen Evolution on Magnesium](#)

[Santiago Fajardo, Gerald Frankel](#)

[655 Theory for the Enrichment Limit Associated with Noble Metal Impurities on Corroding Mg Anodes](#)

[Taylor Cain, Nick Birbilis, John R. Scully](#)

[656 Cathodic Activation of Magnesium](#)

[Nick Birbilis](#)

[657 The Use of EDTA As a Mechanistic Probe of Magnesium Corrosion in Chloride Containing Electrolyte](#)

[Geraint Williams, Raman Subramanian, Carol Frances Glover, Sean John, Hamilton Neil McMurray](#)

[658 Towards Unravelling the Source of Cathode-Activated Corrosion Filaments Formed on Corroding Mg Alloy Surfaces](#)

[Joseph Kish, Zach Cano, Joseph McDermid](#)

[659 Interpretation of Inductive Loop in Electrochemical Impedance of Magnesium Dissolving in Sodium Sulfate Solution](#)

[Keita Umetsu, Yoshinao Hoshi, Isao Shitanda, Masayuki Itagaki](#)

[660 Hydrogen Evolution Behavior of Dissolving Magnesium Investigated By EIS and Gas Chromatography](#)

[Rie Takemiya, Yoshinao Hoshi, Isao Shitanda, Masayuki Itagaki](#)

[661 Dealloying of Magnesium Alloys](#)

[Ashlee Wingersky, Allison Handler, Julia Fisher, Anna Weiss, Karl Sieradzki](#)

[662 Corrosion Mechanisms of Fusion Welded Magnesium Alloys As a Function of Microstructure](#)

Leslie Gail Bland, James Fitz-Gerald, John R. Scully

663Corrosion of Galvanically Coupled Magnesium

Dila Ram Banjade, John Harb, Steve Porter

664Corrosion Behavior of Friction Stir Welded HpdC AM60B Lap Joints

Sarah Zhang, Zach Cano, Brycklin Wilson, Joseph McDermid, Joseph Kish, Carol Frances Glover, Geraint Williams

665Corrosion Protection of Friction Stir Spot Welds Made in Magnesium Alloys

Yuri Savguira, Sarah Busef, Tom H. North, Steven J. Thorpe

666Galvanic Corrosion Between Weld Zones As Seen in Fusion Welded AZ31B

Leslie Gail Bland, James Fitz-Gerald, John R. Scully

667Formation of Calcareous Deposition Layers on AM50 Magnesium Alloy in Presence of  $\text{Ca}^{2+}$  in De-Icing Salt Solutions: Immersion Vs. Salt Spray Test

Michael Werner Grabowski, Daniel Bengtsson Blücher, Michael Korte, Sannakaisa Virtanen

668Inhibition Performance Study of Aqueous Vanadate Species on Mg Alloys

Jichao Li, Belinda Hurley, R. Buchheit

669Effect of Al Content on the Microstructure and Corrosion Resistance of Plasma Electrolytic Oxidation (PEO) Coatings on Mg-Al Alloys

Tao Zhang

670Mg Corrosion Control By Biopolymer-Polyelectrolyte Membranes

[Benjamin Paul Wilson, Kirsi Yliniemi, Ferdinand Singer, Sarah Höhn, Eero Kontturi, Lasse Murtomäki, Sannakaisa Virtanen](#)

671 [Influence of Proteins and Cells on Corrosion of Mg](#)

[Sannakaisa Virtanen](#)

## **C05-Critical Factors in Localized Corrosion 8**

Corrosion

672 [Stress Corrosion Cracking of Sensitized 304 Stainless Steel Under MgCl<sub>2</sub> Droplets](#)

[Kazuki Nakao, Eiji Tada, Atsushi Nishikata](#)

673 [Investigation of Pitting on Stainless Steel Using Scanning Electrochemical Microscopy](#)

[Ricardo M. Souto](#)

674 [in-Situ Critical Pitting Temperature on Duplex Stainless Steels](#)

[Luis Francisco Garfias-Mesias](#)

675 [The Effect of Biofilm Formation in Singapore Seawater on Corrosion of Metal and Alloys: New Observations and Concepts](#)

[Sudesh Lakshitha Wijesinghe, Zixi Tan, Dominique Thierry, Nicolas Larche, Serena Teo, Daniel J Blackwood](#)

676 [Pit Initiation and Growth on Stainless Alloys in Solutions Containing Sulfate and/or Chloride, and Thiosulfate](#)

[Anatolie G Carcea, Roger C Newman](#)

677 [Diffusion-Limited 1D Pit Growth of S13Cr in Brine at Elevated Temperature](#)

[Jiheon Jun, Gerald Frankel, Narasi Sridhar](#)

[678Experiments Based on One-Dimensional Diffusion Modeling to Determine Critical Factors in Pitting](#)

[Jayendran Srinivasan, Robert G. Kelly](#)

[679Microelectrochemical Investigation of Pit Initiation Site on Austenitic Cast Stainless Steel](#)

[Asako Otake, Izumi Muto, Aya Chiba, Yu Sugawara, Nobuyoshi Hara](#)

[680Effect of Low-Temperature Carburizing Treatment on Improving Pitting Corrosion Resistance at Manganese Sulfide Inclusion in Type 304 Stainless Steel](#)

[Aya Chiba, Shuhei Shibukawa, Izumi Muto, Takashi Doi, Kaori Kawano, Yu Sugawara, Nobuyoshi Hara](#)

[681\(Olin Palladium Award\) Some Critical Issues in the Breakdown of Passive Films](#)

[Digby D. Macdonald](#)

[682The Influence of Water Radiolysis on Corrosion By Supercritical Water](#)

[Subramanian Hariharan, Mojtaba Momeni, Veena Subramanian, James J Noel, Jiju Joseph, Jungsook Clara Wren](#)

[683Effect of Hydrogen Sulfide Ions on a Passivation Behavior of Type-316L Stainless Steel](#)

[Jun-Seob Lee, Yuichi Kitagawa, Takayuki Nakanishi, Yasuchika Hasegawa, Koji Fushimi](#)

[684Dissolution and Repassivation Behaviour of Ti, Ti-6Al-4V, Type316L and Co-27Cr-5.5Mo in Bio-Mechano-Chemical Environment](#)

[Kotaro Doi, Sayaka Miyabe, Shinji Fujimoto](#)

[685Cerium and Lanthanum Salts Used As Individual and Combined Inhibitors for Corrosion Protection of AA7075-T6 in Chloride Solution](#)

Barbara Volaric, Peter Rodic, Ingrid Milosev

686Study of Single Al Corrosion Pit Growth By Electrochemical Techniques

Weilong Zhang, Mike A Kryzman, Mark R Jaworowski, George S Zafiris

687Stability Criteria for Intergranular Corrosion of AA5083-H131

Mary Lyn C. Lim, Elissa Trueman, John R. Scully, Robert G. Kelly

688Coupled Tensile Stress Increases and Topography Evolution during Aluminum Corrosion

Omer Capraz, Shinsuke Ide, Pranav Shrotriya, Kurt Hebert

689Critical Factors Affecting Intergranular Corrosion of AA5083 Under Atmospheric Exposures

Piyush Khullar, Jose Vargas Badilla, Mary Lyn C. Lim, Stewart C. Hahn, David W. Ellis, Robert G. Kelly

690Pitting and Hydrogen Evolution on Aluminum in Concentrated HCl Solutions

Brandon Lynch, Santiago Fajardo, Gerald Frankel

691Intergranular Corrosion in Sensitized AA5083 Under Alternating Wet and Dry Conditions

Mary Lyn C. Lim, Stewart C. Hahn, Robert G. Kelly

692Potential Dependence of Intergranular Corrosion Propagation in Sensitized Al-Mg Alloys

Mary Lyn C. Lim, David W. Ellis, Stewart C. Hahn, John R. Scully, Robert G. Kelly

693Susceptibility of 5xxx Aluminum Alloys to Localized Corrosion in Natural Waters

Jason S Lee, Brenda J. Little

694Developing a Framework for Accelerated Test Design By Investigating the Impact of Key Testing Variables on the Exfoliation Corrosion of AA2060

Mary Parker, Srishti Shrivastava, Robert G. Kelly

695Role of Confinement in Localized Corrosion

Rohit Puranik, David J Quesnel

696(Corrosion Division H. H. Uhlig Award) Application Of Electrochemistry in the Development of Performance Assessment Models for High Level Nuclear Waste Disposal

Dave Shoemith

697(Corrosion Division Morris Cohen Student Award) Impact of Salt Deliquescence on the Humidity-Dependence of Atmospheric Corrosion

Eric Schindelholz, B. E. Risteen, Robert G. Kelly

698The Effect of the Flow-Regime, Reversal of Polarization, and Oxygen on the Long Term Stability in Capacitive De-Ionization Processes

Izaak Cohen, Eran Avraham, Yaniv Bouhadana, Abraham Soffer, Doron Aurbach

699The Dezincification of Brass: In Situ Measurement of Zn and Cu Dissolution with Atomic Emission Spectroelectrochemistry

Kevin Ogle, Peng Zhou

700High Resolution in Situ Studies of Localized and Crevice Corrosion with Multiple Beam Interferometry and Atomic Force Microscopy

Buddha Ratna Shrestha, Asif Bashir, Genesis Ngwa Ankah, Frank Renner, Markus Valtiner

[701 On Stress-Corrosion Cracking Initiation: Pitting Susceptibility and Cathodic Activity Near Nonmetallic Steel Inclusions](#)

[Kyle Brophy, Faysal Eliyan, Joseph Kish](#)

[702 Heterogeneous Thermal Oxide Film Formed on Polycrystalline Pure Iron](#)

[Yu Takabatake, Yuichi Kitagawa, Takayuki Nakanishi, Yasuchika Hasegawa, Koji Fushimi](#)

[703 Localized Corrosion of Carbon Steel in the Presence of Gamma Radiation](#)

[Jungsook Clara Wren, Linda Wu, Dan Guo, Alexander Van Belois, James J Noel, Peter Keech](#)

[704 Comparison of Fractographic Behaviors of Electrochemically Hydrogenated and Liquid N<sub>2</sub> Treated 4340 Steel of Various Microstructures](#)

[Mobbassar Hassan SK, Ruel Overfelt, Aboubakr Moustafa Abdullah](#)

[705 Factors Affecting Stray Currents Corrosion of Buried Pipeline](#)

[Zhu Qingjun, Hou Baorong](#)

[706 Vibrio neocaledonicus Sp., a Novel Marine Bacterium with the High Corrosion Inhibition Efficiency](#)

[Masoumeh Moradi, Zhenlun Song, Tao Xiao](#)

[707 Effect of Crevice Length on Potential, Current and pH Distribution in the Crevice Formed in Galvanic Coupling Between AA7050-T7451 and SS316](#)

[Chao Liu, Veronica N Rafla, John R. Scully, Robert G. Kelly](#)

[708 Modeling Aircraft Galvanic Stress Controlled By Kinetic Limitations](#)

[Jason S Lee](#)



[7093D Corrosion Modeling of Coating Defects](#)

[Christopher A Lueth, John Harb](#)

[710Mcb \(Mass and Charge Balance\) Model Simulation of Corrosion of Co-Cr Alloy Stellite-6](#)

[Mojtaba Momeni, Mehran Behazin, Jungsook Clara Wren](#)

[711Multidimensional Modeling of Nickel Alloy Corrosion inside High Temperature Molten Salt Systems](#)

[Bahareh Tavakoli, Sirivatch Shimpalee, John W. Weidner, Hyun-Seok Cho, John William Van Zee, Brenda L. Garcia-Diaz, Michael J. Martinez-Rodriguez, Luke Christopher Olson, Joshua R. Gray](#)

[712Modeling Trapping of Hydrogen Absorbed into Aluminum during Corrosion](#)

[Kurt Hebert](#)

[713Effect of Fluctuation of Electrolyte Flow Rate in Hydrogen Entry Cell on Hydrogen Permeation into Steel Sheet](#)

[Koji Fushimi, Yudai Yamamoto, Misako Jin, Yuichi Kitagawa, Takayuki Nakanishi, Yasuchika Hasegawa](#)

[714Modeling of Cathode Efficiency of Stainless Steel Under Fully Immersed Conditions](#)

[Jayendran Srinivasan, Rebecca Burkley, Chao Liu, Michael T. Woldemedhin, Robert G. Kelly](#)

[715Effects of Temperature on the Corrosion Potential of Stainless Steel Under Gamma-Ray Irradiation](#)

[Tomonori Satoh, Chiaki Kato, Fumiyoshi Ueno](#)

[716The Modelling of Pitting Corrosion of Carbon Steel in High Level Nuclear Waste Supercontainer](#)

[Pin Lu, Samin Sharifi-Asl, Bruno Kursten, Digby D. Macdonald](#)

## **C06-Pits & Pores 6: Nanomaterials - In Memory of Yukio H. Ogata**

Corrosion/Luminescence and Display Materials

717([Invited](#)) [Porous Silicon Studies of Prof. Yukio H. Ogata](#)

[Tetsuo Sakka, Kazuhiro Fukami](#)

718([Invited](#)) [Electrodeposition in Microporous Silicon from the Viewpoint of Hydration Property: Effect of Coexisting Ions in Zinc Electrodeposition](#)

[Kazuhiro Fukami, Ryo Koda, Akira Koyama, Tetsuo Sakka, Takeshi Abe, Atsushi Kitada, Kuniaki Murase](#)

719[Material Deposition into Porous Silicon Template](#)

[Farid A. Harraz, Adel A. Ismail, Saleh A. Al-Sayari, Ali Al-Hajry, Mohammad S. Al-Assiri](#)

720[Effect of Displacement Deposition on Platinum Deposition within Nanoporous Silicon](#)

[Akira Koyama, Kazuhiro Fukami, Ryo Koda, Tetsuo Sakka, Takeshi Abe, Atsushi Kitada, Kuniaki Murase](#)

721([Invited](#)) [Silicon Nanowires/Metal Nanoparticles Composites with Specific Properties](#)

[Rabah Boukherroub](#)

722([Invited](#)) [Silicon Electrochemical Micromachining Technology: The Good, the Bad and the Future](#)

[Giuseppe Barillaro](#)

723[Porosity Control and Transfer in Silicon Nanostructures through Electrochemical & Chemical Etching](#)

[Thomas Defforge, Sanahan Vijayakumar, Armando Loni, Arnaud Chaix, Audrey Sauldubois, Caroline Andrezza-Vignolle, Frederique Cunin, Francesco Di Renzo, Leigh T Canham, Gael Gautier](#)

[724Low Doped n-type Localized Porous Silicon Made by Hole Injection from Back-side p<sup>+</sup>/n Junction for Power Switches Application](#)

[Angélique Fèvre, Samuel Menard, Thomas Defforge, Gael Gautier](#)

[725Metal-Assisted Etching of Silicon: Activity of Metal Catalysts and Control of Porous Structure](#)

[Shinji Yae, Naoki Fukumuro, Susumu Sakamoto](#)

[726Porous Silicon Nanoneedles By Metal Assisted Chemical Etch for Intracellular Sensing and Delivery](#)

[Ciro Chiappini, Enrica De Rosa, Jonathan Otto Martinez, Paola Campagnolo, Carina Almeida, Ennio Tasciotti, Molly Stevens](#)

[727\(Invited\) Pore Filling of Porous Silicon with Ferromagnetic Nanostructures](#)

[Klemens Rumpf, Petra Granitzer, Peter Poelt, Herwig Michor](#)

[728Magnetic Studies of Iron Oxide Nanoparticles Encapsulated within Nanostructured Silicon](#)

[Petra Granitzer, Klemens Rumpf, Roberto Gonzalez-Rodriguez, Jeffery Coffey, Peter Poelt, Michael Reissner](#)

[729Morphological and Optical Properties of Stain Etched Silicon in Vanadium Oxide \(V<sub>2</sub>O<sub>5</sub>\) / Hydrofluoric Acid \(HF\) Solution](#)

[Maha Ayat, Nouredine Gabouze, Sabrina Sam, Luca Boarino, Rabah Boukherroub](#)

[730\(Invited\) Bright Light Emitting Silicon/Germanium Nanostructures](#)

[David J Lockwood](#)

[731\(Invited\) Electronic and Acoustic Applications of Anodized Nano-Crystalline Silicon](#)

[Nobuyoshi Koshida](#)

[732Plasmonic Mesostructures Prepared by Oriented Mesoporous Materials as a Template](#)

[Shunsuke Murai, Shiguma Uno, Ryosuke Kamakura, Koji Fujita, Katsuhisa Tanaka](#)

[733Porous Silicon in Microelectronics: From Academic Studies to Industry](#)

[Gael Gautier, Thomas Defforge, Sebastien Desplobain, Jérôme Billoué, Marie Capelle, Patrick Povéda, Kumar Vanga, Bin Lu, Benjamin Bardet, Julie Lascaud, Cheikhou Seck, Angélique Fèvre, Samuel Menard, Laurent Ventura](#)

[734\(Invited\) Ultrafine Porous Polyimide Membrane for Rechargeable Lithium Batteries](#)

[Kiyoshi Kanamura, Kazuhei Miyahara, Yohei Aoyama, Kenya Ouchi, Masaki Haibara, Hirokazu Munakata](#)

[735\(Invited\) Electrochemical Preparation and Processing of Porous Silicon Nanoparticles for Targeted, Self-Reporting Drug Delivery](#)

[M. J. Sailor](#)

[736Nanoporous Silicon-Based Platforms for Biological Applications Fabricated by UV Laser Techniques](#)

[Gonzalo Recio-Sanchez, Ramon J Pelaez, Carmen N. Afonso, Fidel Vega, Raul J Martin-Palma](#)

[737Response Simulation and Extraction of Gas Concentrations for Nanostructure Decorated Nano-/Microporous Silicon Interfaces](#)

[William Laminack, Caitlin Baker, James L. Gole](#)

[738\(Invited\) Green Synthesis of Porous Silicon Derived from Accumulator Plants: Associated Morphologies and Stabilization of a Natural Bioactive Extract](#)

[Nguyen T Le, Sabrie Howell, Jhansi Kalluri, Armando Loni, Leigh T Canham, Jeffery L Coffey](#)

[739\(Invited\) Organization in Molecular Layers Covalently Attached to Oxide-Free Silicon Surfaces](#)

[Catherine Henry de Villeneuve, Thang Long Nguyen Le, Stefan Klaes, Philippe Allongue, François Ozanam](#)

[740Effects of Substrate Composition on Morphology and Growth of Porous Oxide Layers](#)

[Hiroaki Tsuchiya, Min-Su Kim, Toshiaki Erami, Yuki Otani, Shinji Fujimoto](#)

[741Porous Layers Composed of Oxide Crystallites Formed by the Combination of Laser Ablation and Anodization of Metal](#)

[Abbie S. Ganas, Dmitry A. Znamensky, Nahúm Méndez Alba, José Luis Hernández-Pozos, Kurt W Kolasinski](#)

[742Bias-dependent Photoabsorption Properties of GaN Porous Structures under Back-side Illumination](#)

[Taketomo Sato, Hirofumi Kida, Yusuke Kumazaki, Zenji Yatabe](#)

[743\(Invited\) Thermal Carbonization of Porous Silicon: The Current Status and Recent Applications](#)

[Jarno Salonen, Martti Kaasalainen, Olli-Pekka Rauhala, Lippo Lassila, Martta Hakamies, Tero Jalkanen, Robert Hahn, P. Schmuki, Ermei Mäkilä](#)

[744Catalytic Activity of Ru for Metal-Assisted Etching of Si](#)

[Daisuke Sadakane, Kano Yamakawa, Naoki Fukumuro, Shinji Yae](#)

[745Optical Property of Porous Silicon Produced by Metal-Assisted Etching](#)

[Kano Yamakawa, Susumu Sakamoto, Naoki Fukumuro, Shinji Yae](#)

[746\(Invited\) Inhomogeneity of Barrier Layer Inducing Irregularity of Porous Anodic Oxide Film on Aluminum](#)

[Sachiko Ono, Hidetaka Asoh](#)

[747Role of Oxide Stress in the Initial Growth of Self-Organized Porous Aluminum Oxide](#)

[Kurt Hebert, Omer Ozgur Capraz, Pranav Shrotriya, Peter Skeldon, George Thompson](#)

[748Semi-Metallic TiO<sub>2</sub> Nanotubes: Growth, Properties and Applications](#)

[Robert Hahn, Patrik Schmuki](#)

[749Mechanism Study of Lithium Ion Insertion into Titania Nanotubes](#)

[Thierry Djenizian](#)

[750Ordered and Ultra-High Aspect Ratio Nanocapillary Arrays As a Model System](#)

[Mitchell L Solomon, Philip Cox, Nicholas R Schwartz, Gregory E Chester, Justin J Hill](#)

[751Electrochemical Corrosion Behavior of Nanocrystalline Metal Thin Film Prepared By Magnetron Sputtering -- a Recent Work Report](#)

[Li Liu](#)

[752Pd-Pt Catalyst Layer Formation Based on Porous Si](#)

[Masanori Hayase](#)

[753Dealloying of Few Coating: From Disorder to Order](#)

[Yunhan Ling, Jun Zhang, Siqu Yu, Weifeng Liu](#)

[754Switching from Homogeneous to Localized Corrosion in Stainless-Type Amorphous and Nano-Crystalline Steels](#)

[Frank Uwe Renner, Maria Jazmin Duarte](#)

[755 Corrosion Product Structures of Steel Samples Exposed to Amine Solutions Used for H<sub>2</sub>S Removal.](#)

[Mario A Alpuche-Aviles, Scott Waite, Ryan Malkiewich, Suman Parajuli, Maria Muñoz, Pushpa Chhetri](#)

[756 \(Invited\) Formation of Self-Organized Porous Anodic Films on Iron and Stainless Steels](#)

[Hiroki Habazaki, Khurram Shahzad, Takuya Hiraga, Etsushi Tsuji, Yoshitaka Aoki](#)

[757 Nanoporous  \$\alpha\$ -Alumina Membranes with Pore Diameters Tunable over Wide Range of 30-350 nm](#)

[Hidetaka Asoh, Tatsuya Masuda, Sachiko Ono](#)

[758 Electrochemical and Thermal Contributions to Ultra-Deep AAO Growth: Aspect Ratio  \$>10^4\$](#)

[Mitchell L Solomon, Nicholas R Schwartz, Philip Cox, Justin J Hill](#)

[759 Functional Optical Devices Based on Highly Ordered Metal Nanostructures Obtained Using Anodic Porous Alumina](#)

[Toshiaki Kondo, Takashi Yanagishita, Hideki Masuda](#)

[760 Silicon Nanowires Self-Purification By Metal-Assisted Chemical Etching of Metallurgical Silicon](#)

[Stefan L. Schweizer, Xiaopeng Li, Junna Wang, Alexander Sprafke, Ralf B. Wehrspohn](#)

## **D02-Nonvolatile Memories**

Dielectric Science and Technology

[761 \(Keynote\) Oxide based Resistive Memories for Low Power Embedded Applications and Neuromorphic Systems](#)

Elisa Vianello, Daniele Garbin, Natalija Jovanovic, Olivier Bichler, Olivier Thomas, Barbara de Salvo, Luca Perniola

762(Invited) Current Filamentation in Rram As Measured By High Speed Electrical Thermometry

James A. Bain, Abhishek Sharma, Marek Skowronski

763(Invited) Improving Memory Performance of Cu/HfO<sub>2</sub>/Pt Conducting-Bridge RAM by Solvent Substitution

Kentaro Kinoshita

764(Invited) Simulation and Modeling of the Switching Dynamics in Resistive Switching Devices

Stephan Menzel

765(Invited) Simulating the Behavior of a Bipolar Filamentary ReRAM Cell for Upcoming Memory Devices

Sebastian Wicklein, C Petti, T Minville, A Bandyopadhyay, A Ilkbahar

766Modulating the Anionic-Electronic Transport Kinetics to Trigger Memristance for Resistive Switching Non-Volatile Memories: New Materials, Structering and Methods

Jennifer L. M. Rupp, Felix Messerschmitt, Sebastian Schweiger, Rafael Schmitt, Markus Kubicek

767Multilevel Resistive Switching with Oxygen Vacancy Filaments in Pt/TaO<sub>x</sub>/Cu and Pt/TaO<sub>x</sub>/Pt Devices

Yuhong Kang, Gargi Ghosh, Marius K Orlowski

768Multi Level Operation of CuO Based Cbram with Cute Electrode

Dong Won Kim, Kyoung-Cheol Kwon, Myung-JIn Song, Ki-Hyun Kwon, Hye-Jee KiM, Soo-Min Jin, Ye-Ji Son, Jea-Gun Park



[769\(Keynote\) Nanoscale Memories: What Does Physics Have to Say?](#)

[Victor V. Zhirnov, R Meade, S. C. Pandey, G Sandhu](#)

[770\(Invited\) Integration Challenges of Ferroelectric Hafnium Oxide Based Embedded Memory](#)

[Johannes Müller, Patrick Polakowski, Jan Paul, Stefan Riedel, Raik Hoffmann, Maximilian Drescher, Stefan Slesazeck, Stefan Müller, Halid Mulaosmanovic, Uwe Schröder, Thomas Mikolajick, Stefan Flachowsky, Elke Erben, Elliot Smith, Robert Binder, Dina Triyoso, Joachim Metzger, Sabine Kolodinski](#)

[771\(Invited\) Large Crossbar Arrays for Storage Class Memory and Non-Von Neumann Computing](#)

[Kumar Virwani, Geoffrey W. Burr, Robert M. Shelby, Pritish Narayanan](#)

[772Lead Free Metal-Ferroelectric-Insulator-Semiconductor Devices for Non-Volatile Memory Applications](#)

[Rohit Medwal, Surbhi Gupta, Shojan P. Pavunny, Rajesh K. Katiyar, Reji Thomas, Ram S. Katiyar](#)

[773Characterization of Low-Dielectric Constant Silicon Carbonitride \(SiCN\) Dielectric Films for Charge Trapping Nonvolatile Memories](#)

[Sheikh Rashel AL Ahmed, Shinji Naito, Kiyoteru Kobayashi](#)

[774Resistance Switching Phenomenon Associated with Anisotropic Magnetoresistance of the ReRAM Device with Ferromagnetic Electrodes](#)

[Daisuke Ito, Hayato Yoshida, Tomohiro Shimizu, Shoso Shingubara](#)

[775\(Keynote\) Status and Challenges in Spin-Transfer Torque MRAM Technology](#)

[Mohamad Krounbi, Vladimir Nikitin, Dmytro Apalkov, Jangeun Lee, Xueti Tang, Robert Beach, Dustin Erickson, Eugene Chen](#)

[776\(Invited\) Low Power Stt-Mram and Its Application to Normally-Off Processor](#)

[Naoharu Shimomura, Daisuke Saida, Tadaomi Daibou, Yushi Kato, Chikayoshi Kamata, Saori Kashiwada, Yuichi Osawa, Hiroki Noguchi, Junichi Ito, Shinobu Fujita, Hiroaki Yoda](#)

[777Co<sub>2</sub>Fe<sub>6</sub>B<sub>2</sub>/MgO-Based Perpendicular Spin-Transfer-Torque Magnetic-Tunnel-Junction Spin-Valve without \[Co/Pt\]<sub>n</sub> lower Synthetic-Antiferromagnetic Layer](#)

[Seung-Eun Lee, Tae-Hun Shim, Jea-Gun Park](#)

[778\(Invited\) Spin Torque Switching in Magnetic Random Access Memory](#)

[Tomohiro Taniguchi](#)

[779Critical BEOL Aspects of the Fabrication of a Thermally-Assisted MRAM Device](#)

[E. J. O'Sullivan, Daniel Edelstein, Nathan Marchack, Michael Lofaro, Michael Gaidis, Eric Joseph, Anthony Annunziata, Dirk Pfeiffer, P. L. Trouilloud, Yu Zhu, Steve Holmes, Armand Galan, Adam M. Pyzna, Jemima Gonsalves](#)

[780Thermal Stability Enhancement of Magnetic Perpendicular-Magnetic Tunnel Junctions Using Double MgO Interface Structure](#)

[Yasutaka Takemura, Du-Yeong Lee, Seungeun Lee, Jong-Ung Baek, Tae-Hun Shim, Jea-Gun Park](#)

[781Effects of Radio-Frequency Sputtering Power of MgO Tunneling Barrier on Tunneling Magneto-Resistance Ratio for Cofeb/MgO-Based Perpendicular-Magnetic Tunnel Junctions](#)

[Du-Yeong Lee, Gon-Sub Lee, Hyong-Tak Seo, Jea-Gun Park](#)

[782\(Invited\) Resistive Random Access Memory for Storage Class Applications](#)

[Sung Hyun Jo, Tanmay Kumar](#)

[783\(Invited\) Direct Physical Understanding in Memristive Devices and Corresponding Device Models](#)

[John Paul Strachan](#)

784([Invited](#)) [Mechanism Study of Reversible Resistivity Change in Oxide Thin Film](#)

[Seungbum Hong, Seo Hyoung Chang, Charudatta Phatak, Blanka Magyari-Kope, Yoshio Nishi, Soma Chattopadhyay, Jung Ho Kim](#)

785[Set and Reset Voltage Interdependence in Resistive Switching Memory Cells](#)

[Gargi Ghosh, Marius K Orłowski](#)

786[Analysis of Resistive Switching Characteristics in Surface Anchored Metal Organic Framework \(SURMOF\) Films](#)

[David Malien Nminibapiel, Pragya Shrestha, Zhengbang Wang, K. P. Cheung, Helmut Baumgart, Engelbert Redel, Christof Wöll](#)

### **D03-Photovoltaics for the 21st Century 11**

Dielectric Science and Technology/Electrodeposition/Electronics and Photonics/Energy Technology/Industrial Electrochemistry and Electrochemical Engineering/Physical and Analytical Electrochemistry

787([Invited](#)) [CH<sub>3</sub>NH<sub>3</sub>PbI<sub>3</sub> Perovskite Solar Cells on Inorganic Materials: CuSCN and Crystal Silicon](#)

[Seigo Ito](#)

788[High Efficiency Millimeter-Scale Crystalline Perovskite Solar Cells](#)

[Aditya Mohite, Wanyi Nie, Hsinhan Tsai, Reza Asadpour, Jean-Christophe Blancon, Amanda Neukirch, Gautam Gupta, Jared Crochet, Manish Chhowalla, Muhammad Alam, Hsing-Lin Wang, Sergei Tretiak](#)

789[Reduction of Graphene Oxide through Intense Pulsed Light Towards Transparent Conductive Coating Applications](#)

[Gabriel Draper, Ruchira Dharamsena, Brandon Lavery, Thad Druffel](#)

[790Bandgap Engineering in TiO<sub>2</sub> By Sulfurization](#)

[Woo Jung Shin, Araceli Hernández Granados, Hailin Hu, Meng Tao](#)

[791Renewable Energy Forecast Using Machine Learning](#)

[Ingrid Shao, Siyuan Lu, Hendrik F. Hamann](#)

[792Metallic Nanoparticles and Nanostructure for Light Trapping](#)

[Yongan Tang, Branislav Vlahovic](#)

[793High Performing Semitransparent Graphene/BiFe<sub>0.95</sub>Si<sub>0.05</sub>O<sub>3</sub>/ITO Ferroelectric Photovoltaic Device](#)

[Surbhi Gupta, Rajesh K. Katiyar, Rohit Medwal, Shojan P. Pavunny, Tej B. Limbu, Monika Tomar, G Morell, Vinay Gupta, Ram S. Katiyar](#)

[794\(Invited\) Potential and Activities of III-V/Si Tandem Solar Cells](#)

[Masafumi Yamaguchi, K-H Lee, K Araki, N Kojima, Y Ohshita](#)

[795Low Stress and High Ductility Copper Electroplating Additive Development](#)

[Lingyun Wei, Yu Hua Kao, Rebecca Hazebrouck, Robert Corona, Bryan Lieb, Ying Wang, Michael A. Lowe, Mark Lefebvre, Sung-Ho Pyo, Wataru Tachikawa, Jeffrey Calvert](#)

[796Efficiency Uniformization in Crystalline-Si Solar Cells By Numerical Simulation](#)

[Laidong Wang, Meng Tao](#)

[797Electroplated Cu Grids on Crystalline Silicon Solar Cells and Its Long Term Degradation](#)

[Qiang Huang](#)

[798Flexible Ultra-Thin Silicon Solar-Cell Implemented with Energy-Down-Shift Via Cd<sub>0.5</sub>Zn<sub>0.5</sub>S/ZnS Core/Shell Quantum Dots](#)

[Jin-Seong Park, Jae-Hyoung Shim, Yun-Hyuk Ko, Joo-Hyeong Park, Gon-Sub Lee, Jeon-Gun Park](#)

[799Electrochemical Behavior of Silicon in Eutectic Calcium Chloride and Calcium Fluoride Molten Salt](#)

[Wen-Hsi Huang, Meng Tao](#)

[800Comparison of Different TiO<sub>2</sub> Phase Structures and Morphologies on Dye-Sensitized Solar Cells](#)

[Tsz Cheung Tsui, Wei Han, King Lun Yeung](#)

[801Intense Pulsed Light Annealing of Perovskite Solar Cells](#)

[Brandon Wayne Lavery, Thad Druffel, Gabriel Draper, Mahendra Kumar Sunkara](#)

[802Concept and Nanostructure Control of Plasmonic Porous Silicon Solar Cells](#)

[Kazuki Murakami, Kairi Yamada, Alain Fave, Manabu Ihara](#)

[803Fabrication and Characterization of Hybrid Solar Cells Based on Perovskite Materials](#)

[Tarek M Abdel-Fattah, Shaker Ebrahim, M Soliman, M Anas, E Moustafa](#)

[804Perovskite Based Solar Cells with Multi-Walled Carbon Nanotubes \(MWCNTs\)/Carbon Back Contact](#)

[Tarek M Abdel-Fattah, Shaker Ebrahim, Wegdan Ramadan, Mohammed Nofal, Moataz Soliman](#)

[805\(Invited\) Advance of Dye-Sensitized Solar Cells with Organic Dyes](#)

[Takurou N Murakami, Nagatoshi Koumura](#)

[806PTB7:PC<sub>71</sub>BM Bulk Heterojunction Solar Cells with Multiple Additives](#)

[Masaya Ohzeki, Jiayu Qiu, Shunjiro Fujii, Hiromichi Kataura, Yasushiro Nishioka](#)

[807Study of Nano-Filtration and Solvent Effects for Improving Efficacy of Organic Photovoltaic](#)

[Tarek M Abdel-Fattah, Enas m Younes, Gon Namkoong, E M El-Maghraby, Adly Elsayed, A. H. Abo Elazm](#)

[808Ternary Blend Bulk-Heterojunction Solar Cells Based on Active Layers of PTB7, PC<sub>71</sub>BM, and PC<sub>61</sub>BM](#)

[Jiayu Qiu, Koudai Kiriishi, Kousei Hashiba, Shunjiro Fujii, Hiromichi Kataura, Yasushiro Nishioka](#)

[809\(Invited\) Nanometer-Distance Control in Plasmonic Dye-Sensitized Solar Cells and Applications of Localized Surface Plasmon to Next Generation of Solar Cells](#)

[Manabu Ihara](#)

[810Solution-Derived NiO Hole Transport Layers on the PTB7:PC<sub>71</sub>BM Organic Solar Cells](#)

[Koudai Kiriishi, Kousei Hashiba, Jiayu Qiu, Shunjiro Fujii, Hiromichi Kataura, Yasushiro Nishioka](#)

[811Inverted Organic Solar Cells Based on PTB7:PC<sub>71</sub>BM with PFN Electron Transport Layer on ITO-Free Flexible PEN Substrate](#)

[Kousei Hashiba, Ryo Nagata, Koudai Kiriishi, Hiromichi Kataura, Shunjiro Fujii, Yasushiro Nishioka](#)

## **D04-Semiconductors, Dielectrics, and Metals for Nanoelectronics 13**

Dielectric Science and Technology/Electronics and Photonics

[812Optimized Novel Indium Antimonide Quantum Well Field Effect Transistor for High-Speed and Low Power Logic Applications](#)

Rabiul Islam, Md. Mohi Uddin, Mahmud Abdul Matin

813 HfO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub>/InGaAs MOSCAP Structures and InGaAs Plasma Nitridation Elaborated in a 300mm Pilot Line

Mathilde Billaud, Julien Duvernay, Helen Grampeix, Bernard Pelissier, Mickael Martin, Sylvain David, Christophe Vallée, Zdenek Chalupa, Hervé Boutry, Thierry Baron, Mickaël Cassé, Thomas Ernst, Maud Vinet, Gilles Reibold, Oliver Faynot

814 (Invited) Towards a Vertical and Damage Free Post-Etch InGaAs Fin Profile: Dry Etch Processing, Sidewall Damage Assessment and Mitigation Options

Uthayasankaran Peralagu, Xu Li, Olesya Ignatova, Yen-Chun Fu, David Alan John Millar, Matthew J Steer, Ian M Povey, Khalid Hossain, Manish Jain, Terry G Golding, Ravi Droopad, P. K. Hurley, Iain G Thayne

815 (Invited) MOS Interface Control Technologies for Advanced III-V/ Ge Devices

Shinichi Takagi, Chih-Yu Chang, Masafumi Yokoyama, Koichi Nishi, Rui Zhang, Mengnan Ke, Jae-Hoon Han, Mitsuru Takenaka

816 (Invited) Border Trap Density in Al<sub>2</sub>O<sub>3</sub>/InGaAs MOS: Dependence on Hydrogen Passivation and Bias Temperature Stress

Kechao Tang, Ravi Droopad, Paul C. McIntyre

817 (Invited) Fabrication of N-Polar (Al,Ga,In)N Heterostructures for Transistor Applications

Stacia Keller, Umesh K Mishra

818 (Invited) Surface Passivation of High-k Dielectric Materials on Diamond Thin Films

Kiran Kumar Kovi, Saman Majdi, Markus Gabrysch, Nattakarn Suntornwipat, Jan Isberg

819 (Invited) Defects and Dopants in Silicon and Germanium Nanowires

Marco Fanciulli, Matteo Belli, Stefano Paleari, Alessio Lamperti, Alessandro Molle, Mauro Sironi, Antonio Pizio

820(Invited) Topological States in Multi-Orbital Honeycomb Lattices of HgTe (CdTe) Quantum Dots

Wouter Beugeling, Eferpi Kalesaki, Christophe Delerue, Yann-Michel Niquet, Daniel Vanmaekelbergh, Cristiane Morais Smith

821(Invited) Factors Impacting Threshold Voltage in Advanced CMOS Integration: Gate Last (FINFET) vs. Gate First (FDSOI)

Dina Triyoso, Rick Carter, Jon Kluth, Scott Luning, Amy Child, Jeremy Wahl, Bob Mulfinger, Kasun Punchihewa, Anil Kumar, Laegu Kang, Ryan Sporer, Xiaobo Chen, Sherry Straub, Girish Bohra, Suraj Patil, Xing Zhang, Alex Chen, Mitsuhiro Togo, Rohit Pal

822Electrical Studies on Parylene-C Columnar Microfibrous Thin Films

Ibrahim H Khawaji, Chandraprakash Chindam, Wasim Orfali, Osama Osman Awadelkarim, Akhlesh Lakhtakia

823Effect of Hydrogen Partial Pressure on in-Situ Steam Generation Oxide Layer

Jin Hyuk Yun, Se Geun Park, Young Ho Lee, Che Young Lee, Jung Su An, In Su Cho

824Highly Robust Advanced Single Precursor Based k 2.4 ILD for Beol Cu Interconnects

Deepika Priyadarshini, Son van Nguyen, Hosadurga k Shobha, E. T. Ryan, Steven M Gates, Huai Huang, James Chen, Eric Liniger, Stephan A Cohen, Chao-kun Hu, Anita Madan, Edward Adams, Steven E Molis, Thomas J Haigh, Griselda Bonilla, Theodorus Standaert, Donald F Canaperi, Alfred Grill

825The Effect of CoSi<sub>2</sub> Formation Process on the CMOS Transistor Electrical Properties for Sub 100nm Memory Applications

Jeong Hoon Park, Sang Jin Kim, Jung Ho Lee, Chang Jun Yoo, Hyo Jin Kang, Byung Cheol Lee, Jae Goan Jeong



[826 Electroless Deposition of Ferromagnetic Co<sub>x</sub>Fe<sub>1-x</sub> alloys Using Metal Ion Reducing Agent](#)

[Aniruddha Joi, Ernest Chen, Yezdi Dordi](#)

[827 \(Invited\) Variability in FinFET SRAM Cells](#)

[Kazuhiko Endo, Shinichi O'uchi, Takashi Matsukawa, Yongxun Liu, Meishoku Masahara](#)

[828 \(Invited\) Intrinsic Unipolar SiO<sub>x</sub>-Based Resistive Switching Memory: Characterization, Mechanism and Applications](#)

[Yao-Feng Chang, Burt Fowler, Fei Zhou, Jack C. Lee](#)

[829 \(Invited\) Novel Selector and 3D RRAM Development for High Density Non-Volatile Memory](#)

[Hongxin Yang, Chun Chia Tan, Wei He, Minghua Li, Yu Jiang, Yi Yang](#)

[830 \(Invited\) White-Light-Induced Annihilation of Percolation Paths in SiO<sub>2</sub> and High-k Dielectrics - Prospect for Gate Oxide Reliability Rejuvenation and Optical-Enabled Functions in CMOS Integrated Circuits](#)

[Diing Shenp Ang, Tomohito Kawashima, Yu Zhou, Kwang Sing Yew, Milan Kumar Bera, Haizhong Zhang](#)

[831 Three-Dimensional Fully-Coupled Electrical and Thermal Transport Model of Dynamic Switching in Oxide Memristors](#)

[Xujiao Gao, Denis Mamaluy, Patrick R Mickel, Matthew Marinella](#)

[832 Proximity Gettering Design Via Nano-Cavities Induced By Hydrogen-Ion Implantation for Si CMOS Image-Sensor](#)

[Il-Hwan Kim, Jun-Seong Park, Gon-Sub Lee, Jea-Gun Park](#)

[833 \(Invited\) The Influence of Defects on the Electronic Properties of Hafnia](#)

Damir R. Islamov, Vladimir A. Gritsenko, Timofey V. Perevalov

834(Invited) The Assessment of Border Traps in High-Mobility Channel Materials

Eddy Simoen, AliReza Alian, Hiroaki Arimura, D Lin, Hans Mertens, Jerome Mitard, Sonia Sioncke, Wen Fang, Jun Luo, Chao Zhao, Anda Mocuta, Nadine Collaert, Aaron Thean, Cor Claeys

835Quantitative Characterization of Near-Interface Oxide Traps in 4H-SiC MOS Capacitors by Transient Capacitance Measurements

Yuki Fujino, Koji Kita

836Effects of Deuterium Incorporation on Performance and Reliability of Gate-Last High-k/Metal Gate CMOS Devices

Gun Rae Kim, Hyun-chul Sagong, Woo-kyum Lee, June-Kyun Park, Sang-woo Pae, Jong-woo Park, Byoung-deog Choi

837Negative Gate Transconductance in MIS Tunnel Diode Induced by Peripheral Minority Carrier Control Mechanism

Chien-Shun Liao, Jenn-Gwo Hwu

838Nanoscale Potential Fluctuation in Non-Stoichiometric Hafnium Suboxides

Oleg M. Orlov, Gennady Ja. Krasnikov, Vladimir A. Gritsenko, Vladimir N. Kruchinin, Timofey V. Perevalov, Vladimir Sh. Aliev, Damir R. Islamov, Igor P. Prosvirin

839Tunneling Current Induced Frequency Dispersion in the C-V Behavior of Ultra-Thin Oxide MOS Capacitors

Chang-Feng Yang, Jenn-Gwo Hwu

840Physically Based Analytical Modeling of 2D Electrostatic Potential for Symmetric and Asymmetric Double Gate Junctionless Field Effect Transistors in Subthreshold Region

[Imtiaz Ahmed, Quazi D. M. Khosru](#)

[841 Non-Uniform Hole Current Induced Negative Capacitance Phenomenon Examined by Photo-Illumination in MOS\(n\)](#)

[Huang-Hsuan Lin, Yen-Kai Lin, Jenn-Gwo Hwu](#)

[842 CMOS Compatible Growth of High Quality Ge, SiGe and SiGeSn for Photonic Device Applications](#)

[Murtadha A. Alher, Aboozar Mosleh, Larry Cousar, Wei Dou, Perry Grant, Seyed Amir Ghetmiri, Sattar Al-Kabi, Wei Du, Mourad Benamara, Baohua Li, Mansour Mortazavi, Shui-Qing Yu, Hameed A Naseem](#)

[843 Enhancement of Material Quality of \(Si\)GeSn Films Grown by SnCl<sub>4</sub> Precursor](#)

[Aboozar Mosleh, Murtadha A. Alher, Larry Cousar, Husam Abusafe, Wei Dou, Perry Grant, Sattar Al-Kabi, Seyed Amir Ghetmiri, Bader Alharthi, Huong Tran, Wei Du, Mourad Benamara, Baohua Li, Mansour Mortazavi, Shui-Qing Yu, Hameed A Naseem](#)

[844 Influence of Hydrogen Post-Implantation on Threading Dislocation Density in Strain-Relaxed SiGe Layer](#)

[Jun-Seong Park, Il-Hwan Kim, Gon-Sub Lee, Tae-Hun Shim, Jea-Gun Park](#)

[845 \(Invited\) Effects of Ge Substrate Annealing in H<sub>2</sub> on Electron Mobility as well as on Junction Leakage in n-channel Ge MOSFETs](#)

[Akira Toriumi, Choonghyun Lee, Tomonori Nishimura](#)

[846 Non-Thermal Equilibrium Formation of Ge<sub>1-x</sub>Sn<sub>x</sub> \(0 ≤ x ≤ 0.2\) Crystals on Insulator by Pulsed Laser Annealing](#)

[Kenta Moto, Ryo Matsumura, Hironori Chikita, Taizoh Sadoh, Hiroshi Ikenoue, Masanobu Miyao](#)

[847 Ultra-Low Temperature \(~180°C\) Solid-Phase Crystallization of GeSn on Insulator Triggered by Laser-Anneal Seeding](#)

[Ryo Matsumura, Kenta Moto, Yuki Kai, Taizoh Sadoh, Hiroshi Ikenoue, Masanobu Miyao](#)

848([Invited](#)) [Fabrication of High-Quality Ge-on-Insulator Structures by Lateral Liquid Phase Epitaxy](#)

[Takayoshi Shimura, Yuichiro Suzuki, Masahiro Matsue, Keiko Kajimura, Kohei Tominaga, Takashi Amamoto, Takuji Hosoi, Heiji Watanabe](#)

849[Electrical Characterization of Dry and Wet Processed Interface Layer in Ge/High-K Devices](#)

[YI Ming Ding, Durga Misra, Mdnasiruddin Bhuyian, Kandabara Tapily, Robert D. Clark, Steven Consiglio, Cory S. Wajda, Gert J. Leusink](#)

850([Invited](#)) [Excellent Wetting Behavior of Yttria on 2D Materials](#)

[Rafik Addou, Matthias Batzill, Robert M Wallace](#)

851([Invited](#)) [Is the Silicene a 2D Dirac Material?](#)

[Tetsuroh Shirasawa](#)

852([Invited](#)) [Solution Processing and Device Integration of Two-Dimensional Black Phosphorus](#)

[Mark C. Hersam](#)

853([Invited](#)) [Initial State of Graphene Growth on Ge\(001\) Surfaces](#)

[J Dabrowski, G Lippert, G Lupina](#)

854([Invited](#)) [Vertical Field Effect Transistor Based on Graphene/Transition Metal Dichalcogenide Van Der Waals Heterostructure](#)

[Rai Moriya, Takehiro Yamaguchi, Yoshihisa Inoue, Yohta Sata, Sei Morikawa, Satoru Masubuchi, Tomoki Machida](#)

[855\(Invited\) Non-Covalent Functionalization of Epitaxial Graphene for Atomic Layer Deposition of Dielectric Oxides](#)

[Jonathan D. Emery, Justice M.P. Alaboson, Hunter J. Karmel, Mark C. Hersam, Michael J. Bedzyk](#)

[856\(Invited\) Electronic Properties of Self-Assembled Trimesic Acid Monolayer on Graphene Layers](#)

[Farzaneh Shayeganfar](#)

[857Utilization of a Non-Ionic Surfactant in the Fabrication of Water-Borne Polymeric Semiconductor Nanoparticles for High-Performance, Green Organic Electronics](#)

[Jangwhan Cho, Seongwon Yoon, Jaeun Ha, Dae Sung Chung](#)

[858Enhanced Charge-Transport Behavior on PbS Nanocrystals Capped with Atomic Ligands](#)

[Seongwon Yoon, Jae Un Ha, Jangwhan Cho, Dae Sung Chung](#)

[859A Study on Chamber Contamination Control of Rapid Thermal Nitridation Process By Applying Quartz Liner](#)

[Jin Hyuk Yun, Se Geun Park, Byung Je Kang, Young Ho Lee, Jung Su An, In Su Cho](#)

[860The Improvement Magnet Plate on a Reticle Stage of Lithography Equipment through Analyzing Adhesive and Roughness of Plate](#)

[Ik Hwan Yu, Gun Rae Kim, Hag Su Jung, Jae Sung Bae](#)

## **D05-Processing Materials of 3D Interconnects, Damascene and Electronics Packaging 7**

Electronics and Photonics/Dielectric Science and Technology

[861Plasma Dicing: Current State & Future Trends](#)

[Russ Westerman, Gordon Grivna, Ken Mackenzie, Thierry Lazerand, Jason Doub](#)

[862Miniaturization and Biocompatible Encapsulation for Implantable Biomedical Silicon Devices](#)

[Jean-Charles Souriau, Jorge Mario Herrera Morales, Laetitia Castagné, Gilles Simon, Karima Amara, Bertrand Boutaud](#)

[863Kinetic on Copper Damascene and Cuprous Concentration Computation in with Cl<sup>-</sup> and SPS](#)

[Van Ha Hoang, Masayuki Yokoi, Kazuo Kondo](#)

[864Microvia Filling in an Acidic Copper Planting Bath with Insoluble Anodes](#)

[Chu-Chi Liu, Wei-Ping Dow](#)

[865Using Copolymers As Suppressors in a Copper Plating Bath for through-Hole Filling](#)

[Shih-I Wen, Wei-Ping Dow](#)

[866Accelerating Effect of Additives in Damascene Electrodeposition](#)

[Toshiya Kitahara, Yutaka Kaneko](#)

[867Optimizing TSV Fill Phases for Improved Fill Rate, Process Stability and Void Performance](#)

[John Ghekiere, Robert Mikkola, Daniel Kebreab, James Burnham, Bridger Hoerner, David Erickson](#)

[868Impact of Accelerator Decomposition Products to the Stability of TSV Filling Processes](#)

[Dirk Rohde, Kinga Haubner, Cornelia Jäger, Andreas Kirbs, Manuel Pölleth, Josef Gaida, Jens Palm](#)

[869Extreme Bottom-up in Through Silicon Vias by Leveler Pre-adsorption](#)

[Takao Ishii, Haruki Egoshi, Masanori Hayase](#)

[870Reduction of Thermal Expansion Coefficient of Electrodeposited Copper](#)

[Kazuo Kondo, Shingo Mukahara, Jin Onuki, Masayuki Yokoi](#)

[871Scanning Acoustic Microscopy Beyond Conventional Applications](#)

[Sebastian Brand, Matthias Petzold](#)

[872Towards Quantification of Contaminants in Electrodeposited Cu Films](#)

[N. T. M. Hai, Valentine Grimaudo, Pavel Moreno-García, Peter Broekmann](#)

[873The Studies of Spontaneous Potential Oscillation in a Galvanostatic Copper Electrodeposition and the Crystallographic Textures Thereof](#)

[Po-Fan Chan, Wei-Ping Dow](#)

[874Superconformal Filling of High Aspect Ratio through Glass Vias for Interposer Applications Using Tnbt and Ntbc Additives](#)

[Nikolay Dimitrov, Paul Ogutu, Edmond Fey](#)

[875\(invited\) Copper Electroplating Technology for Packaging](#)

[Chien-Hsun Lai, Yu Cheng Yuan, Marco Arnold, Dieter Mayer](#)

[876Dielectric Spectroscopic Detection of Early Failures in 3-D Integrated Circuits](#)

[Yaw S. Obeng, Chukwudi A. Okoro, Jung-Joon Ahn, Lin You, Joseph J. Kopanski](#)

[877Combined Surface-Activated Bonding Technique for Low-Temperature Cu/SiO<sub>2</sub> Hybrid Bonding](#)

[Ran He, Masahisa Fujino, Akira Yamauchi, Tadatomo Suga](#)

[878Novel Si Etching and Dielectric Liner Film Processing Technologies for Low-Cost TSV Packaging](#)

[Yasuhiro Morikawa](#)

[879 Electrografted P4VP as Dielectric in High Aspect Ratio TSV: Surface Preparation and Thermomechanical Consideration](#)

[Thomas Dequivre, Elias Al Alam, Julien Plathier, Andreas Ruediger, Gessie Brisard, Serge Charlebois](#)

[880 Effect of Plating Additives on Microstructure and Properties of Electrodeposited Ni-Fe Alloy](#)

[Mao-Chun Hung, Po-Fan Chan, Wei-Ping Dow, Hsiao-Yen Lee, Yi-Sheng Lin, Ping-Feng Yang](#)

[881 Highly Adhesive Displacement Plated Cu Seed on Cowb Barrier for All-Wet TSV Fill Process](#)

[Kohei Ohta, Fumihiko Inoue, Tomohiro Shimizu, Shoso Shingubara](#)

[882 Thermal Decomposition of Tungsten Nitrido Precursors for Low Temperature MOCVD of  \$WN\_xC\_y\$](#)

[Seo Young Kim, Arijit Koley, Richard Bonsu, Michelle Nolan, Lisa McElwee-White, Tim Anderson](#)

## **E01-Current Trends in Electrodeposition - An Invited Symposium**

Electrodeposition

[883 \(Electrodeposition Division Research Award\) The Scanning Bipolar Cell: Design Principles for Patterning of Diverse Metals without Contact to the Substrate](#)

[Trevor M Braun, Daniel T. Schwartz](#)

[884 Potential and Adsorbate Effects in Electrodeposition: Lessons Learned from Atomic-Scale in Situ and Operando Studies](#)

[Olaf M. Magnussen](#)



885 [Electrodeposition of Nanowires and Nanostructures from Supercritical Fluids](#)

[David Christopher Smith](#)

886 [Electrodeposition from Liquid Metal Salts](#)

[Jan Fransaer](#)

## **E02-Fundamentals of Electrochemical Growth and Surface Limited Deposition**

Electrodeposition/Physical and Analytical Electrochemistry

887 [\(Keynote\) Imaging Electrochemical Growth Using Liquid Cell Transmission Electron Microscopy](#)

[Frances M Ross](#)

888 [\(Invited\) Thermodynamics of Deposition Flux Dependent Intrinsic Film Stress](#)

[Marcel J. Rost](#)

889 [\(Invited\) Self-Terminated Electrodeposition Reactions](#)

[Sang Hyun Ahn, Yihua Liu, Rongyue Wang, Dincer Gokcen, Carlos M Hangarter, Ugo Bertocci, Thomas Moffat](#)

890 [\(Invited\) Semi-Automated System for Electrodeposition of Pt Monolayer Shell on Refractory Metal Core Fuel Cell Electrocatalysts Directly on Gas Diffusion Layer](#)

[Stoyan Bliznakov, Miomir Vukmirovic, James Wegrzyn, Radoslav Adzic](#)

891 [Synthesis of II-VI Semiconductors Thin Films By Ecald from Citric Buffer](#)

[Remigiusz Kowalik](#)

892 [\(Invited\) Reaction Kinetics of Metal Deposition Via Slrr of UPD ML Studied By Surface Reflectivity Measurements](#)

Stanko Brankovic, Ela Bulut, Wu Dongjun, Hasan Kilic

893(Invited) A Coverage Dependent Behavior of Pt on Au Deposited Using Surface Limited Redox Replacement

Natasa Vasiljevic, Zakiya Al Amri

894 Nanostructured, Bimetallic, Noble Metal Powders Prepared By Atomic Layer Electroless Deposition for Applications in Sensing and Catalysis

Patrick J Cappillino, Joshua D Sugar, Farid El Gabaly, Trevor Cai, Zhi Liu, John Lewellen Stickney, David B. Robinson

895 Cu Underpotential Deposition on Ru(0001)

Stanko Brankovic, Dongjun Wu

896(Invited) In Situ Stress and Nanogravimetric Measurements during Underpotential Deposition

Gery R. Stafford, Matthew Fayette, Ugo Bertocci

897 Towards a Mechanistic Understanding of Platinum Thin Film Deposition on Au(111)

Kathleen Schwarz, Thomas Moffat

898(Invited) Electroless Deposition of Ruthenium Using Sodium Borohydride Reducing Agent: A Mechanistic Study Using Electrochemical Quartz Crystal Microbalance

Aniruddha Joi, Albina Zieliene, Eugenijus Norkus, Loreta Tamasauskaite-Tamasiunaite, Yezdi Dordi

899 Effects of Cations on Electrochemical Behavior of Ni(II)/Ni in a Hydrophobic Ionic Liquid

Yan-Li Zhu, Yasushi Katayama, Takashi Miura

900 In-Situ Stress Measurements during Cobalt Electrodeposition on (111)-Textured Au

[Matthew Fayette, Ugo Bertocci, Gery R. Stafford](#)

[901 In Situ Optical Microscopy Studies of Spontaneous Oscillatory Growth of Zinc Dendrites](#)

[Dian Yu, Hongyang Li, Jeung Hun Park, Christine Orme, Frances M Ross, Suneel Kodambaka](#)

[902 The Effect of Brighteners on the Fabrication of Electroplated High-Bright Aluminum Films Using AlCl<sub>3</sub>-Emic Ionic Liquids](#)

[Futoshi Matsumoto, Shingo Kaneko, Toyokazu Tanabe, Takao Gunji](#)

## **E03-Novel Design and Electrodeposition Modalities 2**

Electrodeposition

[903 \(Invited\) Development of Bimetallic Electrocatalysts and Electrodes for Carbon Dioxide Electrolysis Via Direct Deposition Strategies](#)

[Kyler Carroll, Yung Wei Hsiao, Steven Brown, Liang Su, Fikile R. Brushett](#)

[904 \(Invited\) Electrodeposition of Fe-Pt Magnetic Films and Multilayers with Large magnetic Anisotropy for Magnetic Recording and Microsystems](#)

[Siyuan Ge, Defu Liang, Giovanni Zangari](#)

[905 Advanced Materials for Integrated on-Chip Power Converter](#)

[Hariklia \(Lili\) Deligianni, Naigang Wang, Oblesh Jinka, Joonah Yoon, E. J. O'Sullivan, Lubomyr Romankiw, W. J. Gallagher](#)

[906 \(Invited\) Controlling Component Distribution in Electrodeposited Multilayer and Alloy Films](#)

[Imre Bakonyi, László Péter](#)

[907 Modification of Electrodeposited Co-Pd Alloy Catalysts By Superimposed High Magnetic Field](#)

[Piotr Zabinski, Krzysztof Mech, Sylwia Banbur-Pawlowska, Remigiusz Kowalik](#)

908 [Direct and Pulse Plating of Metastable Zn-Ni Alloys](#)

[Simona Ieffa, Roberto Bernasconi, Luca Nobili, Pietro Luigi Cavallotti, Luca Magagnin](#)

909 [Mediated Electrochemical Deposition of Copper and Silver Thin Films for Improved Resistivity, Grain Size and Intrinsic Stress](#)

[Tyler D. Pounds, Stephen L. Farias, Karl Sieradzki, Robert C. Cammarata](#)

910 [\(Invited\) Pulse Plating for Compound Semiconductor Electrodeposition](#)

[John Lewellen Stickney, Justing Czerniawski, Xiaoyue Zhang, Nhi Bui, Sheng Shen](#)

911 [Light Assisted Electrodeposition for the Metallization of Silicon Solar Cells](#)

[Qiang Huang, Satyavolu Papa Rao, Kathryn Fisher](#)

912 [Intensity Modulated Photocurrent Spectroscopy \(IMPS\) Used to Detect Photoactive Intermediates during Ni-W Electrodeposition](#)

[Shaopeng Sun, Elizabeth J Podlaha](#)

913 [\(Invited\) Electropolymerized Polyaniline/Manganese Iron Oxide Hybrids with Enhanced Electrochemical Energy Storage and Color Switching Response](#)

[Yiran Wang, Huige Wei, Jiang Guo, Bin Qiu, Suying Wei, Zhanhu Guo](#)

914 [In-Situ Observations of Electrochemical Li Growth and Dissolution on a Lipon Electrolyte By High Resolution Scanning Electron Microscopy](#)

[Munekazu Motoyama, Toshio Kimura, Yasutoshi Iriyama](#)

915 [Hybrid Electro-Electroless Deposition \(HEED\)](#)

[Robert Petro, M. Schlesinger](#)

916 [Electrodeposition of Zn Alloys with Cu and Sn from Citrate Electrolytes](#)

[Salem Zahmi, Elizabeth J Podlaha](#)

917 [Latest Proofs of Validity of the Phenomenon of Phase Formation through a Stage of Liquid State in Metals Being Electrodeposited](#)

[Oleg B Girin](#)

918 [Nanostructured Zinc Electrodeposited from Protic Ionic Liquids: Comparison with Zinc Aqueous Electrodeposition Processes](#)

[R. Ortega, Gessie Brisard, Flor Rivas Esquivel](#)

### **E04-Semiconductors, Metal Oxides, and Composites: Metallization and Electrodeposition of Thin Films and Nanostructures 3**

Electrodeposition

919 [\(Invited\) The Electrodeposition of Crystalline Gallium Antimonide Using Electrochemical Liquid-Liquid Solid Deposition \(ec-LLS\)](#)

[Joshua James DeMuth, Luyao Ma, Stephen Maldonado](#)

920 [Electrodeposition of Ordered Copper Germanide from an Alkaline Tartrate-Complexed Electrolyte](#)

[Fu Zhao, Marcel Mibus, Lok-kun Tsui, Giovanni Zangari](#)

921 [Electrodeposition of Cu-Zn-Sn Precursors from an Acidic Solution for  \$\text{Cu}\_2\text{ZnSnS}\_4\$  Absorber Layers](#)

[Begum Unveroglu, Giovanni Zangari](#)

922 [On the Applications of Newly Architected CdTe Nanostructures from Ionic Liquid Medium](#)

[Khushbu R Chauhan, Dipal B Patel, Indrajit Mukhopadhyay](#)

923 [Dry Electrochemical Etching of MoS<sub>2</sub> Thin Films Using Plasma System](#)

[Chisung Ahn, Min Hwan Jeon, Hyeong U Kim, Kyong Nam Kim, Hongyi Qin, Yeongseok Kim, Geun Young Yeom, Taesung Kim](#)

924 [Electropolymerization of Poly\(phenylene oxide\) Films with Variable Thickness](#)

[Marina Timmermans, Stella Deheryan, Felix Mattelaer, Christophe Detavernier, Philippe M. Vereecken](#)

925 [Electrodeposition and Characterization of Selective Coatings Based on Black Cobalt for the Conversion of Solar-to-Thermal Energy](#)

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926 [Electrodeposition of Metallic Silicon in P13TFSI Ionic Liquids Containing SiCl<sub>4</sub>](#)

[Akinori Tsuruta, Hisayoshi Matsushima, Mikito Ueda, Takashi Fujii, Hiromitsu Date](#)

927 [Electrodeposition of Cu-Ag Alloy Thin Films Directly on W Diffusion Barrier By Controlling Complexing Agents and Organic Additives](#)

[Sunjung Kim, Kang O Kim](#)

928 [Properties of Pulse Electrodeposited CuInGaSe<sub>2</sub> Films](#)

[Kollegal Ramakrishna Murali, V Chitra](#)

929 [Properties of Pulse Electrodeposited AgGaS<sub>2</sub> Films](#)

[Kollegal Ramakrishna Murali, S Venkatachalapathy, Ramesh K](#)

930 [Characteristics of Pulse Electrodeposited CuAlSe<sub>2</sub> Films](#)

[Kollegal Ramakrishna Murali, M Thirumorthy, K Ramesh](#)

[931Metal Oxide Conductivity and Nanomechanical Properties of ZnO/Mo/ZnO Multilayer Thin Films Deposited By RF Magnetron Sputtering](#)

[Shi-Hao Wang, Yu-Jen Hsiao, Te-Hua Fang](#)

[932Study of Aminosilane-Compound Modification Condition on Polished Silicon Wafer and Its Influence on the Adhesion of Electroless Nickel/Phosphorous Film](#)

[Wei-Yan Wang, Chin Wei Hsu, Tzu Chien Wei, Chih-Ming Chen, Kuei-Chang Lai](#)

[933Effect of Different Palladium Nanoparticles on the Adhesion Between Electroless-Deposited Nickel-Phosphorus Film and Silane-Compound-Modified Silicon Surface](#)

[Chin Wei Hsu, Wei-Yan Wang, Tzu Chien Wei, Kuei-Chang Lai, Chih-Ming Chen](#)

[934Electrochemical Deposition of Hybrid Material Based on Polyindole and CdTe/CdS](#)

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[935Copper Oxide Layers Obtained Via Anodization for Electrowetting on Dielectrics](#)

[Roberto Bernasconi, Andrea Bellantone, Francesco Liberale, Luca Magagnin](#)

[936Electrodeposition of Thick MnO<sub>2</sub> Films on Restrictive Substrates](#)

[Marina Timmermans, Felix Mattelaer, Christophe Detavernier, Philippe M Vereecken](#)

[937Influence of Structural Properties on the Performance of Dye-Sensitized Solar Cells Based on Electrodeposited ZnO](#)

[Esdras Josué Canto Aguilar, Juan Antonio Anta, Gerko Oskam](#)

[938Properties of Carbon Fibers with Electrochemically Formed ZnO Nanorods](#)

[Kyu Hwan Lee, Dongchan Lim, Sung Mook Choi](#)

[939\(Invited\) Toward the Formation of Ordered Nanoparticle Films By Electrophoretic Deposition and the Subsequent Assessment of Order Via Voronoi Tessellation Analysis](#)

[James H. Dickerson](#)

940 [Development of Silver-Carbon-Nanotube Metal Matrix Composites for Metal Contacts on Space Photovoltaic Cells](#)

[Omar Kamal Abudayyeh, Cayla Nelson, Sang Han, Nathan Gapp, David Wilt](#)

941 [Construction of Asymmetric Graphene Sandwiches: Decoration Using Semiconductor and Metal Nanostructures](#)

[Peter S Toth, Robert AW Dryfe](#)

942 [\(Invited\) Electrochemical Processing of Metal-Insulator-Semiconductor \(MIS\) Photoelectrodes](#)

[Daniel Esposito, Natalie Yumiko Labrador](#)

943 [Hydrogen Atom Desorption Induced By Electron Bombardment on Si Surface](#)

[Wu Li, Shigeo Sato, Hisanao Akima, Masao Sakuraba](#)

944 [Electrochemical Doping As an Alternative to Ion Implantation in Oxide Semiconductor Thin Films](#)

[Takeaki Yajima, Go Oike, Tomonori Nishimura, Akira Toriumi](#)

945 [Formation of Si Nanowires By Electroreduction of Porous Ni/SiO<sub>2</sub> Blocks in Molten CaCl<sub>2</sub>](#)

[Sheng Fang, Juanyu Yang, Han Wang, Bing Yu, Shigang Lu](#)

946 [The Device-Perimeter Dependency in the Transient Current of a Metal-Insulator-Metal-Insulator-Semiconductor Capacitor with Anodic Oxide Films](#)

[Chien-Shun Liao, Jenn-Gwo Hwu](#)

947 [Electrodeposition of Cu on Nickel Seed Layer/p-Si in Buft Cell](#)



[Divya Priyadarshani, Prerna Goradia, Aliasgar Contractor, Roman Gouk, Steven Verhaverbeke, Robert Visser](#)

948[Silane-Free Adhesive Electroless Deposition of a Nickel/Phosphorous Layer on Si Wafer](#)

[Tzu Chien Wei, Chin Wei Hsu, Wei-Yan Wang, Chih-Ming Chen, Kuei-Chang Lai](#)

949[Bottom-up Filling of Damascene Trenches with Cobalt By Electroplating Process](#)

[Chiao-Chien Wei, Eric Chou, Steve Shih, Shih-Ming Lin](#)

## **F01-Electrochemical Engineering General Session**

Industrial Electrochemistry and Electrochemical Engineering

950[Advancements in Copper Interconnect Technology: The Effect of Sulfuric Acid on the Adsorption & Desorption of an Advanced MLI Suppressor](#)

[Wyatt Olson, Manning Schmidt, Anna Wetterer, Mark Willey](#)

951[Collaborative Development of a Functional Trivalent Chromium Electroplating Process](#)

[Maria E. Inman, E. J Taylor, Timothy D Hall, Stephen Snyder, Savindra Lucatero](#)

952[Transition from Surface Finishing of Stainless Steel Semiconductor Valves to Nickel-Titanium Medical Materials By Analysis of Analogous Patent Art](#)

[E. J Taylor, Maria E. Inman](#)

953[Coupling Phenomena Between Micromorphological Evolution and Ionic Mass Transfer Rate during Ag Electrodeposition in AgNO<sub>3</sub> Aqueous Solution](#)

[Yasuhiro Fukunaka, Takao Wakatsuki, Takayuki Homma](#)

954[Fabrication of Bumping Mask for Flip-Chip Process on Stainless Steel Using through Mask Electrochemical Micro Machining\(TMEMM\)](#)

[Jae-Bin Ahn, Heon-Yul Ryu, Jin-Goo Park](#)

[955Characterization of Electric Field Induced Ion Migration in Semiconductor Encapsulation Materials](#)

[Stefan Schwab, Jason Jung, Sabine Gruber, Michael Bauer, Michael Nelhiebel, Herbert Hutter](#)

[956Preparation of Transparent-Type Plasmonic Sensors By the Sol-Gel Process and Electrodeposition](#)

[Mikiko Saito, Masahiro Mita, Masahiro Yanagisawa, Takayuki Homma](#)

[957A New Challenge for Hydrogen Isotope Electrolytic Separation System Combined with Fuel Cell](#)

[Hisayoshi Matsushima, Shota Shibuya, Ryota Ogawa, Mikito Ueda](#)

[958Characterizing Mechanical and Electrochemical Behavior of Mechanically Preloaded Electrodes in Lithium Ion Pouch Cells](#)

[Lei Shi, Ulrich Kunz](#)

[959Effect of ZrO<sub>2</sub> Additive for IrO<sub>2</sub>-Ta<sub>2</sub>O<sub>5</sub>/Ti on Activity of Oer in Sulfuric Acid with Toluene Contamination](#)

[Kohei Nagai, Kenji Matsumae, Yuji Kohno, Koichi Matsuzawa, Akihiro Kato, Zaenal Awaludin, Yoshinori Nishiki, Shigenori Mitsushima](#)

[960Nanoparticle Electrocatalysts for the Oxidation of Biomass](#)

[Christian Arroyo-Torres, John A Staser, Omar Movil-Cabrera](#)

[961Electrochemical Enhanced Recovery of Precious Metals from Electronic Waste](#)

[Luis A. Diaz, Tedd E. Lister, Gemma Clark, Jacob Parkman](#)

[9623D Printed Membraneless Water Electrolysis Cells](#)

[Glen D O'Neil, Daniel Esposito](#)

963 [A Direct Numerical Method of Lines Approach for Predicting Primary and Secondary Current Density Distributions: Linear and Nonlinear Boundary Conditions](#)

[Manan Pathak, Kishalay Mitra, Mayandi Ramanathan, Venkat Subramanian](#)

### **F03-Membrane-based Electrochemical Separations**

Energy Technology/High Temperature Materials/Industrial Electrochemistry and Electrochemical Engineering/Physical and Analytical Electrochemistry

964 [\(Invited\) Membranes of Mixed Ionic and Electronic Conductors for Gas Separation: Effect of Surface and Interfaces](#)

[Meilin Liu, Mingfei Liu](#)

965 [Electrochemical Oxygen Separation Using Layered Double Hydroxides As Hydroxide Ion Conductor](#)

[Kiyoharu Tadanaga, Yuji Arishige, Akitoshi Hayashi, Masahiro Tatsumisago](#)

966 [Modifying Electrode Architectures for Solid Acid Electrochemical Hydrogen Separation Devices](#)

[David Leon Wilson, Thomas A. Zawodzinski, Alexander B. Papandrew](#)

967 [Reaction Dependent Transport of Carbonate and Bicarbonate through Anion Exchange Membranes in Electrolysis and Fuel Cell Operations](#)

[William A. Rigdon, Travis J Omasta, Connor A Lewis, William E Mustain](#)

968 [\(Invited\) Applications of Solid Electrolyte Membranes in Heterogeneous Catalysis. Electrochemical Reaction and Separation](#)

[Michael Stoukides, Anastasios Vourros, Eirini Vasileiou, Vasileios Kyriakou, Ioannis Garagounis](#)

969 [Ion Exchange Membrane Based Ammonia Synthesis](#)

[Hui Xu, Tom McCallum, Shyam S Kocha](#)

970[Water Purification in Porous Media Via Shock Electrodialysis](#)

[Sven Schlumpberger, Nancy B. Lu, Matthew E Suss, Martin Z. Bazant](#)

971[Removal of Cyanide in Solution Using Electrodeionization](#)

[Yun Tian, Yang Yang, Zheng Fan, Xingxing Wu, Zucheng Wu](#)

972[Porous Diamond Membrane Fabricated By Templated Growth for Electrochemical Separation Processes](#)

[Fang Gao, Christian Giese, Georgia Lewes-Malandrakis, Christoph E. Nebel](#)

973[Simultaneous Recovery of Potassium, Chloride and Removal of COD from Landfill Leachate Concentrates Using a Combination of Cation-Exchange Membrane Electrolysis](#)

[Xinyang Li](#)

974[Recovery Cyanide from Cyanide-Containing Wastewater By Selective Electroconcentration](#)

[Yang Yang, Yun Tian, Zheng Fan, Xingxing Wu, Zucheng Wu](#)

975[Hybrid Films Deposition for Nanochannel Membranes with Functional Surfaces](#)

[Jeong Hwan Kim, Sung-Woong Lee, Sun-A Jung, Jae-Sung Yoon, Yeong-Eun Yoo](#)

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Electronics and Photonics/Dielectric Science and Technology

976[\(Invited\) Atomic Layer Deposition of Core-Shell Nanowires for Solar Energy Conversion Devices](#)

[Ashley R. Bielinski, Neil P. Dasgupta](#)

[977 Opportunities of Atomic Layer Deposition for Perovskite Solar Cells](#)

[Valerio Zardetto, Francesco Di Giacomo, Mahir Asif Mohammed, Giulia Lucarelli, Stefano Razza, Alessandra D'Epifanio, Silvia Licoccia, W.M.M. Kessels, Aldo Di Carlo, Thomas M. Brown, Mariadriana Creatore](#)

[978 \(Invited\) A Rational Design for Batteries at Nanoscale by Atomic Layer Deposition](#)

[Chanyuan Liu, Eleanor Gillette, Xinyi Chen, Alexander J Pearse, Alexander C Kozen, Marshall A Schroeder, Keith Gregorczyk, Sang Bok Lee, Gary W Rubloff](#)

[979 Spatial Atmospheric ALD of Functional Layers for CIGS Solar Cells](#)

[A. Illiberi, Corne Frijters, Ellis Balder, Paul Poodt, Fred Roozeboom](#)

[980 \(Invited\) Atomic Layer Deposition of Nanophase Materials for Electrical Energy Storage](#)

[Xiangbo Meng, Jeffrey W Elam](#)

[981 Sensitization of ZnO by Light-Harvesting Antennas Composed of Multiple Stacked Dyes Grown by Liquid-Phase Molecular Layer Deposition](#)

[Yusaku Matsumura, Tetsuzo Yoshimura](#)

[982 Understanding Photovoltage in Insulator-Protected Water-Splitting Half-Cells](#)

[Andrew G. Scheuermann, Christopher E.D. Chidsey, Paul C. McIntyre](#)

[983 \(Invited\) Organic-Inorganic Hybrid Materials Formed By ALD Organometallic Infiltration into Polymers](#)

[Jesse S Jur, Halil Ibrahim Akyildiz](#)

[984 \(Invited\) Opportunities in Atomic Layer Deposition for Electronic Textile and Hydrophobic Coating Applications](#)

[Han-Bo-Ram Lee](#)

[985\(Invited\) Engineered Combinations of Inorganic ALD/CVD Layers and Monomolecular Organic Films](#)

[Silvia Armini](#)

[986Room Temperate Bonding of Al<sub>2</sub>O<sub>3</sub> Layers by Atomic Layer Deposition on Polyimide Substrates](#)

[Takashi Matsumae, Thomas Dushatinski, Tarek M Abdel-Fattah, Tadatomo Suga, Kai Zhang, Xin Chen, Helmut Baumgart](#)

[987Raman Spectroscopy of Aluminum-Doped Zinc Oxide Thin Films Synthesized By Atomic Layer Deposition](#)

[Pengtao Lin, Xin Chen, Kai Zhang, Helmut Baumgart](#)

[988Atomic Layer Deposition and in-Situ Characterization of Yttrium Oxide and Yttria-Stabilized Zirconia](#)

[Laurent Lecordier](#)

[989\(Invited\) Atomic Layer Deposition of Metals and Oxides on Graphene for Future Nanoelectronics](#)

[Ageeth A. Bol, Rene H. J. Vervuurt, Nick F. W. Thissen, Akhil Sharma, W.M.M. Kessels](#)

[990\(Invited\) ALD Materials for the Integration of III-V Based Transistors](#)

[Michael Givens, Fu Tang, Qi Xie, Jan Willem Maes](#)

[991Improving Graphene Conductivity through Selective Atomic Layer Deposition](#)

[Chanyuan Liu, Xiaogang Han, Wenzhong Bao, Alexander J Pearse, Liangbing Hu, Gary W Rubloff](#)

[992Synthesis of Transition Metal Dichalcogenide WSe<sub>2</sub>thin Films By Atomic Layer Deposition](#)

[Kai Zhang, Xin Chen, Pengtao Lin, Quinton Rice, Mahmoud Abdel-Fattah, Felix J. Seo, Qiliang Li, Helmut Baumgart](#)

993 [\(Invited\) Vacuum Ultraviolet Photochemical Atomic Layer Deposition of Alumina and Titania Films](#)

[Paul Raymond Chalker, Paul A Marshall, Karl Dawson, Christopher J Sutcliffe, Ian F Brunell, Naser Sedghi, Stephen Hall, Richard J Potter](#)

994 [New Insights into Sequential Infiltration Synthesis](#)

[Jeffrey W Elam, Mahua Biswas, Seth Darling, Angel Yanguas-Gil, Jonathan D. Emery, Alex B. F. Martinson, Paul F. Nealey, Tamar Segal-Peretz, Qing Peng, Jonathan Winterstein, J. Alexander Liddle, Yu-Chih Tseng](#)

995 [\(Invited\) Ru-Based Binary or Ternary Thin Films By Atomic Layer Deposition for a Seedless Cu Interconnects](#)

[Soo-Hyun Kim](#)

996 [ALD TaN Barrier for Enhanced Performance with Low Contact Resistance for 14nm Technology Node Cu Interconnects](#)

[Joyeeta Nag, Brian Cohen, Samuel Choi, Atsushi Ogino, Minseok Oh, Yan Yan, Jim Liang, Cathryn Christiansen, Andrew Kim, Baozhen Li, Patrick DeHaven, Anita Madan, Siddarth Krishnan, Andrew H Simon](#)

997 [On the Growth of Silver Thin Films By Atmospheric-Plasma Spatial ALD](#)

[Alfredo Mameli, Fieke van den Bruele, W.M.M. Kessels, Fred Roozeboom](#)

998 [\(Invited\) Metallic Nanocoatings on Optical Fibers as a Sensor Platform](#)

[David J. Mandia, Wenjun Zhou, Adam Wells, Jacques Albert, Sean Thomas Barry](#)

999 [Atomic Layer Deposition of Ultrathin TaN and Ternary Ta<sub>1-x</sub>Al<sub>x</sub>N<sub>y</sub> Films for Cu Diffusion Barrier Applications in Advanced Interconnects](#)

[Steven Consiglio, Kyle Yu, Sonal Dey, Kandabara Tapily, Robert D. Clark, Toshio Hasegawa, Cory S. Wajda, Gert J. Leusink, Alain C. Diebold](#)

1000 [Proposal of Integrated Sensitized Solar Cell Films Based on Sputtered ZnO Thin Films](#)

[Alshaalah Jassim, Satoshi Takizawa, Chie Yoshino, Tetsuzo Yoshimura](#)

1001 [Synthesis of ALD Tungsten Trioxide Thin Films from W\(CO\)<sub>6</sub> and H<sub>2</sub>O Precursors](#)

[Kai Zhang, Christopher McCleese, Pengtao Lin, Xin Chen, Monica Morales, Wei Cao, Felix J. Seo, Clemens Burda, Helmut Baumgart](#)

1002 [Synthesis of Noble Metal Nanoparticles By Atomic Layer Deposition Utilizing Self-Assembled Monolayers Templates](#)

[Qianqian Zhu, Kun Cao, Bin Shan, Rong Chen](#)

1003 [Spectroscopic Ellipsometry Characterization of Pd Thin Film Grown by Atomic Layer Deposition](#)

[Yihang Zhang, Xueqi Zhou, Kun Cao, Xiuguo Chen, Shiyuan Liu, Bin Shan, Rong Chen](#)

1004 [Sensitization of ZnO in Stacked Structures Containing Multiple Dyes Grown Using Liquid Phase Molecular Layer Deposition](#)

[TingTing Liu, Yusaku Matsumura, Tetsuzo Yoshimura](#)

1005 [\(Invited\) An Industry Perspective on Atomic Layer Etching](#)

[Satyarth Suri, Colin T. Carver, Robert Turkot, Patricio E Romero, Tristan A Tronic, John Plombon](#)

1006 [Selective Removal of Native SiO<sub>2</sub> Using XeF<sub>2</sub>](#)

[Adam Hinckley, Pablo Mancheno-Posso, C. Steven Lai, Anthony J. Muscat](#)



[1007\(Invited\) Atomic Layer Etching Using Thermal Reactions: Atomic Layer Deposition in Reverse](#)

[Younghee Lee, Jaime W. DuMont, Steven M. George](#)

[1008\(Invited\) Neutral Beam Technology – Defect-free Nanofabrication for Novel Nano-materials and Nano-devices](#)

[Seiji Samukawa](#)

[1009A Spatial ALD Oxide Passivation Module in an All-Spatial Etch-Passivation Cluster Concept](#)

[Fred Roozeboom, Fieke van den Bruele, Yves Creyghton, Paul Poodt, W.M.M. Kessels](#)

[1010\(Invited\) Divide Et Impera: Towards New Frontiers with Atomic Layer Etching](#)

[Thorsten Lill, Keren J. Kanarik, Samantha S.H. Tan, Meihua Shen, Yang Pan, Jeffrey Marks, Vahid Vahedi, Richard A. Gottscho](#)

## **G02-Semiconductor Cleaning Science and Technology 14 (SCST 14)**

Electronics and Photonics

[1011\(Invited\) Understanding and Controlling Electrochemical Effects in Wet Processing](#)

[Srini Raghavan, Chieh-Chun Chiang](#)

[1012\(Invited\) Ultrapure Water for Advance Semiconductor Manufacturing: Challenges and Opportunities](#)

[Slava Libman, Daniel Wilcox, Bernard Zerfas](#)

[1013Oxygen Control Challenge for Advanced Wet Processing](#)

[Yukifumi Yoshida, Masayuki Otsuji, H. Takahashi, Jim Snow, Farid Sebaai, Frank Holsteyns, Paul W. Mertens, Masanobu Sato, Hajime Shirakawa, H. Uchida](#)

[1014Effects of Diluted-NH<sub>4</sub>OH as Conductive Rinse Water in Single Wafer Cleaning Processes](#)

[Yoshifumi Hayashi, Masayuki Kawakami, Daisaku Yano, Koji Yamanaka](#)

[1015Sulfate Adsorption onto and Desorption from Silicon Dioxide Films](#)

[Bing Wu, Sriniraghavan](#)

[1016\(Invited\) Metallic Contamination Control in Advanced ULSI Processing](#)

[Koichiro Saga](#)

[1017Prevention of Metal Contamination in Sub 50 Nm SC1 Cleaning Process](#)

[Hyun-Tae Kim, Gun-Ho Park, Byoung-Jun Cho, Jung-Hwan Lee, Min-Su Kim, Jin-Yong Kim, Jin-Goo Park](#)

[1018Behavior of Nickel Deposition on Silicon Wafers from TMAH and Ammonia based SC1 Cleaning Process](#)

[Drew Sinha](#)

[1019Contamination Specifications, an Overall Perspective](#)

[Paul W Mertens](#)

[1020Submicron Particle Removal during FPD Oxide TFT Process](#)

[Jun Lee, Min-Su Kim, Hyun-Tae Kim, In-Chan Choi, Woo-Young Kim, Dae-Seung Lim, Jin-Goo Park](#)

[1021Effect of Particle Contamination on Extreme Ultraviolet \(EUV\) Mask and Megasonic Cleaning Process for Its Removal](#)

[Min-Su Kim, Hye-Rim Ji, In-Chan Choi, Hyun-Tae Kim, Sung-Hae Jang, Jun Lee, In-Seon Kim, Jung-Hwan Kim, Hye-Keun Oh, Jin-Ho Ahn, Jin-Goo Park](#)

1022 [Removing Organic Residues Using Backside Brush Scrubber Clean](#)

[Kripa Nidhan Chauhan, Vincent Sih, Talapady Bhat, Min Hyo Kang, Eiji Kabutoya, Gordon Cheng](#)

1023 [\(Invited\) Supercritical Drying: A Sustainable Solution to Pattern Collapse of High-Aspect-Ratio and Low-Mechanical-Strength Device Structures](#)

[Han-Wen Chen, Steven Verhaverbeke, Roman Gouk, Kurtis Leschkies, Shiyu Sun, Nikos Bekiaris, Robert J. Visser](#)

1024 [Effect of Surface Energy Reduction for Nano-Structure Stiction](#)

[Tatsuhiko Koide, Shinsuke Kimura, Hiroyasu Iimori, Tomohiko Sugita, Katsuhiro Sato, Yohei Sato, Yoshihiro Ogawa](#)

1025 [Dewetting Model Study on a Spinning Substrate - Challenges for Low Chemical Consumption](#)

[Ken-ichi Sano, David Mui, Mark Kawaguchi](#)

1026 [Effect of Surface Reactivity on Watermark Formation Studied By Sessile Droplet Evaporation Approach](#)

[Amir-Hossein Tamaddon, Harold Philipsen, Paul W Mertens, Guy Vereecke, Frank Holsteys, Marc Heyns, Stefan DeGendt, John Kelly, Dennis H. van Dorp](#)

1027 [\(Invited\) Selective Etch of Si and SiGe for Gate All-Around Device Architecture](#)

[Kurt Wostyn, Farid Sebaai, Jens Rip, Hans Mertens, Liesbeth Witters, Roger Loo, Andriy Yakovitch Hikavy, Alexey Milenin, Naoto Horiguchi, Nadine Collaert, Aaron Thean, Paul W. Mertens, Stefan De Gendt, Frank Holsteys](#)

1028 [Advanced Wet-Etch-Only Process for Complete Tri-Layer Rework](#)

[Philipp Steinke, Jesús Calvo, Benjamin Uhlig](#)

1029 [Etching of Silicon Nitride in 3D NAND Structures](#)

Derek Bassett, Wallace Printz, Takahiro Furukawa

1030 Selective Silicon Nitride Etch with Hot Diluted HF– an Alternative to Orthophosphoric Acid

Philippe Garnier, Marc Neyens, Thomas Massin, David Thomassin, Carole Maurice

1031 Wet Etchant Diffusion through Photoresist during Gate Oxide Patterning

Marc Neyens, Philippe Garnier, Manon Garach, Nevine Rochat, Christophe Licitra, Raluca Tiron

1032 Acoustic Characterization of Patterning Degradation during Wet Etching

Christophe Virgilio, Philippe Garnier, Mathieu Foucaud, Arnaud Devos, David Pinceau, Julien Carlier, Pierre Campistron, Bertrand Nongillard, Marc Neyens, Lucile Broussous

1033 Post Salicidation Clean: Removal of Unreacted Pt from High Pt Content NiPt Silicide

Akshey Sehgal, Garo Derderian, Pranesh Muralidhar

1034 (Invited) Nano-Controlled Etching of Polycrystalline Metals - a Key Enabler for Future Technologies

Kanwaljit Singh

1035 Dual-Fluid Spray Process for Particle and Fluorocarbon-Polymer Removal in BEOL Applications

Akihisa Iwasaki, Ayumi Higuchi, Kana Komori, Masanobu Sato, Hajime Shirakawa

1036 Development of a Cu and W Compatible PERR Clean in BEOL Advanced Interconnect Patterning

Els Kesters, Quoc Toan Le, Stefan Decoster, Victor Vega Gonzalez, Frank Holsteyns, Stefan De Gendt

[1037Effect of Dissolved Oxygen on the Removal of BTA from Cu By Tetra Methyl Ammonium Hydroxide](#)

[Ramanathan Srinivasan, Srin Raghavan, Amrutha MS](#)

[1038Surface Cleaning of SiGe\(100\) and Passivation of Ge\(100\) with Aqueous Ammonium Sulfide](#)

[Stacy Lynn Heslop, Philipp Engesser, Harald F. Okorn-Schmidt, Anthony J. Muscat](#)

[1039Evaluation of InGaAs and InP Compatibility with Alkaline Photoresist Stripping Formulations](#)

[Glenn Westwood](#)

[1040Optimizing Middle of Line \(MoL\) Contact Cleaning to Preserve Tungsten \(W\) Integrity in Advanced Technology Nodes](#)

[SherJang Singh, Pranesh Muralidhar, Kakoli Das, Silas Scott](#)

[1041Post CMP Cleaning: a Comparison of Contact and Non-Contact Physical Cleaning Methods](#)

[Donald Dussault, Mark Beck, Frank Fournel, Christophe Morales](#)

[1042Effect of Pre-Wet Cleaning Conditions on the Pad Oxide Thickness](#)

[Dhiman Bhattacharyya, Sathya Priya Sampathkumar, Jagdish Prasad](#)

[1043Real-Time pH Monitoring of Ultra-Diluted Chemistry with a Micro-Sampling pH Monitor](#)

[Yoko Nakai, Kazuhiro Miyamura, So Takagi, Yoshihiro Mori](#)

[1044Enhanced Point of Use Filtration for Cleaning without Small Particle Addition](#)

[Sasha J Kweskin, Phippen Chen, SunYoung Ham, Thomas Phely-Bobin, Ami Patel](#)

[1045\(Invited\) Reaction Mechanisms on Binary III-V Semiconductor Surfaces during Etching, Passivation, and Deposition](#)

[Anthony J. Muscat](#)

[1046Surface Chemistry of III-V Semiconductors After Wet Etching with HCl and H<sub>2</sub>O<sub>2</sub>](#)

[Pablo Mancheno-Posso, Anthony J. Muscat](#)

[1047Nanoscale Etching: Dissolution of III-As and Ge in HCl/H<sub>2</sub>O<sub>2</sub> Solutions](#)

[Dennis H. van Dorp, David Weinberger, Simon Van Wonterghem, Sophia Arnauts, Katrien Strubbe, Frank Holsteyns, Stefan De Gendt](#)

[1048Chemical Treatments for Native Oxides Removal of GaAs Wafers](#)

[Mickaël Rebaud, Marie-Christine Roure, Virginie Loup, Philippe Rodriguez, Eugénie Martinez, Pascal Besson](#)

[1049Cleaning of InGaAs and InP Layers for Nanoelectronics and Photonics Contact Technology Applications](#)

[Philippe Rodriguez, Laura Toselli, Elodie Ghegin, Mickaël Rebaud, Névine Rochat, Nicolas Chevalier, Eugénie Martinez, Fabrice Nemouchi](#)

[1050Chemical Passivation of In<sub>0.53</sub>Ga<sub>0.47</sub>As\(100\) Using Ammonium Sulfide and Thiols](#)

[Yissel Contreras, Anthony J. Muscat](#)

[1051Wet Processing for Post-epi & Pre-furnace Cleans in Silicon Carbide Power MOSFET Fabrication](#)

[J. Jay McMahon, Mo Jahanbani, Stephen Arthur, David Lilienfeld, Pete Gipp, Thomas Gorczyca, J. Formica, L. Shen, M. Yamagami, Bob Hillard, John Byrnes](#)

[1052Dissolution of Germanium in Sulfuric Acid Based Solutions](#)

[Nobuko Gan, Yuichi Ogawa, Tatsuo Nagai, Toru Masaoka, Kurt Wostyn, Farid Sebaai, Frank Holsteyns, Paul W. Mertens](#)

## **G03-Thermoelectric and Thermal Interface Materials 2**

Electronics and Photonics/High Temperature Materials

1053([Invited](#)) [Advanced Nanostructured Thermoelectric Materials for Energy Conversion](#)

[Yue Wu](#)

1054([Invited](#)) [Silicon-Based Nanocomposites for Thermoelectric High Temperature Waste Heat Recovery](#)

[Gabi Schierning, Hartmut Wiggers, Roland Schmechel](#)

1055([Invited](#)) [Computation-Driven Materials Search for Thermoelectric Applications](#)

[Qing Hao, Hongbo Zhao](#)

1056([Invited](#)) [Optimizations of p and n-Type Bi<sub>2</sub>Te<sub>3</sub>-Based Ternary Compounds By Ms-Pulsed Plating and Annealing Under Telluride Atmospheres](#)

[Kornelius Nielsch](#)

1057([Invited](#)) [Seebeck Coefficient Measurement of Pbsete / PbTe Nanolaminate Structures](#)

[Xin Chen, Pengtao Lin, Kai Zhang, Helmut Baumgart, Brian Geist, Vladimir Kochergin](#)

1058([Invited](#)) [Novel Strategies for the Bottom-up Assembly of Nanowires into Highly Efficient Bulk Thermoelectrics](#)

[Sreeram Vaddiraju](#)

1059([Invited](#)) [Thermoelectric Materials and Modules for High Temperature Application](#)

[Ryoji Funahashi, Tristan Barbier](#)

1060([Invited](#)) [Recent Advances on the Promising Thermoelectric Oxides Materials](#)

[Tristan Barbier, Ryoji Funahashi](#)

1061([Invited](#)) [Optimization of Pulsed Electrodeposited Bi<sub>2</sub>Te<sub>3</sub>-Based Thin Films from DMSO Solution: Influence of Deposition Parameters, Electrolytic Bath Composition and Annealing](#)

[Devendraprakash Gautam, Mike O'Neill, Kafil M. Razeeb](#)

1062([Invited](#)) [Colloidal Nanocrystal Composites with High and Low Thermal Conductivity](#)

[Robert Wang](#)

1063([Invited](#)) [Thin Film Thermoelectric Metal-Organic Framework with High Seebeck Coefficient and Low Thermal Conductivity](#)

[A. Alec Talin, Kristopher Erickson, François Léonard, Vitalie Stavila, Michael E. Foster, Catalin Spataru, Reese Jones, Brian Foley, Patrick Hopkins, Mark D Allendorf](#)

1064([Invited](#)) [Nano-Length-Scale Inorganic/Organic Hybridization for Thermoelectric Materials](#)

[Kunihito Koumoto, Chunlei Wan, Ruoming Tian, Ronggui Yang](#)

1065([Invited](#)) [Phonon Transport in Holey Silicon Nanostructures](#)

[Jaeho Lee, Peidong Yang](#)

1066([Invited](#)) [The Landauer Approach to Electron and Phonon Transport](#)

[Jesse Maassen, Mark Lundstrom](#)

1067([Invited](#)) [Electrodeposited Micro Thermoelectric Module Design for Hybrid Semiconductor Laser Cooling on a Silicon Photonics Platform](#)



[Ryan Enright, Shenghui Lei, Ian Mathews, Graeme Cunningham, Ronan Frizzell, Alexandre Shen](#)

[1068\(Invited\) Thermal Energy Conduction in a Surface Phonon Polariton Crystal](#)

[Baratunde Cola](#)

[1069\(Invited\) Reducing the Thermal Conductivity By Driving PbTe to a Phase Transition Via Strain and/or Alloying](#)

[Ivana Savic](#)

[1070\(Invited\) Phonon Dispersion Engineering and Thermal Transport in Si Membranes](#)

[Francesc Alzina, J. Sebastian Reparaz, Bartłomiej Graczykowski, Alexandros El Sachat, Marianna Sledzinska, Emigdio Chávez-Ángel, Markus R Wagner, Andrey Shchepetov, Mika Prunnila, Jouni Ahopelto, Clivia M Sotomayor Torres](#)

[1071\(Invited\) Tuning of Heat Transport across Thin Films of Polycrystalline AlN via Multiscale Structural Defects](#)

[Juliana Jaramillo-Fernandez, Jose Ordonez-Miranda, Emmanuel Ollier, Reza Sanatinia, Himanshu Kataria, Emigdio Chávez-Ángel, Sebastian Volz, Clivia M Sotomayor Torres](#)

## **G04-ULSI Process Integration 9**

Electronics and Photonics

[1072\(Keynote\) Devices Architectures and Technology for Quantum Computing](#)

[Tetsuo Kodera, Kosuke Horibe, Shunri Oda](#)

[1073Smartphones: Driving Technology to More than Moore 3-D Stacked Devices/Chips and More Moore FinFET 3-D Doping with High Mobility Channel Materials from 20/22nm Production to 5/7nm Exploratory Research](#)

[John O Borland](#)

1074(Invited) Gold-Induced Low-Temperature (<300°C) Growth of Quasi-Single Crystal SiGe on Insulator for Advanced Flexible Electronics

Taizoh Sadoh, Jong-Hyeok Park, Rikuta Aoki, Masanobu Miyao

1075(Invited) Temporary Bonding with Polydimethylglutarimide for Residue-Free Layer Transfer and 3-D Integration

Takashi Matsumae, Andrew D. Koehler, Jordan D Greenlee, Travis J Anderson, Helmut Baumgart, Glenn G Jernigan, Karl D Hobart, Francis J Kub

1076(Keynote) Silicon Photonics Technology for Optical Communications with High Bandwidth Density Requirements (1Tbit/s and 1,000 Gbit/s/cm<sup>2</sup>)

Sylvie Menezo, Gabriel Pares, Stephane Bernabe, Olivier Castany, Corrado Sciancalepore, Karim Hassan, Benjamin Blampey, Benoit Charbonnier, Julie Harduin, Sonia Messaoudene, Saman Saeedi, Azita Emami, Badhise Ben Bakir

1077(Invited) Si Photonics and Recent Challenges for on-Chip WDM

Kazumi Wada, Z. Zhang, M. Yako, K. Ju, N.J. Kawai

1078(Invited) Multifunctional Technology with Monolithic Integrated THz-, Photonic- and  $\mu$ -Fluidic Modules

Andreas Mai, Stefan Lischke, Matthias Wietstruck, Lars Zimmermann, Mehmet Kaynak, Bernd Tillack

1079(Invited) Electrical Properties of Group 4 Metal-Nitride/Ge Contacts and the Application to Ge Optoelectronic Devices

Hiroshi Nakashima, Keisuke Yamamoto, Dong Wang

1080Self-Assemble Formation of Ge Dots on Si(100) via C/Ge/C/Si Structure

Yuhki Itoh, Tomoyuki Kawashima, Katsuyoshi Washio

1081Gate-Bias Dependent Phonon Softening Observed in Ge MOSFETs

Shoichi Kabuyanagi, Tomonori Nishimura, Takeaki Yajima, Akira Toriumi

1082 Biaxial Stress Evaluation in SiGe Epitaxially Grown on Ge Substrate by Oil-Immersion Raman Spectroscopy

Kazuma Takeuchi, Daisuke Kosemura, Shotaro Yamamoto, Motohiro Tomita, Koji Usuda, Naomi Sawamoto, Atsushi Ogura

1083 (Invited) Challenges of Energy Band Engineering with New Sn-Related Group IV Semiconductor Materials for Future Integrated Circuits

Shigeaki Zaima, Osamu Nakatsuka, Takashi Yamaha, Takanori Asano, Shinichi Ike, Akihiro Suzuki, Masashi Kurosawa, Wakana Takeuchi, Mitsuo Sakashita

1084 (Invited) Tunneling FET Technologies Using III-V and Ge Materials

Shinichi Takagi, Minsoo Kim, Mitsuhiro Noguchi, Koichi Nishi, Mitsuru Takenaka

1085 (Invited) Vertical Tunnel FETs Using III-V Nanowire/Si Heterojunctions

Katsuhiro Tomioka, Takashi Fukui, Junichi Motohisa

1086 (Invited) On the Electrical Activity of Extended Defects in High-Mobility Channel Materials

Eddy Simoen, Geert Eneman, Andriy Yakovitch Hikavy, Roger Loo, Somya Gupta, Clement Merckling, AliReza Alian, Andreas Schulze, Matty Caymax, Robert Langer, Kathy Barla, Cor Claeys

1087 (Invited) Material and Device Integration for Hybrid III-V/SiGe CMOS Technology

Veeresh Vidyadhar Deshpande, Vladimir Djara, Daniele Caimi, Eamon O'Connor, Marilyne Sousa, Lukas Czornomaz, Jean Fompeyrine

1088 (Invited) Characterization of Individual Si/SiO<sub>2</sub> Interface Traps: Direct Observation of Single P<sub>b0</sub> Centers by the Charge Pumping (CP) Method and Correction of the Conventional CP Theory

[Toshiaki Tsuchiya](#)

1089([Invited](#)) [Scavenging Kinetics of Interfacial SiO<sub>2</sub> in HfO<sub>2</sub>/SiO<sub>2</sub>/Si Gate Stacks](#)

[Akira Toriumi, Xiuyan Li](#)

1090([Invited](#)) [High-Resolution Photoemission Study of High-k Dielectric Bilayer Stack on Ge\(100\)](#)

[Seiichi Miyazaki, Akio Ohta](#)

1091([Invited](#)) [Negative Capacitance Using Ferroelectrics for Future Steep-Slope MOSFETS](#)

[Anthony O'Neill](#)

1092[Photoemission Study on Chemical Bonding Features and Electronic Defect States of Thermally-Grown SiO<sub>2</sub>/4H-SiC Structure](#)

[Hiromasa Watanabe, Akio Ohta, Katsunori Makihara, Seiichi Miyazaki](#)

1093([Invited](#)) [Effect of Individual Dopants in Nano-SOI-MOSFETs and Nano-pn-Diodes](#)

[Michiharu Tabe, Daniel Moraru, Arup Samanta, Krzysztof Tyszka, Hoang Nhat Tan, Yuki Takasu, Ryszard Jablonski, Le The Anh, Hiroshi Mizuta, Takeshi Mizuno](#)

1094([Invited](#)) [Silicon Field Emitter Array Photocathode](#)

[Hidetaka Shimawaki, Masayoshi Nagao, Yoichiro Neo, Hidenori Mimura, Fujio Wakaya, Mikio Takai](#)

1095[Hydrogen Plasma Utilization in Advanced Logic Technology](#)

[Qiuhua Han, Xiaoying Meng, Haiyang Zhang](#)

1096[Process Optimization on Self-Aligned Double Patterned Fin Formation](#)

[Haiyang Zhang, Yan Wang, Fangyuan Xiao](#)

[1097 Strained p-Channel MOSFET Fabrication Challenge and Perspective for the 28-Nm Technology Node and Beyond](#)

[Zhe Zheng, Fangyuan Xiao, Haiyang Zhang](#)

[1098 \(Invited\) Advanced CMOS Device Technologies Discussed Also with Transition-Metal Di-Chalcogenide \(TMDC\) Channel](#)

[Hitoshi Wakabayashi](#)

[1099 \(Invited\) Silicene As a 2D Material Candidate](#)

[Patrick Vogt, Guy Le Lay, Paola De Padova](#)

[1100 \(Invited\) Performance of Graphene and Beyond Graphene 2D Semiconductor Devices](#)

[Frank Schwierz](#)

[1101 \(Keynote\) Heterogeneous Integration of MEMS by Adhesive Bonding](#)

[Masayoshi Esashi, Shuji Tanaka](#)

[1102 CMOS and NEMS Hybrid Architectures](#)

[Thomas Ernst, Issam Ouerghi, Willy Ludurczak, Julien Arcamone, Laurent Duraffourg, Eric Ollier, Julien Philippe, Sébastien Hentz](#)

[1103 \(Invited\) Observation of Stress Responses of Bacteria Confined in a MEMS Microfluidic Chip](#)

[Yusuke Nishimura, Makoto Ishida, Kazuaki Sawada, Hiromu Ishii, Katsuyuki Machida, Kazuya Masu, Changle Wang, Kenichiro Iida, Mitsumasa Saito, Shinichi Yoshida](#)

[1104 Innovative Embedded Non-Volatile Memories: Flexibility and Reliability](#)

[Gabriele Navarro, Elisa Vianello, Gabriel Molas, Véronique Sousa, Luca Perniola](#)

1105 [Increase in Oxide Trap Density Due to the Implementation of High-k and Al<sub>2</sub>O<sub>3</sub> Cap Layers in Thick-Oxide Input-Output Transistors for DRAM Applications](#)

[Eddy Simoen, Romain Ritzenthaler, Moon Ju Cho, Tom Schram, Naoto Horiguchi, Marc Aoulaiche, Alessio Spessot, Pierre Fazan, Cor Claeys](#)

1106 [Resistive Switching Characteristics of Si-Rich Oxides with Embedding Ti Nanodots](#)

[Yusuke Kato, Takashi Arai, Akio Ohta, Katsunori Makihara, Seiichi Miyazaki](#)

1107 [\(Invited\) Visualization of Conductive Filament of ReRAM during Resistive Switching by in-situ TEM](#)

[Yasuo Takahashi, Masaki Kudo, Masashi Arita](#)

1108 [\(Invited\) An Investigation of the InGaAs MOS System for Future High Mobility Channel Applications](#)

[P. K. Hurley, Yuri Gomeniuk, Jun Lin, Scott Monaghan, Ian M Povey, Martyn E Pemble, B J Hutchinson, Brendan Sheehan, Vladimir Djara, Eamon O'Connor, Karim Cherkaoui](#)

1109 [Dummy Poly Gate Removal Process Optimization with Pulsing Plasma Application](#)

[Shi-Liang Ji, Rui-Xuan Huang, Cheng-Long Zhang](#)

## **G05-GaN & SiC Power Technologies 5**

Electronics and Photonics/Dielectric Science and Technology

1110 [\(Invited\) Wide Bandgap \(WBG\) Power Switching Devices for Distributed Clean Energy Systems](#)

[Krishna Shenai](#)

1111 [\(Invited\) High Power SiC Power Processing Unit Development](#)

[Robert Scheidegger](#)

1112([Invited](#)) [Silver Sinter Joining and Stress Migration Bonding for Wbg Die-Attach](#)

[Katsuaki Suganuma, Toru Sugahara, Jinting Jiu, Shijo Nagao, Emi Yokoi, Hao Zhang](#)

1113([Invited](#)) [Enabling SiC Yield and Reliability through Epitaxy and Characterization](#)

[Hrishikesh Das, Swapna Sunkari, Martin Domeij, Andrei Konstantinov, Fredrik Allerstam, Thomas Neyer](#)

1114([Invited](#)) [Structural Characterization of SiC Crystals Grown By Solvent Laser Heated Floating Zone Method and Hot Wall Chemical Vapor Deposition for the Development of a Low Defect Density Bulk Growth Technique for SiC](#)

[Balaji Raghothamachar, Ouloide Yannick Goue, Michael Dudley](#)

1115[Direct Determination of Burgers Vectors of Threading Mixed Dislocations in 4H-SiC c-Plane Wafers Grown by PVT Method](#)

[Jianqiu Guo, Yu Yang, Fangzhen Wu, Ouloide Yannick Goue, Balaji Raghothamachar, Michael Dudley](#)

1116[Assessment of Factors Controlling the X-ray Penetration Depth in Studies of 4H-SiC using Monochromatic and White Beam Synchrotron X-ray Topography in Reflection Geometry](#)

[Yu Yang, Jianqiu Guo, Ouloide Yannick Goue, Fangzhen Wu, Balaji Raghothamachar, Michael Dudley](#)

1117([Invited](#)) [Role of GaN-Based Devices in Medium and High Power Conversion](#)

[Srabanti Chowdhury](#)

1118([Invited](#)) [AlGaN Higher Power Devices](#)

[Kenneth A. Jones](#)

[1119\(Invited\) Ultra-Wide-Bandgap Semiconductors for Power Electronics](#)

[Robert J. Kaplar, Andrew A. Allerman, Andrew M. Armstrong, Albert G. Baca, Arthur J. Fischer, Jonathan J. Wierer, Jason C. Neely](#)

[1120Avalanche Energy of High-Voltage Silicon and SiC Power Diodes](#)

[Krishna Shenai](#)

[1121\(Invited\) Threshold Voltage Stability Comparison of Commercial SiC Mosfets and Related Issues](#)

[Ron Green, Aivars Lelis, Dan Habersat](#)

[1122\(Invited\) Baseplate Materials for Securing Reliability of Wide Band Gap Power Semiconductor Module Operating at High Temperatures](#)

[Hiroki Takahashi, Takeshi Anzai, Fumiki Kato, Shinji Sato, Hidekazu Tanisawa, Yoshinori Murakami, Kinuyo Watanabe, Hiroshi Sato](#)

[1123\(Invited\) Epitaxial III-Nitride Film Growth in a Single Wafer Rotating Disk MOCVD Reactor](#)

[George D Papasouliotis, Jie Su, Balakrishnan Krishnan, Ronald Arif](#)

[1124\(Invited\) Quality Improvement and Mapping Analysis of Single Crystal 4H SiC Grown with Purified Beta-SiC Powder Source](#)

[Younghee Kim, Eunjin Jung, Myunghun Lee, Jungyu Kim, Doojin Choi](#)

[1125Double Shockley Stacking Fault Formation in Higher Doping Regions of PVT-Grown 4H-SiC Wafers](#)

[Yu Yang, Jianqiu Guo, Ouloide Yannick Goue, H Wang, F Wu, Balaji Raghothamachar, Michael Dudley, G Chung, J Quast, E Sanchez, I Manning, Darren Hansen](#)

[1126Study on the Relaxation Process in 4H-SiC Homoepitaxy Growth](#)



[Jianqiu Guo, Yu Yang, Fangzhen Wu, Ouloide Yannick Goue, Balaji Raghothamachar, Michael Dudley](#)

1127([Invited](#)) [Vertical GaN Pin Diodes Formed By Mg Ion Implantation](#)

[Travis J Anderson, Jordan D Greenlee, Boris Feigelson, Jennifer K Hite, Karl D Hobart, Francis J Kub](#)

1128([Invited](#)) [Ion Implantation into GaN and Implanted GaN Power Transistors](#)

[Kazuki Nomoto, Kengo Takahashi, Oikawa Takuya, Hiroki Ogawa, Tomoaki Nishimura, Tomoyoshi Mishima, Tohru Nakamura, Huili Grace Xing](#)

1129([Invited](#)) [Radiation-Induced Defect Mechanisms in GaN Hemts](#)

[Andrew D. Koehler, Travis J Anderson, Petra Specht, Brad D Weaver, Jordan D Greenlee, Marko J Tadjer, David I Shahin, Karl D Hobart, Francis J Kub](#)

1130[Vertical Buffer Leakage and Temperature Effects on the Breakdown Performance of GaN/AlGaN HEMTs on Si Substrate](#)

[Fouad Benkhelifa, Stefan Müller, Vladimir M. Polyakov, Steffen Breuer, Heiko Czap, Christian Manz, Michael Mikulla, Oliver Ambacher](#)

1131[Leakage Current Mechanisms in Reverse Biased High-Voltage 4H-SiC Power Diodes](#)

[Krishna Shenai, Balaji Raghothamachar, Michael Dudley](#)

1132([Invited](#)) [Reliability and Pulsed I-V Analysis of Vertically-Scaled GaN MIS-Hemts](#)

[David J. Meyer, Brian P. Downey, Jason A. Roussos, D. Scott Katzer, Mario G. Ancona, Ming Pan, Xiang Gao](#)

1133[4H-SiC JFET Multilayer Integrated Circuit Technologies Tested up to 1000 K](#)

[David J Spry, Phil G Neudeck, Liangyu Chen, Carl W Chang, Dorothy Lukco, Glenn M. Beheim](#)

[1134\(Invited\) Characteristics of a Wire-Bonding-Less SiC Power Module Operating in a Wide Temperature Range](#)

[Shinji Sato, Hidekazu Tanisawa, Takeshi Anzai, Hiroki Takahashi, Yoshinori Murakami, Fumiki Kato, Kinuyo Watanabe, Hiroshi Sato](#)

1135[Short-Circuit Resilience of SiC JFETs](#)

[Maxime Berthou, Shiqin Niu, Dominique Tournier, Dominique Planson](#)

## **H01-Low-Dimensional Nanoscale Electronic and Photonic Devices 8**

Electronics and Photonics/Dielectric Science and Technology/Sensor

1136(Invited) [Semiconductor Nanowires and Nanosheets for Extremely Widely Tunable Lasing](#)

[Cun-Zheng Ning](#)

1137(Invited) [Lead Halide Perovskite Nanowire and Nanoplate Lasers with Low Lasing Thresholds and High Quality Factors](#)

[Song Jin](#)

1138(Invited) [High Performance Deep Ultraviolet Nanowire Light Emitting Diodes and Lasers](#)

[Zetian Mi, Songrui Zhao, Xianhe Liu](#)

1139(Invited) [Semiconductor/Oxide Composite Nanowires Supplying White Luminescence](#)

[Fumitaro Ishikawa, Naoki Yamamoto](#)

1140[Physical and Electrical Properties of Ag Contacts on MoS<sub>2</sub>](#)

[Hui Yuan, Minghu Pan, Guangjun Cheng, Curt A. Richter, Qiliang Li](#)

[1141 Post Deposition Annealing Atmosphere Effect on SSI-LEDs Made of Zr-Doped HfO<sub>2</sub> High-k Gate Dielectric](#)

[Shumao Zhang, Yue Kuo, Stanislav Verkhoturov](#)

[1142 \(Invited\) Electronics Based on Monolayers](#)

[Lain-Jong Li](#)

[1143 \(Invited\) Integration of 2-D Materials for Electronic Device Application](#)

[Jianyuan Jia, Jaeho Jeon, Jin-Hong Park, Sungjoo Lee](#)

[1144 \(Invited\) Band Gap Tunable Monolayer WSe<sub>2\(1-x\)</sub>S<sub>2x</sub> Synthesis, Characterization and Device Applications](#)

[Bin Xiang, Jian Huang, Lei Yang, Qi Fu](#)

[1145 \(Invited\) Hybrid Two-Dimensional Nanosheet Materials for Energy Storage Devices](#)

[Lele Peng, Yue Zhu, Guihua Yu](#)

[1146 \(Invited\) Functional Nanostructures for Highly Efficient Photoelectrochemical Water Splitting](#)

[Yuegang Zhang](#)

[1147 \(Invited\) Two-Dimensional Layered Materials/Silicon Heterojunctions for Energy and Optoelectronic Applications](#)

[Jiansheng Jie](#)

[1148 ZnCdSe-Sensitized WO<sub>3</sub> and TiO<sub>2</sub> based Photoelectrodes: A Comparative Study](#)

[Ruchi Gakhar, Dev Chidambaram](#)

[1149 \(Invited\) Enhanced Energy Harvesting Scheme Utilizing Hierarchical Micro/Nanostructures](#)

[Yu-Lun Chueh](#)

[1150\(Invited\) Wearable Electronics Using Low-Dimensional Nanomaterials](#)

[Jang-Ung Park](#)

[1151\(Invited\) Physical, Chemical and Biological Sensors Based on Nanomaterials for Wearable and Smart Electronics](#)

[Nae-Eung Lee, Tran Quang Trung, Eun Roh, Byeong-Ung Hwang, Doil Kim, Sajal Shrivastava, Le Thai Duy, Vinh Quang Dang, Yeong-Min Son, Wonil Lee, Il-Yung Sohn, Ju-Hyuck Lee, Bo Young Kim, Saqib Siddiqui, Sang-Woo Kim](#)

[1152\(Invited\) Printed High Performance Flexible Device Sheet](#)

[Kuniharu Takei](#)

[1153\(Invited\) Flexible Electronic Skins for Wearable Sensors](#)

[Hyunhyub Ko](#)

[1154\(Invited\) Laser Cooling in Semiconductors](#)

[Jun Zhang](#)

[1155\(Invited\) Surfactant-Assisted Chemical Vapor Deposition of High-Performance Small-Diameter Gasb Nanowires](#)

[Johnny C Ho](#)

[1156\(Invited\) Emerging Oxide Nanowires: Creation Concept and Their Promises for Novel Nanoscale Devices](#)

[Takeshi Yanagida](#)

[1157\(Invited\) New Synthesis Approaches to Nanostructured Complex Functional Metal Oxides](#)

[Candace K. Chan](#)

[1158\(Invited\) Operando Measurement of Energy Band Alignment and Built-in Potential in Thin-Film Photovoltaic Devices](#)

[Liwei Chen](#)

[1159\(Invited\) Efficient Perovskite Thin Film Solar Cells on Nanostructure](#)

[Zhiyong Fan, Mohammad Mahdi Tavakoli, Siu-Fung Leung, Tsui Kwong-Hoi](#)

[1160Nanopatterned Fiber Based Textile Triboelectric Nanogenerator](#)

[Wanchul Seung, Sang-Woo Kim](#)

[1161Highly Flexible and Transferable Supercapacitors with Ordered Three-Dimensional MnO<sub>2</sub>/Au/MnO<sub>2</sub> Nanospikes Arrays](#)

[Yuan Gao, Qingfeng Lin, Mohammad Mahdi Tavakoli, Siu-Fung Leung, Zhiyong Fan](#)

[1162\(Invited\) Strain and Phonon-Carrier Interactions in Ge-Si<sub>0.5</sub>Ge<sub>0.5</sub> Core-Shell Nanowires Probed Using Tip-Enhanced Raman Spectroscopy](#)

[Edward T. Yu, Zhongjian Zhang, David Dillen, Bryan W. Brasile, Emanuel Tutuc](#)

[1163Multiple-Input Multiple-Output Optical Integrator Design by Non-Interacting Control via Dynamic Extension](#)

[Stephen Hayden Williams, Xiaojia Xue, Makhin Thitsa](#)

[1164Characterization of InN - In<sub>0.25</sub>Ga<sub>0.75</sub>N Quantum Well Laser Structure for 1330 nm Wavelength](#)

[Md. Mobarak Hossain Polash, M. Shah Alam](#)

[1165Optical Gain Optimization of Al<sub>0.8</sub>Ga<sub>0.2</sub>N-Delta-GaN Quantum Well Laser in Ultraviolet Spectra Using Genetic Algorithm](#)

Md. Mobarak Hossain Polash, M. Shah Alam

1166(Invited) Microscopic Studies of Black Phosphorus and Its Field-Effect Transistors

Minghu Pan, Hui Yuan, Ya-Qiong Xu, Zhixian Zhou, Vincent Meunier

1167Fast and Patternable Synthesis of Graphene and Transition Metal Dichalcogenide Materials Via Laser Annealing on Insulating Substrates

Henry Medina, Yu-Ze Chen, Chih-Chi Huang, Yu-Lun Chueh

1168(Invited) Interface and Dielectric Engineering for High-Performance Top-Gated MoS<sub>2</sub> Field Effect Transistors

Xuming Zou, Lei Liao

1169(Invited) Ultrashort Channel Length Black Phosphorus Field-Effect Transistors

Jinshui Miao, Suoming Zhang, Le Cai, Chuan Wang

1170(Invited) Probing Metal-Graphene Interactions with Raman Spectroscopy

Guangjun Cheng, Irene Calizo, Angela R. Hight Walker

1171(Invited) A Metal Oxide Antifuse-Diode Device

Yue Kuo

1172(Invited) Transistors without Semiconductors By Functionalized Boron Nitride Nanotubes

Yoke Khin Yap

1173(Invited) Oxide Interface Is the Device: Properties of Two-Dimensional Electron Gas

Tao Wu

[1174Growth of InGaAsP Alloy Nanowires for Emission from Visible to Mid-Infrared Wavelengths](#)

[Seyed Ebrahim Hashemi Amiri, Sunay Turkdogan, Zhicheng Liu, Fan Fan, Cun-Zheng Ning](#)

[1175\(Invited\) Triboelectric Nanogenerators for Self-Powering Small Electronics](#)

[Sang-Woo Kim](#)

[1176\(Invited\) Low Dimensional Materials Used for Solar Cells](#)

[Meicheng Li](#)

[1177Micropatterned P\(VDF-TrFE\) Film Based Piezoelectric Nanogenerators for Highly Sensitive Self-Powered Pressure Sensing System](#)

[Hong-Joon Yoon, Ju-Hyuck Lee, Sang-Woo Kim](#)

[1178\(Invited\) Electrochemical Nanowire Devices for Energy Storage](#)

[Liqiang Mai, Liang Zhou, Xiaocong Tian, Ruimin Sun, Mengyu Yan](#)

[1179\(Invited\) Imprinted Functional Nano-Structures for Highly Efficient Photonic Devices](#)

[Heon Lee](#)

[1180\(Invited\) Mesoporous Anatase Single Crystals for Efficient Co<sup>\(2+/3+\)</sup> Based Dye-Sensitized Solar Cell](#)

[Jung Ho Kim](#)

[1181A Controllable and Widely Applicable Electrochemical Anodization Process to Fabricate Porous Anodic Aluminum Oxide Membrane](#)

[Yuanjing Lin, Qingfeng Lin, Xue Liu, Yuan Gao, Zhiyong Fan](#)

1182 [Lift-Off Patterning of Nano-Crystalline Quantum Dot Films](#)

[Ala Sabeeh, Yash Thakur, Jerzy Ruzyllo](#)

## **H02-Solid-State Electronics and Photonics in Biology and Medicine 2**

Electronics and Photonics/Sensor

1183 [\(Invited\) The Next Generation Biochip](#)

[Yuh-Shyong Yang](#)

1184 [\(Invited\) Development of Fibronectin-Modified Gold Egfet Sensor for the Detection of S. Epidermidis Biofilm and Staphylococcal 16S rRNA](#)

[Chao-Sung Lai](#)

1185 [\(Invited\) Electrical Sensing with a Tube-in-a-Tube Semiconductor](#)

[YuHuang Wang, Allen Ng, Yanmei Piao, Chien-Fu Chen, Hyejin Kwon, Cheng Lee](#)

1186 [AlGaIn/GaN High Electron Mobility Transistors for Cardiovascular Disease \(CVD\) Marker Detection](#)

[Chia-Ho Chu, Indu Sarangadharan, Abiral Regmi, Yi-Ting Chen, Yu-Lin Wang](#)

1187 [\(Invited\) Single Cell Detection Using Magnetic Zigzag Nanowire Biosensor](#)

[Hao-Ting Huang, Zung-Hang Wei](#)

1188 [Simulation of the pH Sensing Capability of an Open-Gate GaN-Based Transistor](#)

[Erin Patrick, Mohua Choudhury, Mark E Law](#)

1189 [Aptamer Immobilized Field Effect Transistor for Early Diagnostic of Human Immunodeficiency Virus Type 1 \(HIV-1\)](#)

[Chia-Ho Chu, Indu Sarangadharan, Abiral Regmi, Yi-Ting Chen, Yu-Lin Wang](#)



[1190\(Invited\) Triboelectric Nanogenerators Harvesting \(Bio\)Mechanical Energy for Self-Powered Systems](#)

[Sihong Wang](#)

[1191\(Invited\) Piezotronics in 1D/2D Nanomaterials for Active and Adaptive Nano-Electronics/Optoelectronics](#)

[Wen Zhuo Wu](#)

[1192\(Invited\) A Spontaneously Generated Electrical Charge of an Aqueous Droplet by Pipetting and Its Use of a Self-Powered Sensor](#)

[Dongwhi Choi, Dong Sung Kim](#)

[1193Development of Fiber-Based Devices as Energy Harvesters and Self-Powered Sensors](#)

[Ting-Wei Chang, Yi-Yun Ke, Zong-Hong Lin](#)

[1194\(Invited\) New Electrochemiluminescent Materials for Bioanalysis](#)

[Guobao Xu, Wenjing Qi, Ling Zhang, Xiaoqing Liu, Lianzhe Hu](#)

[1195Cultivation of Rat Nerve Cells on Nanoimprinted Microstructures on Polydimethylsiloxane Sheets](#)

[Eiki Koshinuma, Hirotaka Maenosono, Daisuke Endo, Yasuhiro Nishioka](#)

[1196Nanobionic Architectures of Photosystem I on Ĩ-System Modified Graphene Electrodes](#)

[Sven Christian Feifel, Kai Stieger, Heiko Lokstein, Fred Lisdat](#)

[1197Investigation of the Dynamic Relaxation Behavior of Biomolecules Immobilized on Metal Electrode in Time Domain](#)

[Chen-Pin Hsu, Yu-Lin Wang](#)

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[1464 Direct Membrane Deposition with TiO<sub>2</sub> Reinforced Nafion<sup>®</sup> for Medium Temperature  \$\square\square\$  Polymer Electrolyte Membrane Fuel Cells](#)

[Niklas Wehkamp, Matthias Breitwieser, Matthias Klingele, Roland Zengerle, Simon Thiele](#)

[1465 Electrospun Nafion/PVDF Blended Nanofiber Membranes for Regenerative H<sub>2</sub>/Br<sub>2</sub> fuel Cells](#)

[Jun Woo Park, Ryszard Wycisk, Guangyu Lin, Trung Van Nguyen, Peter N Pintauro](#)

[1466 Random and Triblock Copolymers with Phosphonium Cations for Alkaline Fuel Cells](#)

[Ye Liu, WenXu Zhang, Bingzi Zhang, Yuan Yang, Bryan E Coughlin, Yushan Yan, Matthew W Liberatore, Andrew M Herring](#)

[1467 Study of Polyphenylene Oxide Membranes Containing Long and Short Alkyl Side Chains](#)

[Alina Amel, Yair Ein Eli](#)

[1468 Membranes from Blended Ionomer/PVDF Nanofibers: I. PFSA/PVDF and PFIA/PVDF Fiber Spinning and Membrane Fabrication](#)

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[1469 Dual Nafion/Polyaniline Nanofibers Architecture for Applications in Fuel Cells Electrodes](#)

[Silas Simotwo, Vibha Kalra](#)

1470 [Graft-Type Anion-Conducting Electrolyte Membranes Having Poly\(2-imidazoliumylstyrene\) Prepared By Radiation-Induced Grafting for Hydrazine Hydrate Fuel Cells](#)

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1471 [Catalyst-Layer Ionomer Imaging of Fuel Cells](#)

[Laure Guetaz, Miguel Lopez-Haro, Sylvie Escribano, Arnaud Morin, Gerard Gebel, David A. Cullen, Karren L. More, Rod L Borup](#)

1472 [Investigation of Solvent and Carbon Particles Behavior during Drying Process from Catalyst Ink to Catalyst Layer](#)

[Takahiro Suzuki, Masamichi Kobayashi, Hiroki Tanaka, Masanori Hayase, Shohji Tsushima](#)

1473 [In-Situ Analysis of Water Distribution within PEFC Catalyst Layer By Soft X-Ray Imaging](#)

[Takashi Sasabe, Ting-Chu Jao, Suguru Uemura, Shuichiro Hirai](#)

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1475 [In Situ Humidity Measurements at the CL Surface By MEMS-Based Sensors](#)

[Jun Tsujikawa, Ryotaro Minami, Takuto Araki](#)

1476 [Simultaneous Measurements of Liquid Water Distributions and Catalyst Layer Surface Temperature inside Operating PEMFC](#)

[Kentaro Watanabe, Jun Tsujikawa, Takuto Araki](#)

[1477Autostack - CORE - Industry Led European Consortium to Develop Next Generation Automotive Stack Hardware](#)

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[1479Development of a Pure Oxygen Fuel Cell System for an Autonomous Underwater Vehicle with Focus on Fuel Starvation due to Inert Gas Accumulation on the Anode](#)

[Manuel Hitscherich, Carsten Cremers, Detlef Stolten, Karsten Pinkwart, Jens Tübke](#)

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[Thomas I Valdez, Keith J. Billings](#)

[1481A CFD Simulation for an Air Breathing PEMFC for Power Source Portable Applications](#)

[Elena Carcadea, Mihai Varlam, Ioan Stefanescu, Derek Ingham, Adriana Marinoiu, Laurentiu Patularu, Mircea Raceanu, Dorin Schitea](#)

[1482Experimental Results with Fuel Cell Start-up and Shut-down. Impact of Type of Carbon for Cathode Catalyst Support](#)

[Olivier Lottin, Jérôme Dillet, Gael Maranzana, Sofyane Abbou, Sophie Didierjean, Adrien Lamibrac, Rod L Borup, Rangachary Mukundan, Dusan Spornjak](#)

[1483Development of Accelerated Stress Tests for Polymer Electrolyte Membrane Fuel Cells](#)

[Rangachary Mukundan, David A. Langlois, Dennis Torraco, Roger Lujan, Karen Rau, Dusan Spornjak, Andrew M Baker, Rod L Borup](#)

[1484Electrochemical Impedance Spectroscopy as a Diagnostic Tool for High-Temperature PEM Fuel Cells](#)

[Florian Mack, Ruben Laukenmann, Samuele Galbiati, Jochen A. Kerres, Roswitha Zeis](#)

1485 [The Importance of Diffusion Mechanisms in High Temperature Polymer Electrolyte Fuel Cells](#)

[Qing Cao, Steven B. Beale, Uwe Reimer, Dieter Froning, Werner Lehnert](#)

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[Petru Andrei, Mohit Mehta](#)

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[Daniel M. Peppin, Mike Yandrasits, Austin S Fochs](#)

1488 [Current Density Distribution in the Lateral Direction of Conventional and Interdigitated Flow Field](#)

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1489 [Method to Resolve Transport Distance for Oxygen Diffusion in the Land-Channel Geometry of a PEMFC](#)

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1490 [Effect of Hydrophilic Treatment of Cathode Channel on Liquid Water Transport through Gas Diffusion Layer and Performance of PEFC](#)

[Kosuke Nishida, Yudai Kono, Takuya Nakamura, Ryo Giga](#)

1491 [Membrane Durability in Heavy Duty Fuel Cells for Transit Bus Applications](#)

[Erik Kjeang, Ka Hung Wong, Natalia Macauley, Ramin M.H. Khorasany, Michael Lauritzen, Mark Watson, Shanna Knights](#)

1492 [Modeling the Effect of Pt Precipitation on PEM Degradation](#)



Sergei Burlatsky, Vadim Atrazhev

1493 Impact of Membrane Properties and Membrane Degradation on Cathode Catalyst Layer Degradation

Monica Dutta, Lida Ghassemzadeh, Mike Lauritzen, David Harvey, Silvia Wessel, Alan P Young, Shanna Knights

1494 Probing the Morphological Changes of in-Situ Degraded Membranes in Polymer Electrolyte Fuel Cells

Senthil velan Venkatesan, Steven Holdcroft, Erik Kjeang

1495 Cerium Migration during PEM Fuel Cell Assembly and Operation

Andrew M Baker, Dennis Torraco, Elizabeth J. Judge, Dusan Spornjak, Rangachary Mukundan, Rod L Borup, Suresh G Advani, Ajay K Prasad

1496 Investigation of Wet/Dry Cycling of Polymer Electrolyte Membrane By Full-Cell Scale Numerical Simulation with Transient Load Profiles

Tsutomu Takayama, Hideto Yoshimura, Haruki Motegi, Ryo Takayama, Natsuki Kariya, Masakazu Yoneda

1497 Effect of Hygrothermal Ageing on PFSA Ionomers' Structure/Property Relationship

Shouwen Shi, Thomas J. Dursch, Rod L Borup, Adam Z Weber, Ahmet Kusoglu

1498 Assessment of Nanofiber Electrode MEA Durability By Analytical Electron Microscopy

Karren L. More, Matthew Brodt, Ryszard Wycisk, Peter N Pintauro

1499 Effects of Carbon Structures of Supported Pt Catalysts on the Performance of Polymer Electrolyte Fuel Cells

Young-Chul Park, Haruki Tokiwa, Katsuyoshi Kakinuma, Masahiro Watanabe, Makoto Uchida

[1500 Accelerated Stress Tests on Fuel Cell Cathode Catalysts: A Material Balance Approach Combining Modeling and Experiment](#)

[Cynthia A. Rice, Patrick Urchaga, Jingwei Hu, Thomas Kadyk, Michael Eikerling](#)

[1501 Online Mass Spectrometric Monitoring of Carbon Corrosion in PEMFC Electrodes Subjected to Accelerated Stress Testing](#)

[Jan O Meier, Martin Joos, Carsten Cremers, Karsten Pinkwart, Jens Tübke](#)

[1502 Carbon Corrosion in PEM Fuel Cells during Drive Cycle Operation](#)

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[1503 Mechanism and Kinetics of Carbon Corrosion in Polymer Electrolyte Fuel Cells during Drive Cycles](#)

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[1504 Effects of Repeated Feed-Gas Exchange Processes on Degradation Processes of Pt-Based PEFC Cathode Catalysts Studied by In-situ XAFS, STEM-EDS and Electrochemical Methods](#)

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[1506 Effects of Cobalt Cation on Low Pt-loaded PEM Fuel Cell Performance](#)

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[1507 Effect of Caprolactam and Sulfate System-Derived Contaminants on Catalyst Activity and PEMFC Performanc](#)

Huyen N Dinh, Guido Bender, Heli Wang, Clay S. Macomber, Leah McGovern

1508Long Term Effects of Airborne Contaminants in PEMFC Cathode

Yunfeng Zhai, Junjie Ge, Jean St-Pierre

1509Water Management in an Alkaline-Exchange-Membrane Fuel Cell

Huai-Suen Shiau, Iryna V Zenyuk, Adam Z Weber

1510Impact of Organic Cation Adsorption on the Hydrogen Oxidation Reaction of Pt in Alkaline Fuel Cells

Hoon T Chung, Ulises Martinez, Jerzy Chlistunoff, Yu Seung Kim, Yoong-Kee Choe, Ivana Matanovic

1511The Effect of Carbonate and pH on Hydrogen Oxidation and Oxygen Reduction on Pt-Based Electrocatalysts in Alkaline Media

Samuel St. John, Robert W. Atkinson, Asa Logan Roy, Raymond R Unocic, Alexander B. Papandrew, Thomas A. Zawodzinski

1512Effective Nickel and Ruthenium Modified Palladium Anode Catalysts for Ethylene Glycol Oxidation in Alkaline Medium

Rodrigo Garcia Da Silva, Adalgisa Rodrigues De Andrade, Karine Servat, Claudia Morais, Teko W. Napporn, Kouakou Boniface Kokoh

1513Current State of the Art in Water Electrolysis Performance Based on Anion Exchange Membranes

Katherine E Ayers, Javier Parrondo, Chris Capuano, Morgan George, Vijay K Ramani, Cy Fujimoto

1514In-Operando Neutron Radiography Studies of Polymer Electrolyte Membrane Water Electrolyzers

[Michael Andreas Hoeh, Tobias Arlt, Nikolay Kardjilov, Ingo Manke, John Banhart, David L Fritz, Jannik Ehlert, Wiebke Lüke, Werner Lehnert](#)

1515 [Inhibiting the Swelling Behavior of Nafion Membranes for PEM Water Electrolysis](#)

[Marcelo Carmo, Dirk Henkensmeier, Wiebke Lüke, Detlef Stolten](#)

1516 [Studies of MEA Durability in Proton Exchange Membrane Water Electrolysis](#)

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1517 [Investigation of Mass Transport Losses in Polymer Electrolyte Electrolysis Cells](#)

[Michel Suermann, Thomas J. Schmidt, Felix N Büchi](#)

1518 [Engineering Modeling of PEM Water Electrolysis](#)

[Richard Hanke-Rauschenbach, Boris Bensmann](#)

1519 [In-Situ Analysis of Gas Crossover in PEM Water Electrolysis - the Effect of Membrane Variation](#)

[Wiebke Lüke, Marcelo Carmo, Maximilian Schalenbach, Detlef Stolten](#)

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[Kevin Harrison, Owen Smith, Michael Peters, Danny Terlip](#)

1521 [Unconventional Water Splitting Platforms](#)

[Mohammad H. Hashemi, Miguel A. Modestino, Demetri Psaltis](#)

1522 [Internal Resistance Reduction of a Membrane Electrolyzer for Electrohydrogenation of Toluene As Hydrogen Carrier Synthesis](#)

[Shigenori Mitsushima, Yasutomo Takakuwa, Yuki Sawaguchi, Kensaku Nagasawa, Yuji Kohno, Koichi Matsuzawa, Zaenal Awaludin, Akihiro Kato, Yoshinori Nishiki](#)

1523 [Advancements in Anion Exchange Membrane Cations](#)

[Matthew R Sturgeon, Hai Long, A M Park, Bryan S Pivovar](#)

1524 [Development of Alkaline Fuel Cells Using Hydroxide-Ion Conductive Layered Double Hydroxides](#)

[Kiyoharu Tadanaga, Kohei Igarashi, Takashi Kubota, Akira Miura, Mikio Higuchi](#)

1525 [Proton and Metal Cage-Based Anion-Conductive Fluoropolymers for AMFCs](#)

[Shaoyi Xu, Rong Jiang, Yong Gao](#)

1526 [New Polymer Structures for Anion Exchange Membranes](#)

[Liang Zhu, Jing Pan, Michael Hickner](#)

1527 [Comparative and Comprehensive Studies of Tolerance to Airborne Contaminants of PEMFC with Pt and Non-Pt Cathodes Using Segmented Cell Approach and Spatial EIS](#)

[Tatyana V. Reshetenko, Alexey Serov, Sarah Stariha, Ivana Matanovic, Kateryna Artyushkova, Jean St-Pierre, Plamen Atanassov](#)

1528 [Prediction Method for PEMFC Cathode Kinetic Losses Induced By Contaminants](#)

[Jean St-Pierre, Yunfeng Zhai, Junjie Ge](#)

1529 [Pt Electrocatalyst Supported on a 3D-Nanoporous Carbon Shows a High Performance in a High-Temperature Polymer Electrolyte Fuel Cell](#)

[Naotoshi Nakashima, Zehui Yang, Isamu Moriguchi](#)

1530 [Development of a Durable Cathode Material for PEFC By Encapsulating of Pt Particles into Carbon Mesopores](#)

[Akari Hayashi, Yasuto Minamida, Masahiko Kitamura, Zhiyun Noda, Kazunari Sasaki](#)

1531 [Carbonaceous Nanowire Supports for Polymer Electrolyte Membrane Fuel Cells](#)

[Fernando H Garzon, Mahlon S. Wilson, Dustin Banham, Siyu Ye, Karren L. More](#)

1532 [On the Origin of Enhanced ORR Activity of RuO<sub>2</sub> Nanosheet Modified Pt Catalysts: An Impedance Spectroscopy Approach](#)

[Wataru Sugimoto, Christophe Chauvin, Daisuke Takimoto, Masayuki Itagaki](#)

1533 [Conductivity Limits of Extrinsicly Doped SnO<sub>2</sub> Supports](#)

[Matthew Worsdale, Annett Rabis, Emiliana Fabbri, Thomas J. Schmidt, Denis Kramer](#)

1534 [Indium Tin Oxide as Catalyst Support for PEM Fuel Cell: RDE and MEA Performance](#)

[Guanxiong Wang, Ellazar Niangar, Kan Huang, Dianne Atienza, Amod Kumar, Nilesh Dale, Kenzo Oshihara, Vijay K Ramani](#)

1535 [SnO<sub>2</sub> Aerogels: Towards Performant and Stable PEFC Catalyst Supports](#)

[Guillaume Ozouf, Gwenn Cognard, Frederic Maillard, Laure Guetaz, Marie Heitzmann, Christian Beauger](#)

1536 [Understanding Liquid-Water Management in PEFCs Using X-Ray Computed Tomography and Modeling](#)

[Iryna V Zenyuk, Adam Z Weber](#)

1537 [Impact of Water Management on Local Potential Evolutions during PEM Fuel Cell Operation with Dead-Ended Anode](#)

[Sofyane Abbou, Jérôme Dillet, Gael Maranzana, Sophie Didierjean, Olivier Lottin](#)

1538 [Characterization of Liquid Water Invasion in Gdls Using X-Ray Tomographic Microscopy](#)

[Adrien Lamibrac, Jörg Roth, Jens Eller, Federica Marone, Felix N Büchi](#)

1539 [Influence of Thermal Conductivity and 2-D Temperature Distribution of Liquid Water Saturation](#)

[Jacob M LaManna, Daniel S Hussey, David L Jacobson, Matthew M. Mench](#)

1540 [Water Management in PEM Fuel Cells with Non-Precious Metal Catalyst Electrodes](#)

[Dusan Spernjak, Hoon T Chung, Rangachary Mukundan, Rod L Borup, Daniel S Hussey, David L Jacobson, Gang Wu, Piotr Zelenay](#)

1541 [3D Printed Flow Channel Fixture for Visualization of Water Condensation in PEFC By X-Ray Computed Tomography](#)

[Robin White, Mohamed El Hannach, Oliver Luo, Frank Orfino, Monica Dutta, Erik Kjeang](#)

1542 [Electrocatalysis of Direct Methanol and Ethanol Oxidation in Polymer Electrolyte Fuel Cells](#)

[Antonino S. Aricò, David Sebastian, Sabrina Campagna Zignani, Vincenzo Baglio](#)

1543 [Nanostructured Transition Metal Nitride \(MN\) As a Potential Support for Pt\(Ru\) Anode Electro-Catalyst for Direct Methanol Fuel Cells \(DMFCs\)](#)

[Prasad Prakash Patel, Moni Kanchan Datta, Prashanth Jampani, Prashant N Kumta](#)

1544 [Development and Characterization of a Dithionite / Air Fuel Cell](#)

[Jens Noack, Jens Tübke, Karsten Pinkwart](#)

1545 [Electrochemical Oxidation of Borohydride for Direct Fuel Cells](#)

[Christoph Grimmer, Maximilian Grandi, Robert Zacharias, Theo Friedrich, Viktor Hacker](#)

[1546Influence of Structural Effects on Platinum Electrodes in the Preferential Adsorption of CO and Methanol in Acid Media](#)

[Marcia Elizangela Paulino, Flavio Colmati, Ernesto Rafael Gonzalez](#)

[1547GDL and MPL Characterization and Their Relevance to Fuel Cell Modelling](#)

[Jan Haußmann, Florian Wilhelm, Simon Enz, Merle Klages, Anahid Pournemat, Christian Bergbreiter, Joseph Simon Clark, Keerthi Duraisamy, Katrin Seidenberger, Henning Markötter, Ingo Manke, Joachim Scholta](#)

[1548Novel Gas Diffusion Layers with Patterned Wettability](#)

[Antoni Forner-Cuenca, Johannes Biesdorf, Lorenz Gubler, Thomas J. Schmidt, Pierre Boillat](#)

[1549Influence of the Gas Diffusion Layer Compression on the Oxygen Mass Transport in PEM Fuel Cells](#)

[Christoph Simon, Frédéric Hasché, David Müller, Hubert A. Gasteiger](#)

[1550Impact of Cell Compression on Resistance, Mass Transport, and Ultimate PEMFC Performance](#)

[Megan B. Sassin, Yannick Garsany, Benjamin D. Gould, Karen Swider-Lyons](#)

[1551Influence of Hydrophilic and Hydrophobic Triple MPL Coated GDL on the Oxygen Transport Resistance in a PEFC under High Humidity Conditions](#)

[Tatsumi Kitahara, Hironori Nakajima, Kosuke Okamura](#)

[1552Effect of Pore Volume of Hydrophilic Microporous Layer \(MPL\) on PEFC Performance](#)

[Toshihiro Tanuma, Masako Kawamoto](#)

[1553In-Situ Measurement of Oxygen Partial Pressure on the Surface of a Cathode GDL with Automotive Compatible Operating Conditions](#)



Shinichi Hirano, Jixin Chen, Michael Potocki, George Saloka

1554 Influence of MPL Structure Modification on Fuel Cell Oxygen Transport Resistance

Zijie Lu, James Waldecker, Mickey Tam, Max Cimenti

1555 Determination of Permeability of the Gas Diffusion Layer of Proton Exchange Membrane Fuel Cells (PEMFCs)

Sadegh Hasanpour, Mina Hoorfar, Andre Phillion

1556 Characterization Studies of a New MEA Structure for Polymer Electrolyte Fuel Cells

Jaehyung Park, Ugur Pasaogullari, Leonard J. Bonville

1557 Oxide-Supported PEFC Electrocatalysts

Kazunari Sasaki, Yohei Nagamatsu, Dai Horiguchi, Masahiro Iwami, Makito Okumura, Zhiyun Noda, Takeshi Daio, Stephen Matthew Lyth, Akari Hayashi

1558 Characterization of Pt Catalysts Supported on Ta-SnO<sub>2</sub> with Fused Aggregated Network Structure

Katsuyoshi Kakinuma, Yuichi Senoo, Koji Taniguchi, Masahiro Watanabe, Makoto Uchida

1559 Effect of Added Graphitized Carbon Black on Both Performance and Durability of Pt/Nb-SnO<sub>2</sub> Cathodes for PEFCs

Makoto Uchida, Yuji Chino, Koji Taniguchi, Yuichi Senoo, Katsuyoshi Kakinuma, Masanori Hara, Masahiro Watanabe

1560 Mitigation of Cathode Catalyst Degradation during Air/Air Startup Cycling Via the Atmospheric Resistive Switching Mechanism of a Hydrogen Anode with a Pt Catalyst Supported on Ta-Doped TiO<sub>2</sub>

Haruhiko Shintani, Yuya Kojima, Katsuyoshi Kakinuma, Masahiro Watanabe, Makoto Uchida

[1561 Corrosion Resistant Electrospun Niobium Carbide Nanotube Supports for PEMFC Cathodes](#)

[Yannick Nabil-Moreau, Sara Cavaliere, Ian Harkness, Graham Hards, Jonathan Sharman, Deborah Jacqueline Jones, Jacques Rozière](#)

[1562 Ta-Based Catalyst Support for Proton Exchange Membrane Fuel Cell Applications](#)

[Anusha D. Abhayawardhana, Viola Birss](#)

[1563 Electrospun Ni nanofibres as Pt supports for PEMFC electrodes](#)

[Giorgio Ercolano, Sara Cavaliere, Deborah Jacqueline Jones, Jacques Rozière](#)

[1564 Fabrication and Performance of Membrane Electrode Assembly Using a Hydrophilic Pt/\[TaOPO<sub>4</sub>/VC\] Electrocatalyst](#)

[Yannick Garsany, Megan B. Sassin, Benjamin D. Gould, Karen Swider-Lyons](#)

## **J01-Physics and Chemistry of Luminescent Materials**

Luminescence and Display Materials

[1565 RE-Doped Ternary Sulfides A<sub>2</sub>LnS<sub>2</sub> \(A = Rb, K, Na; Ln = La, Gd, Lu, Y\) - a New Phosphor Family](#)

[Vitezslav Jary, Lubomir Havlak, Jan Barta, Eva Mihokova, Maksym Buryi, Martin Rejman, Martin Nikl](#)

[1566 Red Emitting Ca<sub>2</sub>SiO<sub>4</sub>:Eu<sup>2+</sup> Phosphors for White Light Emitting Diodes](#)

[Yasushi Sato, Hiroki Kuwahara, Hideki Kato, Makoto Kobayashi, Masato Kakihana](#)

[1567 Design and Luminescent Properties of Ce<sup>3+</sup>-Activated Oxide Phosphor](#)

[Sun Woog Kim, Takuya Hasegawa, Masaru Muto, Yukari Kawano, Kazuyoshi Uematsu, Kenji Toda, Hiromitsu Takaba, Tadashi Ishigaki, Mineo Sato](#)

[1568The Pursuit of Novel Phosphor Hosts for the Next Generation of Solid State Lighting](#)

[Jakoah Brgoch](#)

[1569Recent Progress in Blue Phosphors: From Non-Thermal Quenching to Highly Efficient Phosphor](#)

[Won Bin Im, Yoon Hwa Kim](#)

[1570Luminescent Materials Informatics Based on Confirmatory Factor Analysis](#)

[Kee-Sun Sohn, Satendra Singh, Woon Bae Park, Minseuk Kim](#)

[1571Synthesis of Phosphor Materials By New Low-Temperature Solid-State Reaction Method Showing Abnormally High Diffusion](#)

[Kenji Toda, Takuya Hasegawa, Tatsuro Kaneko, Ayano Toda, Sun Woog Kim, Kazuyoshi Uematsu, Tadashi Ishigaki, Junko Koide, Masako Toda, Yoshiaki Kudo, Mineo Sato](#)

[1572Thermal & Humidity Stability of Mn<sup>4+</sup> Doped Complex Fluoride Phosphors](#)

[Srinivas P Sista, James Murphy, Florencio Garcia-Santamaria, Anant A Setlur](#)

[1573Engineering of Rare-Earth-Metal Oxysulfate \(RE<sub>2</sub>O<sub>2</sub>SO<sub>4</sub>\) Hollow Nanospheres for Upconversion](#)

[Gen Chen, Litao Yan, Hongmei Luo](#)

[1574Cooperative and White Light Emission from Yb- and Yb,Er-Doped Y<sub>2</sub>Si<sub>2</sub>O<sub>7</sub> Nanopowders](#)

[Baldassare Di Bartolo, Murat Erdem, John Collins, Bryan Sitt, Joseph Ligouri](#)

[1575Influence of the Starting Solution on the Growth and Morphology of Rare Earth-Doped Yttrium Oxide Spherical Particles By the Urea Precipitation Method](#)

Jack Silver, Terry Ireland, George Robert Fern

1576Controlling Particle Size and Luminescence in Mn<sup>4+</sup> Activated K<sub>2</sub>SiF<sub>6</sub>

Prasanth Kumar Nammalwar, Digamber G Porob, Ravi Hanumantha, Anant A Setlur, James Murphy

1577Improvement of Luminescence Properties and Particle Growth of AlN Phosphors By Si-Doping

Yujin Cho, Benjamin Dierre, Naoki Fukata, Naoto Hirosaki, Kohsei Takahashi, Takashi Takeda, Takashi Sekiguchi

1578Tuning the Luminescence Properties of Organometal Halide Perovskites for Light-Emitting Applications

Haizheng Zhong

1579Luminescence Quenching of [M]NbO<sub>4</sub>:Pr<sup>3+</sup> [M=La, Lu, Gd] Under UV Excitation

John Collins, Elena Labovitis, Marco Bettinelli, Asa Sutton, Katrina Dauphinais

1580Inverse Nephelauxetic Effect in the Pressure Dependence of R-Line Energy of Ruby

Kazuyoshi Ogasawara, Mega Novita

1581Assessing Spatial Resolution of Cathodo-Luminescence Imaging and Spectroscopy at the Nanoscale for Inorganic Phosphor Powders

George Robert Fern, Paul Gregory Harris, Terry Ireland, Jack Silver

1582Concentration Dependency of Eu<sup>2+</sup> Doped La<sub>4-x</sub>Ca<sub>x</sub>Si<sub>12</sub>O<sub>3+x</sub>N<sub>18-x</sub> Phosphors and the Energy Levels of the Rare-Earth Ions

Otmar Melvin ten Kate, Rong-Jun Xie, Shiro Funahashi, Takashi Takeda, Naoto Hirosaki

1583Cathodoluminescence Studies of Phosphor Particles

[Paul Gregory Harris, Daniel den Engelsen, Jack Silver](#)

1584 [Electronic Structures and Optical Properties of Aluminum in Bulk, Thin Film and Nanoparticulate Forms](#)

[Kailash C. Mishra, Alan Piquette, Peter C. Schmidt, Keith H Johnson](#)

1585 [Inorganic-Organic Hybrid Phosphor Layer for Si Solar Cells](#)

[Hiroshi Okura, Ryosuke Sakata, Naoki Doi, Tadashi Ishigaki, Ryohei Komiyama, Hidetoshi Miyashita, Sang-Seok Lee, Koutoku Ohmi](#)

1586 [Upconversion Luminescence of HfO<sub>2</sub> Phosphors Embedded into Polyester FILMS](#)

[S. Carmona, L. Mariscal B., J. M. Hernández, Gilberto Alarcón-Flores, H. Murrieta, Ciro Falcony](#)

1587 [Luminescent Properties of Al<sub>2</sub>O<sub>3</sub>:Tb<sup>3+</sup> Powders Embedded in Polyethylene Terephthalate Films](#)

[L. Mariscal B., Salvador Carmona-Tellez, Ciro Falcony, Héctor Murrieta Sánchez](#)

1588 [3d and 4f Ions in Solids: Description and Understanding of Optical Properties](#)

[Mikhail G. Brik, Alok M Srivastava, Sam Jospeh Camardello](#)

1589 [Thermal Properties of Mn<sup>4+</sup>-Doped Complex Fluoride Phosphors](#)

[Anant A Setlur, James Murphy, Florencio Garcia-Santamaria, Srinivas Sista](#)

1590 [Thermal Degradation of Nitride Phosphors](#)

[Rong-Jun Xie, Chunyun Wang, Takashi Takeda, Yujin Cho, Takayuki Suehiro, Naoto Hirosaki](#)

1591 [The Exploration of Rare Earths Based Luminescence for Detection and Sensing in Radiation Security and Enhanced Oil Recovery](#)

[Wei Chen, Lun Ma, Sunil Sahi](#)

1592 [Amber Full Conversion Ceramics for LED Applications](#)

[Yi Zheng, Jason Montaner, Madis Raukas, Chris Tarry, Juliane Kechele, Sonja Tragl, Johanna Strube-Knyrim, Dominik Eisert, Klemens Ferstl, Britta Goeoetz](#)

1593 [Chromium Doped Persistent Phosphors for Medical Imaging](#)

[Dirk Poelman, Olivier Q De Clercq, Philippe F Smet, Kevin Braeckmans](#)

1594 [Zncds:Cu, Al, Cl: A Near Infra-Red Emissive Phosphor for Marking, Coding, and Identification](#)

[Paul Jonathan Marsh, Jack Silver, George Robert Fern](#)

1595 [Optical and Thermal Management of Phosphor-Converted LEDs](#)

[Madis Raukas, John Kelso, Alan Lenef, Alexander Linkov, Maxim Tchoul](#)

## **L01-Physical and Analytical Electrochemistry, Electrocatalysis, and Photoelectrochemistry General Session**

Physical and Analytical Electrochemistry

1596 [Real Time Monitoring of Electrostatic Potentials in the Vicinity of Electrodes Delivering Current Pulses Used in Neural Stimulation](#)

[Zhang Feng, David Friel, Daniel Scherson](#)

1597 [A Versatile Bioanode with Improved Current Density and the Coulombic Efficiency through a Cascade Reaction](#)

[Muhammad Nadeem Zafar, Iqra Aslam, Shahzad Murtaza, Roland Ludwig, Lo Gorton](#)

1598 [Direct Electrochemical Conversion of Nitrogen to Ammonia from Air and Water on Nitride Electro-Catalysts at Ambient Conditions](#)

Younes Abghoui, Egill Skulason

1599 Electrochemical and Catalytic Properties of Liver Microsomes Adsorbed to Magnetic Nanoparticles

Rajasekhara Nerimetla, Sadagopan Krishnan

1600 Electron Transport in Magnetic Nanomaterials for Sensing and Catalytic Applications

Sadagopan Krishnan, Gayan Premaratne, Trey Sunday, Ryan Matlock, Charuksha Walgama

1601 Bimetallic Iron and Nickel Nanoparticles for the Electrocatalytic Oxidation of Methanol and Ethanol for Fuel Cells

Stephanie L Candelaria, Nicholas Bedford, Lauren F Greenlee

1602 Electrochemical Kinetic Study on the a Yeast-Catalyzed Activity in Microbial Half Cell

Yang Bae Jeon, Fusheng Tang, Jin Wook Lee

1603 The Effect of Intra Vs. Intermolecular Proton Transfer on the Oxidation of Phenylenediamine-Based Ureas

Diane K. Smith, Ran He

1604 Effect of High Energy Carbon Beam Irradiation on Carbon Nanotubes Modified Glassy Carbon and Its Application in Sensing of Deoxyguanosine

Rajendra N Goyal, Rosy Sharma, Pankaj Gupta

1605 Mediator-Less Catalytic Oxidation of NADH Using Oxygen Plasma Treated Screen Printed Carbon Electrodes

Mutyala Sankararao, Jayaraman Mathiyarasu

[1606 FEM Modelling of Diffusional Electrochemical Impedance Spectroscopy at a Channel Electrode](#)

[Thomas Holm, Mats Ingdal, Frode Seland, David A. Harrington](#)

[1607 Reversibility of Ferri-Ferrocyanide Redox during in-Situ Soft X-Ray Spectroscopy](#)

[Marcel Risch, Kelsey A. Stoerzinger, Tom Z. Regier, Derek Peak, Sayed Nagy, Yang Shao-Horn](#)

[1608 Impedance of Mediated Electrochemical Processes: Fenton Reaction](#)

[Piotr Polczynski, Rafal Robert Jurczakowski](#)

[1609 Application of the Wedge Scheme to Explain Quinone-Phenol Electrochemical Systems](#)

[Patrick Andrew Staley, Diane K. Smith](#)

[1610 Thin TiO<sub>2</sub> Overlayers As Catalysts for Oxygen Reduction and Evolution Reactions](#)

[Hadi Tavassol, Sossina M Haile](#)

[1611 Biomimetic O<sub>2</sub> Reduction at MN<sub>4</sub> Catalysts Adsorbed on Carbon Nanotubes and on Pyridine Grafted Carbon Nanotubes](#)

[Jose H Zagal, Federico Tasca, Marco Viera, Cesar Zuniga, Ricardo Alberto Venegas, Francisco Javier Recio](#)

[1612 Novel Methanol-Tolerant Metal Selenide Based Chalcogenide Electrocatalysts for Oxygen Reduction in Alkaline Solution](#)

[Jahangir Masud, Abdurazag Swesi, Manashi Nath](#)

[1613 Nickel Selenide As High-Efficiency Catalyst for Oxygen Evolution Reaction](#)

[Abdurazag Swesi, Jahangir Masud, Manashi Nath](#)



[1614 Combined Experimental and Computational Approach for Rational Design of Bio-Nano Interfaces](#)

[Sofia Babanova, Ivana Matanovic, Madelaine Seow Chavez, Plamen Atanassov](#)

[1615 Enrichment of Novel Electroactive Bacteria from Equatorial Climate Sediments Via Potentiostatic Growth and Subsequent Characterisation Via Metagenomics, Metatranscriptomics, Voltammetry and Electrochemical Impedance Spectroscopy](#)

[Lucinda Elizabeth Doyle, Pui Yi Yung, Stefan Wuertz, Rohan Benjamin Hugh Williams, Enrico Marsili](#)

[1616 Selective Patterning on Pyrocarbon Interdigitated Electrodes for Biezymatic Sensing of Glutamate](#)

[Kirstin Claire Morton, Steve Semancik](#)

[1617 Naphthoquinone Derivatives As Low-Potential Electron Mediators of Fad-Dependent Glucose Dehydrogenase](#)

[David P Hickey, Ross D Milton, Sofiene Abdellaoui, Koun Lim, Boxuan Tan, Shelley D. Minteer](#)

[1618 Bioelectrochemical and Spectroscopic Study during Interfacial Biooxidation Process of Chalcopyrite Mediated By Sulfur and Iron Oxidizing Microorganisms](#)

[Maria Irene Lopez-Cazares, Jessica Viridiana Garcia-Meza, Erika Roxana Larios Duràn, Roel Cruz-Gaona](#)

[1619 Enhanced Photo-Bioelectrochemical Energy Conversion By Genetically Engineered Cyanobacteria](#)

[Narendran Sekar, Ramaraja P. Ramasamy](#)

[1620 Simultaneous Impedance Spectroscopy and Optical Microscopy to Investigate Cells Attachment and Spreading](#)

[Maryam Parviz, John Justin Gooding, Katharina Gaus](#)

[1621Light-Harvesting Proteins and Biofilms on Iron Oxide Photoelectrodes](#)

[Artur Braun, Debajeet K. Bora, Greta Faccio, Krisztina Schrantz, Elena Rozhkova](#)

[1622Mediator-Less Direct Electron Transfer and Oxygen Reduction By Bilirubin Oxidase Adsorbed on to a Bucky Paper Electrode](#)

[Charuksha Walgama, Anuruddha Pathirana, Nick Means, Alan Le Goff, Serge Cosnier, Sadagopan Krishnan](#)

[1623Synchrotron Based Structural Investigations of Mass-Selected Pt<sub>x</sub>Gd Nanoparticles and a Gd/Pt\(111\) Single Crystal for Electrochemical Oxygen Reduction](#)

[Anders Filsøe Pedersen, Amado Andrés Velázquez-Palenzuela, Federico Masini, Maria Escudero-Escribano, Elisabeth Therese Ulrikkeholm, Davide Deiana, Paolo Malacrida, Daniel Friebel, Anders Nilsson, Ifan Erfyl Lester Stephens, Ib Chorkendorff](#)

[1624Synthesis of 3D Cos/CNF Electrode for Efficient Oxygen Evolution](#)

[Junfeng Zhang, Rui Chen, Qi Liu, Qingfa Wang](#)

[1625Influence of Temperature on the Shape Evolution of IrO<sub>2</sub>-SiO<sub>2</sub> coating and Its Electrochemical Activity for Oxygen Evolution](#)

[Qingfa Wang, Xiangwen Zhang, Li Wang, Ruoping Yangzhang](#)

[1626Electrochemical Characterisation of Cobalt-Oxide Catalysts with Different Cobalt Loading for Oxygen Reduction Reaction in Alkaline Media](#)

[Lisa Maria Uhlig, Alexander Dyck, Gustav Wilhelm Sievers, Volker Brüser, Gunther Wittstock](#)

[1627Electrochemical Reduction of CO<sub>2</sub> to Useful Fuels on Molybdenum and Molybdenum Oxide Thin-Film Catalysts](#)

[Anastasia A. Permyakova, Julien Durst, Juan S. Herranz, Yohan Paratcha, Thomas J. Schmidt](#)

[1628Electroreduction of Oxygen on Carbon Supported Palladium Nanocubes](#)

Heiki Erikson, Ave Sarapuu, Kaido Tammeveski, José Solla-Gullón, Juan Feliu

1629 Electrochemical Investigations of Aromatic Hydrocarbons in Adiponitrile

Graham T. Cheek

1630 Organized Light Harvesting Photosystem I Layers on a Cytochrome C for the Construction of New Photobioelectrodes

Sven Christian Feifel, Kai Stieger, Heiko Lokstein, Fred Lisdat

1631 Square Wave Voltammetric Method for Simultaneous Determination of Bleaching Agents in Skin Cosmetics

Giselle Nathaly Calaña, Silvane Machado, Karen Wohnrath, Christiana Andrade Pessoa, Noemi Nagata

1632 Electron Transfer Studies Between New Fad-Dependent Glucose Dehydrogenase and Different Osmium Polymers (Applications in Biosensors and Biofuel Cells)

Iqra Aslam, Muhammad Nadeem Zafar, Roland Ludwig, Dónal Leech, Lo Gorton

1633 Exploiting the Reaction of Cytochrome C with Fructose Dehydrogenase for a Multilayer Electrode Construction

Fred Lisdat, Christoph Wettstein, Kenji Kano, Ulla Wollenberger

1634 The Study on the Synergistic Effect of Anti-Poisoning Electrocatalyst and Self-Humidifying Proton Exchange Membrane for Hydrogen Fuel Cell

Ran Deng, Viola Sim, Wei Han, King Lun Yeung, Maria Victoria Martínez-Huerta, Xin Ouyang

1635 Modified Electrodes Obtained By Electrochemical Codeposition of Some Conducting Polymers and Carbon Nanotubes with Different Dopants

Florina Branzoi, Viorel Branzoi, Catalina Pacuretu

[1636 Extensive Studies of the Electrochemical Behavior of Pt Ni/MWCNT Catalysts in Alkaline Media](#)

[Ana Maria Valenzuela-Muñiz, Gabriel Rosado, Ysmael Verde Gomez](#)

[1637 Field-Dipole Interactions at p-GaAs \(100\) Electrode in Sodium Dodecyl Sulfate Acid Solution](#)

[Valentina Lazarescu, Mirela Enache, Gianina Dobrescu, Mihai Anastasescu, Catalin Negrila, Mihail Florin Lazarescu](#)

[1638 Empirical Insights into the CO<sub>2</sub> Reduction Reaction Mechanism: A Study of the Reduction of CO<sub>2</sub>, CO and Formaldehyde on Cu Electrodes By Differential Electrochemical Mass Spectrometry](#)

[Alnald Javier, Brian Chmielowiec, Jean Sanabria-Chinchilla, Youn-Geun Kim, Jack Hess Baricuatro, Manuel P Soriaga](#)

### **L03-Electroactive and Redox Active Polymers**

Physical and Analytical Electrochemistry/Energy Technology

[1639 \(Keynote\) Biofilm-Supported Redox-Polymer-Type Materials for Electrocatalytic Oxygen Reduction of Importance to Biosensing and Bioenergetics](#)

[Pawel J Kulesza](#)

[1640 \(Keynote\) Redox Active Polymers: A Size Selective Solution for Nonaqueous Redox Flow Batteries](#)

[Elena C Montoto, Etienne Chenard, Nagarjuna Gavvalapalli, Jingshu Hui, Kevin Cheng, Mark Burgess, Timothy Lichtenstein, Jeffrey S Moore, Joaquín Rodríguez-López](#)

[1641 \(Invited\) Understanding the Role of Organic Alloys in Polymer-Fullerene Solar Cells](#)

[Barry C Thompson](#)

[1642 \(Invited\) Tailoring Polymer Structure and Composition for High-Power and High-Charge Capacity Redox Electrodes](#)

[Mark E. Roberts](#)

[1643\(Invited\) Nanostructured Electroactive Polymers for Energy Storage and Biosensors Technologies](#)

[Ye Shi, Guihua Yu](#)

[1644\(Invited\) Intermediate Tunnelling-Hopping Regime in DNA Charge Transport](#)

[Limin Xiang, Julio Palma, Christopher Bruot, Vladimiro Mujica, Mark A Ratner, Nongjian Tao](#)

[1645\(Invited\) Natural Fiber Welded Composites: Electrodes and Capacitors](#)

[Luke M. Haverhals, David P. Durkin, Kristy Jost, E. Kathryn Brown, Genevieve Dion, Yury Gogotsi, Hugh C De Long, Brent Tisserat, Paul C Trulove](#)

[1646\(Invited\) Functional Conductive Polymer Binders for High-Performance Silicon-Based Anodes in Lithium-Ion Batteries](#)

[Zhe Jia, Hui Zhao, Gao Liu](#)

[1647\(Invited\) Impact of Nafion Dispersion Morphology on Fuel Cell Performance and Durability](#)

[Yu Seung Kim, Cynthia Welch, Rex Hjelm, Nathan Mack, Christina Johnston, Baek Choi, David A. Langlois, Kwan-Soo Lee, Edward Bruce Orlor, Andrea Labouriau, Karren More, Hui Xu, Jason Willey, Cortney K Mittelsteadt](#)

[1648\(Invited\) Solid-State Charge Transport in Redox-Active Radical Polymers](#)

[Bryan W Boudouris](#)

[1649\(Invited\) Electrically Switchable Surface Properties Using End-Charged Polymers and pH-Responsive Swelling of Polymer Brushes Via Self-Consistent Field Theory](#)

[David Wu, Renfeng Hu](#)

[1650Radical Environments for Fast Charge Transport in the Stable Radical Polymer, Ptma](#)

[David C. Bobela, Barbara Katherine Hughes, Wade A. Braunecker, Travis Kemper, Ross E. Larsen, Thomas Gennett](#)

[1651Spectroelectrochemical Studies of Charge Transfer Processes in Stable Nitroxyl Radical-Containing Polymers](#)

[Barbara Katherine Hughes, Wade A. Braunecker, Justin C. Johnson, Thomas Gennett](#)

[1652Conjugated Organophosphorus Materials As Electrodes for Organic Batteries](#)

[Christian Reus, Thomas Baumgartner](#)

[1653Characterization of the Time-Dependent Strain Behavior of Electroactive NCC-PEO Composite Polymers](#)

[Patrick Bass, Lauchlin Blue, Lin Zhang, Ethan Hofer, Z.-Y. Cheng, Maobing Tu](#)

#### **L04-Electrode Processes 10**

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

[1654Modeling Multi-Scale Carbon Fiber Supports for Thin Film Bioelectrodes](#)

[Duyen Van Thuy Do, Hao Wen, Cenk Gumeci, Scott Calabrese Barton](#)

[1655Modeling and Optimization of Porous Electrodes for Alkaline Oxygen Evolution](#)

[Thomas Kadyk, Michael Eikerling](#)

[1656Insights from the Rigid-Band Model: Tuning Perovskite Electronic Structure for the Oxygen Evolution Reaction](#)

[Wesley T Hong, Kelsey A. Stoerzinger, Alexis Grimaud, Yueh-Lin Lee, Wanli Yang, Yang Shao-Horn](#)

[1657DFT-Based Screening for a New Electro-Catalyst to Convert Nitrogen to Ammonia at Room Temperature and Ambient Pressure](#)

[Younes Abghoui, Egill Skulason](#)

[1658Development of Screen Printed Electrodes Chemically Modified with Schiff Base Films for Application in Forensic Chemistry](#)

[Marcelo Firmino de Oliveira](#)

[1659Using Scanning Electrochemical Microscopy to Control Boundary Layer Chemistry during Nickel Electrodeposition](#)

[Nicole L. Ritzert, Rongyue Wang, Thomas P. Moffat](#)

[1660Nano-Structured Pd-Sn Catalysts for Alcohol Electro-Oxidation in Alkaline Medium](#)

[Anna Zalineeva, Alexey Serov, Monica Padilla, Ulises Martinez, Kateryna Artyushkova, Stève Baranton, Christophe Coutanceau, Plamen Atanassov](#)

[1661Novel System Based on Divalent Silver for Mediated Electrochemical Oxidation of Persistent Organic Pollutants](#)

[Piotr Polczynski, Rafal Robert Jurczakowski, Wojciech Grochala](#)

[1662Formic Acid Oxidation on Platinum- a Simple Mechanistic Study](#)

[Kathleen Schwarz, Ravishankar Sundararaman, Thomas Moffat, Thomas Allison](#)

[1663Electrochemical Oxidation of Dibenzothiophene in Acetonitrile and Acetonitrile-Water Mixtures](#)

[Erika Méndez, Miguel Ángel González Fuentes, Andrea Becerra, Felipe J González](#)

[1664Electrochemical Reduction of Carbon Dioxide on Silver Nanostructures and the Role of Oxygen](#)

[Michael Shincheon Jee, Byoung Koun Min, Yun Jeong Hwang](#)

[1665 Optimizing Gas Diffusion Electrode for Electrochemical Reduction of CO<sub>2</sub> to CO](#)

[Byoungsu Kim, Febrian Hillman, Shigenori Fujikawa, Paul J.A. Kenis](#)

## **L05-Nanoscale Electrochemistry**

Physical and Analytical Electrochemistry/Energy Technology

[1666 Electrochemical Studies of Thin Films of Side-Chain Ferrocene-Containing Diblock Copolymers](#)

[Takashi Ito, Govinda Ghimire, Yi Yi, Maksymilian A Derylo, Lane A Baker](#)

[1667 Single-Step Coelectrodeposition of Hybrid Silica Nanocomposite Directs the Fabrication of Free-Standing and Transferal Conducting Polymer Thin Films](#)

[Ahmed A. Farghaly, Maryanne M. Collinson](#)

[1668 Electrochemical Detection of Colloidal Semiconductor Nanoparticles: From Single Nanoparticles to Aggregates](#)

[Mario A Alpuche-Aviles, Pushpa Chhetri, Krishna K. Barakoti, Andrew Recinos](#)

[1669 Nano-Impact Electrochemistry for Assessing the Chemical Reactivity of Nanoparticles](#)

[Anahita Karimi, Daniel Andreescu, Silvana Andreescu](#)

[1670 Nanolayered Supramolecular Protein Clusters on Electrodes: A Switchable Cascadic Reaction Scheme for Dual-Analyte Detection](#)

[Sven Christian Feifel, Andreas Kapp, Roland Ludwig, Fred Lisdat](#)

[1671 Nickel \(III\) Salt Dispersed Poly-anilinefilm: Preliminary SECM Examination](#)

[Inam ul Haque](#)

[1672 Novel Electrocatalysts for Generating Oxygen from Acid Water Electrolysis](#)



[Kuntal Chatterjee, Jingjie Wu, Jianfeng Shen, Ken Hackenberg, Robert Vajtai, Jun Lou, Pulickel M Ajayan](#)

1673 [In-Situ TEM Study of  \$Ba\_{0.5}Sr\_{0.5}Co\_{0.8}Fe\_{0.2}O\_3\$  for Oxygen Evolution Electrocatalysis](#)

[Binghong Han, Kelsey A. Stoerzinger, Vaso Tileli, Andrew Gamalski, Eric A. Stach, Yang Shao-Horn](#)

1674 [Low-Temperature Electrochemical Ammonia Synthesis with Nanoscale Fe-Ni Bimetallic Catalysts](#)

[Lauren F Greenlee, Nikki S Rentz, Julie N Renner, Katherine E Ayers, Nicholas Bedford](#)

1675 [Processing and Properties of Nanocomposite Thin Films for Micro-Solid Oxide Fuel Cell Applications](#)

[Michael Rottmayer, Raj Singh, Hong Huang](#)

1676 [Origin of Catalytic Activity in MoS<sub>2</sub> Nanostructures upon Chemical Transformation](#)

[Gautam Gupta, Dustin R. Cummins, Ulises Martinez, Aditya Mohite, Manish Chhowalla, Mahendra Kumar Sunkara](#)

1677 [Tuning the Composition and Structure of Metallic Nanotubes for Electrocatalysis](#)

[Alexander B. Papandrew, Robert W. Atkinson, Samuel St. John, Raymond R Unocic, Thomas A. Zawodzinski](#)

1678 [The Suppression Effect of 830nm Laser Irradiation on Porous Silicon Formation](#)

[C. -C. Chiang, Y.-C Huang, P.- C. Juan, F. -S. Lo, T. -H. Lee](#)

1679 [Aligning Silicon Nanopillar Formed in Electroless HF/H<sub>2</sub>O<sub>2</sub> Etching through Pre-Forming Porous Layer](#)

[C. -C. Chiang, Dawei Xu, Y.-C Huang, P.- C. Juan, F. -S. Lo, Hui-Qin Hu, Cheng-Long He, T. -H. Lee](#)

[1680Platinum-Based Alloy and Ionic Liquid Composites Dispersed on Carbon Black As a Synergistic Catalyst for Oxygen Reduction Reaction](#)

[Quoc-Chinh Tran, Ho-Suk Choi](#)

## **L06-Photocatalysts, Photoelectrochemical Cells, and Solar Fuels 6**

Energy Technology/Physical and Analytical Electrochemistry/Sensor

1681[Water Splitting Semiconductor Photoanodes - a Comparative Study](#)

[Jan Augustynski](#)

1682[Catalysts, Protection Layers, and Semiconductors: The Challenge of Interfacing](#)

[Ib Chorkendorff](#)

1683[Photocatalytic Hydrogen Evolution from Earth Abundant Nickel Oxide Clusters Dispersed on MCM-48 Mesoporous Materials](#)

[Rui Peng, Khadga Shrestha, Gautam Mishra, Jonas Baltrusaitis, Chia-Ming Wu, Ranjit T Koodali](#)

1684[Towards Efficient and Acidically Stable Dye-Sensitized Photocathodes for Solar Fuels](#)

[Yiying Wu](#)

1685[Efficient and Stable Silicon-Based Solar Water Splitting Devices](#)

[Jihun Oh](#)

1686[Plasmon-Mediated Surface Chemistry for Solar Photocatalysis](#)

[Wei David Wei](#)

1687[Hot-Carrier Interactions in Semiconductor Nanomaterials Designed for High-Efficiency Solar Energy Conversion](#)

[Istvan Robel, Claudiu Cirloganu, Lazaro A. Padilha, Qianglu Lin, Nikolay Makarov, Jeffrey M. Pietryga, Victor I. Klimov](#)

1688[Solar-to-Hydrogen Production on Multi-Band Photoelectrodes: Surpassing the Current Matching Requirements of Conventional Tandem Devices](#)

[Zetian Mi, Bandar AlOtaibi, Shizhao Fan](#)

1689[New III-V Semiconductor Alloys for Solar Hydrogen Production](#)

[Swathi Sunkara, Mahendra Kumar Sunkara, Alejandro Garcia, Harry Russell, Madhu Menon, Jacek B Jasinski](#)

1690[Solar to Fuels Conversion By a Monolithic and Standalone Photoelectrochemical Device](#)

[Hyo Sang Jeon, Yun Jeong Hwang, Byoung Koun Min](#)

1691[Dye-Sensitized Solar Cell with Electrophoretic Deposited Photocatalytic Carbon Nanotube Counter Electrode: Nanotube Density and Cell Performance](#)

[Suprem Das, Seth Logsdon, Drew Caneff, Robert Kinser, Shan Hu](#)

1692[Multicomponent Electrocatalytic Systems for Solar Fuels Generators](#)

[Frances A Houle, Francesca M. Toma, Daniel Friebel, Joel A. Haber, Ian D. Sharp, Alexis T. Bell](#)

1693[Efficient Solar-to-Hydrogen Production Materials and Devices](#)

[Heli Wang, Joel W. Ager, Nicolas Gaillard, Eric Lars Miller](#)

1694[Changes in Photoanodes during Solar Water Oxidation, the Wet Part of Artificial Photosynthesis](#)

[Artur Braun](#)

1695[Electronic Band Structure and Charge Transfer in Semiconductors](#)

[Nianqiang Wu, Scott Kevin Cushing](#)

1696[Emerging Semiconductor Materials for Direct Photoelectrochemical Water Splitting](#)

[Kevin Sivula](#)

1697[Metal Organic Framework Solar Cells: A New Class of Sensitized Light Harvesting Devices](#)

[William A Maza, Amanda J Morris](#)

1698[Metal Oxide Nanosurfaces and Hetero-Interfaces for Solar Harvesting Applications](#)

[Sanjay Mathur, Yakup Gonullu, Thomas Fischer](#)

1699[Hexavalent Chromium Removal in Industrial Relevant Water Matrices Using Metal Oxide Photocatalysts](#)

[Candace K. Chan](#)

1700[Rational Design of Semiconductor for Photoelectrochemical Water Splitting](#)

[Su-Huai Wei](#)

1701[Photoelectrochemical Solar Energy Conversion and Electrocatalysis Using Earth-Abundant Nanomaterials](#)

[Song Jin](#)

1702[Wide Bandgap Copper Indium Gallium Disulfide Thin Film Materials for Photoelectrochemical Hydrogen Production](#)

[Nicolas Gaillard](#)

1703[Extremely Thin Photoelectrode Architectures for Photocatalysis](#)

[Isabell Thomann](#)

[1704\(Europe Section Heinz Gerischer Award\) A Perspective of Photoelectrochemistry: Past Expectations and Present Realities](#)

[Adam Heller](#)

[1705Developing Catalysts for the Selective Electrochemical Reduction of Carbon Dioxide to C2 and C3 Products](#)

[Boon Siang Yeo](#)

[1706Surface Chemistry of Electrocatalysts for CO<sub>2</sub> Reduction to Fuels](#)

[Coleman X. Kronawitter, Zhu Chen, Peng Zhao, Bruce E. Koel](#)

[1707Photocatalytic Conversion of CO<sub>2</sub> By H<sub>2</sub>O As an Electron Donor Using Various Solid-State Photocatalysts](#)

[Kentaro Teramura](#)

[1708Development of Nanostructured Hybrid Materials for Electrocatalytic and Photoelectrocatalytic Reduction of Carbon Dioxide](#)

[Pawel J Kulesza, Anna Wadas, Ewelina Szaniawska, Renata Solarska, Krzysztof Bienkowski, Iwona Agnieszka Rutkowska](#)

[1709Photocatalytic Reduction of CO<sub>2</sub> with H<sub>2</sub>O By Engineered TiO<sub>2</sub> Nanocomposites](#)

[Ying Li, Lianjun Liu](#)

[1710Fuel Production from the Electroreduction of CO<sub>2</sub>](#)

[Anne C. Co](#)

[1711Photocatalytic Reduction of CO<sub>2</sub> to CO on TiO<sub>2</sub>-Passivated InP at High Underpotentials in Ionic Liquids](#)

[Guangtong Zeng, Stephen B. Cronin](#)

1712 [Enabling Unassisted Solar Water Splitting By Hematite](#)

[Dunwei Wang](#)

1713 [Development of New Photocatalysts for Solar-to-Fuel Conversion](#)

[Kazuhiko Maeda](#)

1714 [Mathematical Modeling of Solar-Fuel Generators](#)

[John Stevens, Chengxiang Xiang, Meenesh Singh, Yikai Chen, Adam Z Weber](#)

1715 [SnO<sub>2</sub> and F:SnO<sub>2</sub> Inverse Opal Based Photoelectrochemical Water Splitting](#)

[Soon Hyung Kang](#)

1716 [Fast Water Oxidation Kinetics in Li-Doped TiO<sub>2</sub> Nanotubes](#)

[Lok-kun Tsui, Giovanni Zangari](#)

1717 [Preparation of Nickel Tungstate \(NiWO<sub>4</sub>\) Nanoparticles and Characterization with Electrochemical Methods in Combination with Mott-Schottky Theory](#)

[Seyyedamirhossein Hosseini, Hossein Farsi, Shokoufeh Moghiminia, Zhihai Li](#)

1718 [Guiding Practical Pathways for Photo-Electrochemical Solar-Hydrogen Generation](#)

[Sophia Haussener, Mikael Dumortier](#)

1719 [Atomic Layer Deposition of Epitaxial Iron Oxides for Photoelectrochemical Water Oxidation](#)

[Jonathan D. Emery, Christian M. Schlepütz, Peijun Guo, Shannon C. Riha, Robert P.H. Chang, Alex B.F. Martinson](#)

1720 [Silicon-Indium Tin Oxide Schottky Junction with Nickel Oxide Catalyst for Water Oxidation](#)

[Sanghwa Yoon, Jae-Hong Lim, Bongyoung Yoo](#)

1721 [Benchmarking Nanoparticulate Metal Oxides for the Alkaline Water Oxidation](#)

[Suho Jung, Charles C L McCrory, Jonas C Peters, Thomas F Jaramillo](#)

1722 [Electrodeposited WO<sub>3</sub> Film on Various Metal Substrates and Its Morphological Effect for Photoelectrochemical Water Splitting](#)

[Soon Hyung Kang](#)

1723 [Photoelectrochemical Characteristics of Pulse Electrodeposited AgIn<sub>0.5</sub>Ga<sub>0.5</sub>Se<sub>2</sub> Thin FILMS](#)

[Ramakrishna Murali](#)

1724 [Photoelectrochemical Behaviour of Pulse Plated CuIn<sub>0.6</sub>Al<sub>0.4</sub>Se<sub>2</sub> Thin FILMS](#)

[Kollegal Ramakrishna Murali, Thirumoorthy M, Ramesh K](#)

1725 [Photoelectrochemical Cells Studies with Pulse Electrodeposited CuInS<sub>2</sub> Films](#)

[Kollegal Ramakrishna Murali](#)

1726 [Photoelectrochemical Studies on Brush Plated CuInSe<sub>2</sub> Films](#)

[Kollegal Ramakrishna Murali, Sambandam Murugan](#)

1727 [Photoelectrochemical Cells Studies with Brush Electrodeposited AgGaSe<sub>2</sub> Films](#)

[Kollegal Ramakrishna Murali, J Ashok Kumar, S Perumal](#)

1728 [Preparation of Thylakoid/Polyaniline/Reduced Graphene Oxide/Glassy Carbon Integrated System and Photocurrent Enhancement](#)

[Jinhwan Lee, Sunghyun Kim](#)

[1729Solar Fuel Generation By 1D ZnO /QDs Heterostructures](#)

[Yang He, Jiangtian Li, Deryn Chu, Joeseeph Bright, Nianqiang Wu](#)

[1730Enhanced Production of Solar-Fuels By Plasmonic Metal/Semiconductor Photocatalyst Heterostructures](#)

[Joeseeph Bright, Jiangtian Li, Scott Kevin Cushing, Deryn Chu, Nianqiang Wu](#)

[1731Spray Pyrolyzed TiO<sub>2</sub>/ Sol Gel Dip Coated NiO Dye Sensitized Solar Cells](#)

[Kollegal Ramakrishna Murali](#)

[1732Sol Gel Dip Coated Yb and Tm Doped Indium Oxide Dye Sensitized Solar Cells](#)

[Kollegal Ramakrishna Murali](#)

[1733Preparation, Characterization and Photoelectrochemical Investigation of p-Type Nanostructured Cobalt Titanate](#)

[Hossein Farsi, Shokufeh Moghiminia, Heidar Raissi](#)

[1734Photoelectrochemical Treatment of Reject Brines from RO Plants](#)

[Alan Rassoolkhani, Kevin Nguyen, Austin McKee, Monica Hemingway, Scott Tentinger, Wei Cheng, Syed Mubeen](#)

[1735Photoelectrochemical Characterization of Spin-Coated CuBi<sub>2</sub>O<sub>4</sub> Thin Films for Water Splitting](#)

[Ingrid Guadalupe Rodríguez Gutiérrez, Maricarmen Flores Pinto, Manuel Jesús Rodríguez Pérez, Geonel Rodriguez-Gattorno, Gerko Oskam](#)

[1736Low-Cost Synthetic Routes for Fabricating Tandem/Multi-Junction Photoelectrochemical Devices](#)

[Wei Cheng, Alan M Rassoolkhani, Syed Mubeen](#)



[1737 Graphene Oxides and Their Hybrids for CO<sub>2</sub> Conversion and Solar Fuels](#)

[Li-Chyong Chen, Kuei-Hsien Chen](#)

[1738 Impact of Catalyst Performance on the Life-Cycle CO<sub>2</sub> Emissions of Methanol Production By Direct Electrocatalytic Reduction of CO<sub>2</sub>](#)

[Matthew Pellow, Sally Benson](#)

[1739 Performance Modeling of Simultaneous CO<sub>2</sub> and Water Electrolysis By Practical Photo-Electrochemical Devices](#)

[Ronald R. Gutierrez Perez, Sophia Haussener](#)

[1740 Electroreduction of CO<sub>2</sub> to Synthesis Gas and Hydrocarbons on Doped Carbons](#)

[Ana Sofia Varela, Peter Strasser](#)

[1741 Co-Electrolysis Cell Configurations for CO<sub>2</sub> Electrochemical Reduction](#)

[Julien Durst, Juan S. Herranz, Yohan Paratcha, Anastasia A. Permyakova, Thomas J. Schmidt](#)

[1742 The Effect of Electrolyte on the Electrochemical Reduction of CO<sub>2</sub> to CO](#)

[Sumit Verma, Xun Lu, Sichao Ma, Paul J.A. Kenis](#)

[1743 Fully Integrated Stand-Alone Device for Gas-Phase CO<sub>2</sub> Reduction Using Sunlight: Proof of Concept](#)

[Mobin Arab, Tamara L. Church, Xiaobo Li, Thomas Maschmeyer, Andrew I. Minett](#)

[1744 Magnetic Fields That Enhance the Rates of Multistep Reactions Important in Energy Storage and Conversion](#)

[Wayne L. Gellett, Heung Chan Lee, Jessica Jewett Reed, Johna Leddy](#)

[1745 Thermal Management in Photo-Electrochemical Hydrogen Generation Devices Using Concentrated Solar Irradaiton](#)

[Saurabh Tembhurne, Sophia Haussener](#)

[1746 Electronic Structure and Optical Properties of Nb<sub>2</sub>O<sub>5</sub> Photo-Catalyst Calculated By Density Functional Method](#)

[Pezhman Shirvanian, Michael Hao](#)

[1747 Cost Effective Inkjet Printing of Titania Nanoparticles for Photocatalytic Applications](#)

[Roberto Bernasconi, Luca Magagnin](#)

[1748 Photoelectrochemistry of Nano Zerovalent Fe Based CdFe<sub>2</sub>O<sub>4</sub> / Fe<sub>x</sub>O<sub>y</sub> Produced from Cd<sup>2+</sup> Water Remediation](#)

[Keyla Soto, Edwin O. Ortiz-Quiles, Eduardo Larios, Miguel Jose-Yacamán, Carlos R Cabrera](#)

[1749 Exfoliated Molybdenum Disulfide for TiO<sub>2</sub> Based Dye Sensitized Solar Cells](#)

[Edwin O. Ortiz-Quiles, Carlos R Cabrera](#)

[1750 Methanol Photooxidation on Colloidal Anatase TiO<sub>2</sub>: A Mechanistic Study](#)

[Mario A Alpuche-Aviles, Krishna K. Barakoti, Andrew Recinos](#)

[1751 Wettability Impact of Porous Current Supplier on Current Efficiency in Solid Polymer Water Electrolyzer](#)

[Kohei Ito, Yuta Tsuchiya, Takuya Sakaguchi, Akiko Inada, Hironori Nakajima](#)

## **L07-Physical and Analytical Electrochemistry in Ionic Liquids 4**

Physical and Analytical Electrochemistry/Battery/Industrial Electrochemistry and Electrochemical Engineering/Sensor

[1752](#)[Electrochemical Characterisation of Adsorption of Halide Ions at Bi\(111\) Electrode from Ionic Liquids and Their Mixtures](#)

[Carolyn Siimenson, Liis Siinor, Enn Lust](#)

[1753](#)[Electrochemical Reactions at Ionic Liquid/Gold Interface Probed By Electrochemical Surface Plasmon Resonance](#)

[Naoya Nishi, Yoichi Ikeda, Ken-ichi Amano, Tetsuo Sakka](#)

[1754](#)[Potential-Dependent Structure of Ionic Liquids and Solvated Lithium Ions on a Gold Electrode: A Surface-Enhanced Infrared Study](#)

[Kenta Motobayashi, Ken-ichi Uchida, Kazuya Minami, Naoya Nishi, Tetsuo Sakka, Masatoshi Osawa](#)

[1755](#)[Electrochemical Characterization of the Interface Between Pyrolytic Graphite Electrode and 1-Butyl-3-Methylimidazolium Iodide](#)

[Liis Siinor, Enn Lust](#)

[1756](#)[Mechanistic Study of Energy Efficient Electrochemical Capture and Release of CO<sub>2</sub> in Ionic Liquid Complexes](#)

[Poonam Singh, Daniel A Buttry](#)

[1757](#)[On the Mechanism of Electrochemical Reduction of Niobium Halides in Ionic Liquids](#)

[Adriana Ispas, Andreas Bund](#)

[1758](#)[Mg Battery Electrolytes from Aluminate and Borate Complexes in Ionic Liquids](#)

[Tylan S Watkins, Daniel A Buttry](#)

[1759](#)[Effect of 1-Butyl-1-Methylpyrrolidinium Dicyanamide on the Structure of Pd Electrodeposit](#)

[Sujan Shrestha, Elizabeth J Biddinger](#)

[1760 Conductivity and Ionicity of Ionic Liquids □ Made By Ligand Assisted Ionization of Metal Halides](#)

[Mohammad Hasani, Charles Austen Angell](#)

[1761 Nanocomposite Semi-Solid Ionic-Liquid Electrolytes with Enhanced Charge-Transport and Redox Mediating Capabilities](#)

[Pawel J Kulesza, Iwona Agnieszka Rutkowska, Justyna M. Orlowska](#)

[1762 Fundamental Characterization of Solvent Effects on Electrochemical Properties of Silylamine-Type Reversible Ionic Liquids](#)

[Sungyup Jung, Juan D Jimenez, Elizabeth J Biddinger](#)

[1763 Understanding Lithium Solvation in Ionic Liquids from First Principles Molecular Dynamics Simulations](#)

[Ali Kachmar, Marcelo A. Carignano](#)

[1764 Electrochemical Characterization of 1 Wt% Mixture of 1-Ethyl-3-Methylimidazolium Chloride and 1-Ethyl-3-Methylimidazolium Tetrafluoroborate|Bi\(111\) Interface](#)

[Laura Läll, Liis Siinor, Enn Lust](#)

[1765 A Facial Liquid Plasma-Induced Polymerization of a Highly Ion-Conductive Polymeric Membrane](#)

[Ho-Suk Choi, Quoc-Chinh Tran](#)

## **M01-Sensors, Actuators, and Microsystems General Session**

Sensor

[1766 Effective Design and Fabrication of Harsh Environment and Biomedical Gas Sensors](#)

Prabir Dutta

1767Field Trials Testing of a Mixed Potential Electrochemical Hydrogen Safety Sensor at a Commercial Hydrogen Filling Station

Eric L. Brosha, Christopher J Romero, Daniel Poppe, Michael Strada, Todd L Williamson, Rangachary Mukundan

1768Digital Voltage-Current Time Differential Method for Operating Zirconia-Based NO<sub>x</sub> Gas Sensors

Leta Woo, Frank Bell, Mike Boettcher, James Chee, Joe Fitzpatrick, Brett Henderson, Lee Sorensen, Victor Wang, Robert Novak, Jaco Visser

1769Zirconia-Based Electrochemical Oxygen Sensor to Infer Fuel Ethanol Content in Flex Fuel Vehicles

Richard E Soltis, Daniel Makled, Michael McQuillen, Gopichandra Surnilla

1770Performance Evaluation of Mixed-Potential HC, NO<sub>x</sub> and NH<sub>3</sub> Sensors in Diesel and Lean Gasoline Engine Exhaust

Cortney R Kreller, Eric L. Brosha, Rangachary Mukundan, Vitaly Prikhodko, Josh Pihl, Scott Curran, James E Parks

1771Doped ZnO Nanorod Array for Ultra Low NO<sub>2</sub> Sensing

Rishabh Jain, Venkata Manthina, Radenka Maric

1772CO<sub>2</sub> Gas Sensing Response of YPO<sub>4</sub> Nanobelts Produced By a Colloidal Method

Carlos R Michel, Alma H Martinez, Cesar D Rivera-Tello

1773Response Characteristics of a Stable Mixed Potential Ammonia Sensor in Simulated Diesel Exhaust

Eric L. Brosha, Josh Pihl, Cortney R Kreller, Vitaly Prikhodko, Scott Curran, James E Parks, Rangachary Mukundan

1774 [Nanomaterials-Based Biosensors for Biomedical and Food Safety Applications](#)

[Yang Song, He Li, Chengzhou Zhu, Dan Du, Yuehe Lin](#)

1775 [Electrical/ Electrochemical Impedance Measurement for Biological Applications](#)

[Liju Yang](#)

1776 [Multiplexed DNA Biomarker Detection with Phase Change Nanoparticles](#)

[Ming Su](#)

1777 [Highly Selective Detection of Glucose, Cholesterol and Urea with Integrated ZnO Nanorods Field-Effect Transistors Array Biosensors](#)

[Rafiq Ahmad, Jin-Ho Park, Yoon-Bong Hahn](#)

1778 [\(Invited\) Personalized Breath-Based Health Monitors](#)

[Pelagia Gouma](#)

1779 [Developing Fully-Integrated Biosensing Systems on the Laboratory Benchtop](#)

[Leyla Soleymani, Christine Gabardo, Amin Hosseini, Stephen Woo, Chris Adams-McGavin, Aaron Kwong, Oriana Vanderfleet](#)

1780 [Graphene Oxide Based Electrochemical Biosensor](#)

[Allen Armando Rodriguez-Silva, Omar Movil-Cabrera, John A Staser](#)

1781 [Facile Detection of Troponin I Using Dendritic Platinum Nanoparticles and Glass Capillary Tube Indicators](#)

[Sanghee Lee, Donghoon Kwon, Changyong Yim, Sangmin Jeon](#)

1782 [Sensor Units to Measure Multi-Direction Seebeck Coefficient of Micro-Scale Film](#)

Yeongseok Kim, Sang-Woo Kang, Hyeong-U Kim, Taesung Kim

1783A Study on Contamination Control of Oxygen Analyzer By Applying Purifier

Jin Hyuk Yun, Se Geun Park, Young Ho Lee, Che Young Lee, Jung Su An, In Su Cho

1784In-Situ Characterization of Microfluidic Redox Battery with Dual-Pass Architecture

Omar Ibrahim, Marc-Antoni Goulet, Erik Kjeang

1785The High Photo-Sensitivity of Low-Temperature Poly-Silicon Lateral p-I-n Diode Utilizing Reflective Layers

Yin-Chang Wei, I-Che Lee, Huang-Chung Cheng

1786Voltammetric Sensing of Endocrine Disruptor (Bisphenol A) Based on a Reduced Graphene Oxide/Carbon Nanotube/Gold Nanoparticles Nanocomposite Modified Screen-Printed Electrode

Yi-Cheng Wang, Dilek Cokeliler, Sundaram Gunasekaran

1787Biosensing Application of Electrodeposited Nanoparticles As an Electron Transfer Facilitator for Protein Immobilization

Abdolmajid Bayandori Moghaddam

1788Fabrication of Low-Invasive Patch Glucose Sensors

Jiang Li, Kentaro Hiura, Mikito Yasuzawa, Yusuke Fuchiwaki

1789Detection of SalmonellaEnterica Typhimurium in Chicken Meat Using Phage Coated Magnetoelastic Sensors

I-Hsuan Chen, Shin Horikawa, Bryan A. Chin, James M Barbaree

1790Synthesis and Characterization of Nanoporous SnO<sub>2</sub> Thin Film

Wufeng Jiang, Su-ju Hao, Yu-zhu Zhang, Yunhan Ling

1791Electrochemical Biosensor for Early Diagnosis of Alpha-1-Antitrypsin Deficiency

Bobby Gene Adams, Bryan Evans Materi, Jeffrey Rice, Jonathan Sanders, Cynthia A. Rice

1792Highly Sensitive Detection of Small Molecule Markers By Surface Plasmon Resonance Imaging

Zainab Hussain Al Mubarak, Gayan Premaratne, Cassandra Rodenbaugh, Sadagopan Krishnan

1793Rapid Detection of Pathogenic Bacteria with the Naked Eye Using Magnetophoretic Chromatography Technique

Donghoon Kwon, Sanghee Lee, Hyeonjeong Lee, Sangmin Jeon

17943D Printing the Way to Truly Remote, Autonomous, Solar Powered Sensor Networks for Environmental Monitoring of Trace Heavy Metals By Calibration-Less Anodic Stripping Coulometry of  $\mu$ l Sized Samples

Mohamed M. Marei, Thomas J Roussel, Richard P Baldwin, Robert S Keynton

1795Enzyme Functionalized Gold Nanoparticles for the Enhanced Electrochemical Detection of Lactate

Pandiaraj Manickam, Yogeswaran Umasankar, Shekhar Bhansali

1796Functional PDMS Composite Microbridges for Temperature Sensing Applications

Manu Pallapa, Jacob C. K. Leung, Pouya Rezai

1797Upconverting Nanoparticles for Sensing

Fiorenzo Vetrone



[1798Integration of Nanostructured Dielectrophoretic Device and Surface-Enhanced Raman Probe for Highly Sensitive and Rapid Pathogen Detection](#)

[Foram Madiyar, Saheel Bhana, Luxi Swisher, Xiaohua Huang, Christopher Culbertson, Jun Li](#)

[1799Plasmonic Gold Nanohole Arrays for Surface-Enhanced Raman Scattering Biosensing](#)

[Peng Zheng, Xuefei Gao, Nianqiang Wu](#)

[1800Towards Development of a Low-Cost and Sensitive Thermal Sensor for User-Independent Interpretation of Results from Lateral Flow Assay \(LFA\) Devices](#)

[Manu Pallapa, Pouya Rezai](#)

[1801Magnetic Optical Microarray Imager for Diagnosing Type of Diabetes in Clinical Matrices](#)

[Vini Singh, Sadagopan Krishnan](#)

[1802Bi-Tapered Optical Fibers: Signal Analysis for Sensing Applications](#)

[Daniel J. Jauregui, Amit Ben Harush Negari, Juan M. Sierra Hernandez, Diego Garcia Mina, Branden J. King, Peter E. Powers, Joseph W. Haus, Karolyn M. Hansen](#)

[1803A Comparison of the Sensor Performance of Electrochemical Peptide-Based Sensors Fabricated from 6- or 11-Carbon Self-Assembled Monolayers](#)

[Arin L Sutlief, Rebecca Y. Lai](#)

[1804Amplification Strategy of FET Biosensor Signal for Sensitive Detection of Prion Proteins](#)

[Shofarul Wustoni, Sho Hideshima, Shigeki Kuroiwa, Takuya Nakanishi, Tetsuya Osaka](#)

[1805Enzyme Biosensor for Detection of Formaldehyde on Carbon Nanotube-Screen Printed Electrodes Modified with Pyrenyl Groups](#)

[Gayan Premaratne, Sabrina Farias, Sadagopan Krishnan](#)

1806 [Electrochemical Biosensor for Faster Diagnosis of Alpha-1-Antitrypsin Deficiency](#)

[Bryan Evans Materi, Bobby Gene Adams, Cynthia A. Rice, Jeffrey Rice, Jonathan Sanders](#)

1807 [Preparation of Glucose Oxidase-Immobilized Electrodes Using Cellulose Aqueous Solution](#)

[Mikito Yasuzawa, Yuya Omura, Kentaro Hiura, Jiang Li, Yusuke Fuchiwaki, Masato Tanaka](#)

1808 [Simple, Inexpensive and Rapid Sensors for Commercial and Household Water Quality Monitoring](#)

[Naga Siva Gunda, Ravi Chavali, Sushanta Mitra](#)

1809 [Performance Enhancements for Chemiresistive Electronic Noses Based upon Materials, Temperature Modulation and Signal Processing](#)

[Kurt D. Benkstein, Nalin Katta, Baranidharan Raman, Steve Semancik](#)

1810 [Electrochemical Quantification of Vanadium By Novel Electroanalytical Technique](#)

[Moises Israel Salazar-Gastelum, Gerardine G Botte](#)

1811 [Electrochemical Sensors to Detect Heavy Metals and Carcinogenic Compounds: Inquiry-Based Modules to Meet Today's Interest](#)

[Suzanne Kay Lunsford, Corrie Spradlin, Mary Sullivan, Dolores Dobson, Miyong Hughes](#)

1812 [Self Assembled Chemical Field Effect Transistors for Heavy Metal Detection](#)

[Hang Ruan, Yuhong Kang, Elizabeth Gladwin, Richard O Claus](#)

[1813Gas Sensing Properties of Hierarchically Structured Zinc Oxide Films By Electrophoretic Deposition](#)

[Yoonsung Chung, Hyejin Park, Eunji Lee, Seokhee Lee, Dong-Joo Kim](#)

[1814Activation Free SAM-Assisted Silver Electroless Metallization of Textile for Strain Sensor Application](#)

[Alireza Molazemhosseini, Emanuele Cattarinuzzi, Dario Gastaldi, Pasquale Vena, Luca Magagnin](#)

### **M03-Sensors for Agriculture**

Sensor

[1815Smart\(er\) Agriculture: Robotics, Sensing, and Autonomy](#)

[Daniel Schmoldt](#)

[1816Sensor Research and Detection Technology for Efficient Water Usage and Security in Agriculture](#)

[Dong-Joo KIM](#)

[1817Oligopeptide Probe Coated Magnetoelastic Biosensors for the Rapid Detection of Salmonella Typhimurium](#)

[Sang-Jin Suh](#)

[1818The Center for Produce Safety - an Industry's Journey to Reduce Foodborne Illness](#)

[Bonnie Fernandez-Fenaroli](#)

[1819Spectral Imaging Technologies for Food Safety and Quality Evaluations](#)

[Moon Sung Kim](#)

[1820New Development in Physical, Chemical, and Biological Sensors for Precision Agriculture](#)

[Z.-Y. Cheng](#)

1821 [Biomaterials Research Support at the National Science Foundation](#)

[Aleksandr Simonian](#)

1822 [Phase-Based Electrochemical Biosensors for Detection of Pathogenic Bacteria](#)

[Yan Zhou, Ramaraja P. Ramasamy](#)

1823 [A Biosensor Based on Magnetic Resonance Relaxation](#)

[MariAnne Sullivan, Bart Charles Prorok](#)

1824 [Pulse Excitation Method for Magnetoelastic Biosensors](#)

[Howard Clyde Wikle, Songtao Du, Shin Horikawa, Bryan A Chin](#)

1825 [Exploration of Metal Oxide Catalysts for Direct Urine Fuel Cell and Gas Sensors for Its Condition Monitoring](#)

[Yoonsung Chung, Hyejin Park, Eunji Lee, Seokhee Lee, Sungpil Woo, Youngsoo Yoon, Dong-Joo Kim](#)

1826 [Optimization of Phage and Surface Blocker Loading for the Magnetoelastic Biosensor](#)

[Jijia Hu, Shin Horikawa, Fengen Wang, Yating Chai, Songtao Du, Yuzhe Liu, Bryan A. Chin, Jing Hu](#)

1827 [Layer-By-Layer Assembled Carbon Nanotube Immobilized Enzyme Cascade for Sucrose/O<sub>2</sub> Biofuel Cell Utilization](#)

[Yuanyuan Zhang, Mary Arugula, Shannon Williams, Aleksandr Simonian](#)

1828 [The Dynamic Characterization of Electrochemical Proximity Assay with a Multi-Parametric/Multimodal Spectroscopy Apparatus](#)

[Lang Zhou, Mary Arugula, Christopher J Easley, Curtis Shannon, Aleksandr Simonian](#)

1829 [Electrochemical Sensing System for Detection of Tricresyl Phosphate \(TCP\) in Aqueous Solution and Air](#)

[Alina N Chansheva, Mary A Arugula, Alex L Simonian](#)

1830 [Optimization of Nanoporous Anodic Aluminum Sensor-Based Lspr for Methicillin-Resistant Staphylococcus Aureus detection](#)

[Mi-Kyung Park, Rubab Momna, Haeng Mi Byeon, Sung Hyeok Park, Joo Hyeon Park, You Jin Kim, In Young Choi, Sae-Wan Kim, Shin-Won Kang](#)

1831 [Real-Time Detection of Salmonella on Fresh Apples Using Magnetoelastic Biosensors Operating Under Multi-Harmonic Resonance Modes](#)

[Songtao Du, Shin Horikawa, Jiajia Hu, Fengen Wang, Yuzhe Liu, Bryan A Chin](#)

1832 [Silica-Coated Magnetostrictive Biosensors for Real-Time Detection of Campylobacter Jejuni in Washing Water](#)

[Lin Zhang, Ou Wang, Z.-Y. Cheng, Tung-Shi Huang](#)

1833 [Wireless Sensors and Actuators Based on Magnetostrictive Resonators](#)

[Kewei Zhang, Lin Zhang, Z.-Y. Cheng](#)

1834 [Novel Sensing System for in-Situ Monitoring Soil Water Content](#)

[Lin Zhang, Z.-Y. Cheng](#)

1835 [Development of on-Site Applicable Immunosensor Combined with Light Microscopic Imaging System for the Detection of Salmonella in Poultry](#)

[Jun-Hyun Oh, Mi-Kyung Park](#)

1836 [Enhanced Pathogen Detection on Fresh Produce Using Micron-Scale Magnetoelastic Biosensors](#)

[Shin Horikawa, Yating Chai, Howard Clyde Wikle, Sang-Jin Suh, James M Barbaree, Bryan A Chin](#)

1837 [Multilayer Scanning Coil Detector for Improved Detection of Surface Pathogen Contamination](#)

[Yuzhe Liu, Songtao Du, Shin Horikawa, Howard Clyde Wikle, Jiajia Hu, Fengen Wang, Bryan A. Chin](#)

1838 [Rapid and Sensitive Detection of Salmonella Typhimurium on Plastic Food Processing Plates By Using Wireless Biosensors](#)

[Yuzhe Liu, Shin Horikawa, Songtao Du, Yating Chai, Jiajia Hu, Fengen Wang, Bryan A Chin](#)

1839 [Detection of Multiple Pathogens on Fresh Produce Using a Surface-Scanning Coil](#)

[Fengen Wang, Shin Horikawa, Yating Chai, Jiajia Hu, Songtao Du, Yuzhe Liu, Howard Clyde Wikle, Bryan A. Chin](#)

1840 [Novel Magnetostrictive Fe-Co-B Thin Film Sensors for Food Safety Detection](#)

[Zhizhi Sheng, Z.-Y. Cheng](#)

1841 [VOC Gas Sensors Fabricated with Graphene Oxide Composites for Food Safety and Quality](#)

[Hyejin Park, Eunji Lee, Yoonsung Chung, Seokhee Lee, Dong-Joo KIM](#)

1842 [ZnO Nanostructures with Different Morphologies and Their Combinatorial Optimization with Graphene Oxide for Gas Sensor Properties](#)

[Eunji Lee](#)

1843 [Amperometric Detection of Plant Volatiles Using Metal Oxide Nanoparticles](#)

[Yi Fang, Ramaraja P. Ramasamy](#)

## **Z01-General Student Poster Session**

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1844 [Theory and Experiments for Generalization of the Scanning Bipolar Cell for Patterning of Diverse Metals](#)

[Trevor M Braun, Daniel T. Schwartz](#)

1845 [The Studies of Interfacial Property and Water Dynamic Process within Self-Humidifying Confined PFSA-Zeolite Composite Membrane](#)

[Viola Sim, Ran Deng, Wei Han, King Lun Yeung](#)

1846 [Formation of CuInSe<sub>2</sub> Printable Solar Cell Using Aqueous Phase Synthesized CuIn Alloy Nanoparticles](#)

[Hideyuki Takahashi, Shun Yokoyama, Kazuyuki Tohji](#)

1847 [Understanding the Electrochemical Induction of Urea to Ammonia on Nickel Based Catalyst in Alkaline Medium](#)

[Fei Lu, Gerardine G Botte](#)

1848 [Effect of Oxygen Impurity on Nitrogen Radicals in Post-Discharge Flows](#)

[Yoshinobu Shiba, Akinobu Teramoto, Tomoyuki Suwa, Kensuke Watanabe, Shinichi Nishimura, Yasuyuki Shirai, Shigetoshi Sugawa](#)

1849 [Functionality Supports Synthesis of Tungsten Carbides for Catalytic Applications By Arc Plasma Deposition Process](#)

[JI-Won Oh, Hyunwoong Na, Kyou-Hyun Kim, Seong Ho Son, Sahn Nahm, Hanshin Choi](#)

1850 [Manipulation of Nanoscale 3 Dimensional Architecture: Graphitic Carbon/Nickel Core-Shell Structured Nanoparticles Dispersed on Carbon Black Support](#)

[Hyunwoong Na, JI-Won Oh, Yong Soo Cho, Hanshin Choi](#)

[1851 Proton-Coupled Electron Transfer in an Electroactive Three Hydrogen Bond Dda Array Capable of Binding an Aad Guest](#)

[Ran He, Diane K. Smith](#)

[1852 Photocatalytic Decomposition of Various Organic Compounds over WO<sub>3</sub> Supported Ordered Intermetallic Ptpb Co-Catalyst](#)

[Takao Gunji, Toyokazu Tanabe, Shingo Kaneko, Futoshi Matsumoto](#)

[1853 Development of Mirco-Machine Moving with Glucose and Hydrogen Peroxide](#)

[Keitaro Yamazaki, Shingo Kaneko, Toyokazu Tanabe, Takao Gunji, Futoshi Matsumoto](#)

[1854 Agarose Based Biopolymer Gel Electrolyte for Electrochemical Applications](#)

[Rahul Singh](#)

[1855 The Role of Pre Hydrogen Flow in Nucleation of Graphene on Silicon Nitride](#)

[Segeun Park, Doyeon Kang, Yonghan Roh](#)

[1856 Microelectrochemical Property of Precipitates in Al-Mg Alloy](#)

[Yuto Sakaizawa, Izumi Muto, Yoshiyuki Oya, Takahiro Koyama, Yu Sugawara, Nobuyoshi Hara](#)

[1857 Focused Ion Beam Milling Technique for Plan-View TEM Sampling of DRAM Capacitor](#)

[Sungho Lee, Jonghyuk Kang, Cheol-Woong Yang](#)

[1858 Synthesis and Characterization of Na<sub>3</sub>V<sub>2</sub>\(PO<sub>4</sub>\)<sub>2</sub>F<sub>3</sub> Based Cathode Material for Sodium Ion Batteries](#)

[Ronald Väli, Alar Jänes, Enn Lust](#)

[1859 Chemical Deposition of Vanadium Oxide Electrode for Electrochemical Capacitors](#)



[Haoran Wu, Keryn Lian](#)

[1860 Formulation of Ionic Liquid Electrolyte to Expand the Voltage Window of Supercapacitors](#)

[Katherine L Van Aken, Majid Beidaghi, Yury Gogotsi](#)

[1861 Reaction Energies for Electrode Surface Atom Insertion into R-H Bonds and Their Dependence on Electrode Potential: Application to Pt\(111\)](#)

[Meng Zhao, Alfred B. Anderson](#)

[1862 Fabrication of Ag-Deposited Silicon Nanoparticles for a Lithium Ion Battery Anode Prepared By Alkaline Immersion Plating](#)

[Yu Sugawara, Susumu Arai](#)

[1863 Fabrication of Copper / Single-Walled Carbon Nanotube Composite Plating Films By Electrodeposition](#)

[Kyohei Kirihata, Susumu Arai, Mitsugu Uejima, Mitsuhiro Hirota](#)

[1864 Fabrication By Electrodeposition of a New Tin Anode Reinforced with Carbon Nanotubes for Lithium Ion Batteries](#)

[Kouki Matsunaga, Susumu Arai](#)

[1865 Fabrication of a New Tin Anode for a Lithium-Ion Battery Using a Three-Dimensional Copper Nanostructure](#)

[Mendsaikhan Munkhbat, Susumu Arai](#)

[1866 Inter-Particle Aggregation and Breakage in Taylor-Reactor Using CFD](#)

[Hyeon-Kwon Lee, Dong Hyup Jeon, Jong-Pal Hong, Jung-Hoon Song](#)

[1867 Activated Graphene-Derived Porous Carbon with Exceptional Gas Adsorption Properties](#)

[Aswathi Ganesan, Manikoth M Shaijumon](#)

[1868 Anomalous Mobility Improvement in Ultra-Low-Temperature Polycrystalline-Silicon Thin-Film Transistors on Flexible Substrate after Laser Lift-Off Process](#)

[Yin-Chang Wei, I-Che Lee, Huang-Chung Cheng](#)

[1869 A New Nasicon-Structure Phosphor As a Blue Component for White LED](#)

[Yoon Hwa Kim, Won Bin Im](#)

[1870 Anion Conductive Multiblock Copolymers with Long Side Chains for AEM Fuel Cells](#)

[Lisha Liu, John M. Ahlfield, Paul A Kohl](#)

[1871 In Situ Observation of Electrodeposition of Li on Pt and Ni Substrates in Organic Electrolyte](#)

[Naoaki Munemura, Izumi Muto, Yu Sugawara, Nobuyoshi Hara](#)

[1872 The Study of Abnormal Degradation in High-Voltage P-Type Mosfets with N+ Polysilicon Gate during AC Stress](#)

[Dongjun Lee, Changsub Lee, Sunghoi Hur, Duheon Song, Byoungdeog Choi](#)

[1873 A New Silica-Based Anode Using Three-Dimensional Nanostructured Copper As a Current Collector for Lithium Ion Batteries](#)

[Ryota Ara, Susumu Arai](#)

[1874 Improved Performance and Stability of Ni-Free Anode Materials for Intermediate Temperature-Solid Oxide Fuel Cells](#)

[Soo-Yeon Jo, Jun-Young Park](#)

[1875 Durability Study of Double Perovskite Cathode Materials for Intermediate Temperature-Solid Oxide Fuel Cells](#)

[Ja-Yoon Yang, Jun-Young Park](#)

1876 [Electrospun Porous Nanorod Perovskite Oxide/Ionic Conductor Composite As an Electrochemical Catalyst for Water Splitting](#)

[In-Seop So, Jun-Young Park](#)

1877 [Electrochemical Oscillations during Reduction of Nitrate and Nitrite Ions at High Overpotential](#)

[Terumasa Kuge, Yuri Yamada, Shuji Nakanishi, Yoshiharu Mukouyama](#)

1878 [Alkali Metal Ions Induced Electrochemical Oscillations in H<sub>2</sub>O<sub>2</sub> - H<sub>2</sub>SO<sub>4</sub> - Pt System](#)

[Hirokazu Kawasaki, Daisuke Hara, Mitsunobu Kikuchi, Yuri Yamada, Shuji Nakanishi, Yoshiharu Mukouyama](#)

1879 [Chaotic Oscillations in H<sub>2</sub>O<sub>2</sub> - H<sub>2</sub>SO<sub>4</sub> - Pt Electrochemical System](#)

[Daisuke Hara, Hirokazu Kawasaki, Mitsunobu Kikuchi, Yuri Yamada, Shuji Nakanishi, Yoshiharu Mukouyama](#)

1880 [Specimen Preparation Method to Dual-Axis TEM Analysis Technique](#)

[Sang Gul Park, Sungho Lee](#)

1881 [Bipolar Membrane Fabrication for Fuel Cells](#)

[John M. Ahlfield, Lisha Liu, Paul A Kohl](#)

1882 [Surface Functionalized Carbon Nanofiber Supports for Alkaline ORR Catalysts](#)

[Wenjiao Huang, John M. Ahlfield, Paul A Kohl, Xinsheng Zhang](#)

1883 [Approaches to the Molecular Recognition of Lanthanides Using Azulenyl-, Phenyl-, Beta-Naphtyl- and Vinyl-Malonate Derivatives](#)

Cristina-Andreea Amarandei, Eric Saint-Aman, Liviu Birzan, Eleonora-Mihaela Ungureanu

1884C-Doped TiO<sub>2</sub>-B Nanowires Derived from TiC As an Anode Materials for Lithium Ion Batteries with High Rate Performance

Subrahmanyam Goriparti, Remo Proietti Zaccaria, Claudio Capiglia

1885Synthesis of Lanthanum Telluride Thin Films By Electrodeposition from Ionic Liquids

Yitzhak Snow, Tyler D. Pounds, Stephen L. Farias, Robert C. Cammarata

1886Effect of Br<sub>2</sub> Complexation on a Hydrogen-Bromine Flow Battery Performance

Regis Paul Dowd, Michael Zeets, Trung Van Nguyen

1887The Effect of Change in Solution Chemistry of Bulk Solution on Crevice Corrosion Propagation of Stainless Steel

Takahito Aoyama, Yu Sugawara, Izumi Muto, Nobuyoshi Hara

1888Synergistic Effect of Cobalt Nanoparticles Embedded in Nitrogen-Doped Carbon As a Pt Alternative Electrocatalyst for Dye-Sensitized Solar Cells

Sung hee Ahn

1889Preparation Conditions of Polypyrrole Film on Sulfur-Based Cathode to Prevent Polysulfide Dissolution in Lithium Secondary Batteries

Natsuki Nakamura, Tokihiko Yokoshima, Hiroki Nara, Toshiyuki Momma, Tetsuya Osaka

1890Oxygen Evolution Reaction on Zirconium Oxide Film in Alkaline Medium

Ayaka Oishi, Koichi Matsuzawa, Yuji Kohno, Akimitsu Ishihara, Shigenori Mitsushima

[1891Effect of Thermal Treatment of Poly\(amide imide\) Binder on Cycling Performance of Silicon Alloy-Based Anode for Lithium-Ion Battery](#)

[Sang-Hyung Kim, Hwi Soo Yang, Seung Hyun Yook, Seon-Kyong Kim, Cheol-Ho Park, Hae Young Choi, Dong-Won Kim](#)

[1892Composite Polymer Electrolyte Containing Core-Shell Structured  \$\text{SiO}\_2\(\text{Li}^+\)\$  Particles for Suppressing Lithium Dendrite Growth and Improving High Temperature Cycling Stability of  \$\text{LiNi}\_{0.5}\text{Mn}\_{1.5}\text{O}\_4\$](#)

[Won-Kyung Shin, Se-Mi Park, Dong-Won Kim](#)

[1893Relaxation Structure Analysis of  \$\text{Li}\_x\text{NiO}\_2\$  \( \$x=0.09\$ \) after Li-Extraction](#)

[Akihiro Tamura, Shigeomi Takai, Takeshi Yabutsuka, Takeshi Yao](#)

[1894All-Nanosheet Electrochemical Capacitors Assembled By Laminating Redox-Active Nanosheets and Ion-Conductive Nanosheets](#)

[Seiji Uchida, Syota Ito, Shinya Suzuki, Masaru Miyayama](#)

[1895Preparation and Performance Evaluation of Pt/SnO<sub>2</sub>/KB As Cathode Catalyst of PEMFC](#)

[Sawaka Kitayama, Taro Kinumoto, Miki Matsuoka, Tomoki Tsumura, Masahiro Toyoda](#)

[1896Preparation of  \$\text{LaMnO}\_3\$ -CNF and Activity for Oxygen Electrode Reaction in KOH Aqueous Solution](#)

[Kohei Ono, Taro Kinumoto, Tomoki Tsumura, Masahiro Toyoda](#)

[1897Numerical Simulations of Rechargeable Lithium-Ion Batteries with Porous Positive Electrodes: Local Reaction Rate Distribution](#)

[Daiki Ito, Munekazu Motoyama, Yasutoshi Iriyama](#)

[1898Carbon Dioxide Absorption Behavior and Carbonate Ion Transport of Lithium Orthosilicate / Potassium Carbonate Coexistence System Prepared By Ball Milling](#)

[Kyohei Kanki, Hideshi Maki, Minoru Mizuhata](#)

1899 [Single Particle Measurement Technique Using Tweezers-Type Probe for Insertion Materials](#)

[Yuto Yamada, Tomohiro Ohmura, Hirokazu Munakata, Kiyoshi Kanamura](#)

1900 [Effect of Epitaxial Growth of Gold Nanoparticles on Silicon Substrates on Adhesion of Electrolessly Deposited Metal Films](#)

[Naoki Yamada, Hiroyuki Atsushiba, Susumu Sakamoto, Naoki Fukumuro, Shinji Yae](#)

1901 [Mechanism for Alpha-PbO<sub>2</sub> formation on the Cathode of Lead Acid Battery](#)

[Taichi Iwai, Takeshi Yabutsuka, Shigeomi Takai, Takeshi Yao](#)

1902 [Effect of Nickel Content on the Corrosion Behaviour of Stainless Steel at 80 °C](#)

[Dan Guo, Linda Wu, Ahmed Y. Musa, Veena Subramanian, Delin Li, J. C. Wren](#)

1903 [Carbon Nanomaterials Doped with Sulfur for ORR in Alkaline Media](#)

[Elizabeth Montiel-Macias, Perla B Balbuena, Raynald Gauvin, Gabriel Rosado, Ysmael Verde Gomez](#)

1904 [Studies of Electrode/Electrolyte Interfaces](#)

[Daniel Parr, Jacob Chrestenson, Kasim Malik, Luke M. Haverhals](#)

1905 [Studies of Mass Transport in Semiconducting Thin Film Electrodes](#)

[Daniel Parr, Carl Meunier, Ethan Roberts, Edward E. Remsen, Luke M. Haverhals](#)

1906 [Novel Potentiometric Sensors Based on Nanostructured TiO<sub>2</sub> Electrodes for Selective Determination of Biologically Relevant Transition Metals](#)

[Maryam Hariri, Sylvie Morin](#)

[1907 Investigation of Effect of Zinc on Alloy 600 Passive Layers Formed in High Temperature Primary Water](#)

[Yifan Jiang, Thomas Devine](#)

[1908 Biomolecule Detection Using a Resonant Capacitive Sensor](#)

[Danielle Bane, Guru Subramanyam, Karolyn M. Hansen](#)

[1909 XPS and FTIR Studies of Dual Target Sputtered Bcn Thin Films](#)

[Adithya Prakash, Kalpathy B Sundaram](#)

[1910 Irrigation System Using Photovoltaics and Lithium Ion Batteries for Energy Storage](#)

[Eugene Newton Moss, Charles Oladimeji, Pedro L. Moss, Mark H Weatherspoon](#)

[1911 Carbon Coated MoO<sub>2</sub> Deposited through an Economical Polymer-Assited Solution Method on Nickel Foam As Anodes for Lithium-Ion Batteries](#)

[Brian Patterson, Hongmei Luo](#)

[1912 Nanogaps Fabricated from Electrodeposited Fe-Ni-Co Nanowires](#)

[Xiaohua Geng, Elizabeth J Podlaha](#)

[1913 Engineering Optical Properties of Nanorods Fabricated By Physical Vapor Deposition](#)

[Md Aman Uddin, Ugur Pasaogullari](#)

[1914 Cyclic Voltammetric Analysis of 1-Methyl-4-Nitroimidazole Under Biological Conditions](#)

[Andrew Doan Nguyen, Ghazwan M Darzi, Diane K. Smith](#)

[1915 3D Architected Si-Cu Core-Shell Nanolattices As Mechanically Robust, Binder-Free Li-Ion Battery Electrodes](#)

[Xiaoxing Xia, X. Wendy Gu, Julia R Greer](#)

1916 [Analysis of a Four H-Bond Array Using Cyclic Voltammetry: Introducing a New Redox Center to Strengthen Dimerization](#)

[Bryan T. Tamashiro, Diane K. Smith](#)

1917 [Evaluation of Dynamic Hydrophobicity of Nanoporous Silicon Surfaces Prepared By Metal-Assisted Chemical Etching](#)

[Kenta Machida, Hidetaka Asoh, Naoya Yoshida, Toshinori Okura, Sachiko Ono](#)

1918 [Electrochemical Properties of Transition Metal-Doped LiCoPO<sub>4</sub> Synthesized By Hydrothermal Method](#)

[Yusaku Noda, Yuto Yamada, Shohei Miyamoto, Hirokazu Munakata, Koji Ohira, Shuhei Yoshida, Daisuke Shibata, Kiyoshi Kanamura](#)

1919 [Proton-Coupled Electron Transfer in an Electroactive Three Hydrogen Bond Dda Array Capable of Binding an Aad Guest](#)

[Ran He, Diane K. Smith](#)

1920 [Effect of Etchant Composition on Surface Morphology of GaAs during Anisotropic Chemical Etching](#)

[Hidetaka Asoh, Sachiko Ono, Daiki Ito](#)

1921 [Opaque White Anodic Oxide Film Formed on Aluminum](#)

[Ayaka Kurihara, Hidetaka Asoh, Sachiko Ono](#)

1922 [The Effect of the Angle of Incident of the Light upon the Optical Reflectance on Silicon Nanowires Grown By Electroless Etching](#)

[Victor H. Velez, Robert George Mertens, Kalpathy B Sundaram](#)



[1923Studies on the Effects of Angle of Incidence on the Optical Reflectance Properties of Silicon Nanowires Grown By Electroless Etching](#)

[Victor H. Velez, Robert George Mertens, Kalpathy B Sundaram](#)

1924[Electrochemical Synthesis of Co-Rh Alloys](#)

[Krzysztof Mech, Piotr Zabinski, Remigiusz Kowalik, Marek Wojnicki](#)

## **Z02-Nanotechnology General Session**

All Divisions/Interdisciplinary Science and Technology Subcommittee

1925[Analytical Study of the Band GAP and Optical Characteristics of Copper Sulphide Thin Film: Experiment and Computation](#)

[Emmanuel Ifeanyi Ugwu, John Okwo, Daniel Ugadu Onah, John Elom Ekpe](#)

1926[Electroassisted Assembly of Alkylphosphonic Acids Monolayers on Nitinol](#)

[Sébastien Devillers, Annelies Vanhooland, Tatiana Issakova, Joseph Delhalle, Zineb Mekhalif](#)

1927[Cellular Toxicity Assessment and Environmental Impact of Pre- and Post-CMP Nanoparticle Slurries](#)

[Karshak Kosaraju, Mubin Tarannum, Steven Crawford, Shyam Aravamudhan](#)

1928[Surface-Initiated ATRP of \(hydroxyethyl\)Methacrylate on Nitinol Modified By in Situ Generated Diazonium from Its Nitro Precursor](#)

[Amory Jacques, Joseph Delhalle, Zineb Mekhalif](#)

1929[Fabrication of Large Scale Silver Nanowire Network By Ion Beam Irradiation](#)

[Shehla Honey, F.T. Thema, Ishaq Ahmad, Shahzad Naseem, Maaza Malik](#)

1930[Influence of Focused Electron Beam on Electrical Characterization of Advanced Mosfets](#)

[Jonghyuk Kang, Sungho Lee, Byoungdeog Choi](#)

1931 [Ultrasound Assisted LiFePO<sub>4</sub> Nano Plate Synthesis Via Subsequential Aqueous Precipitation Method](#)

[Safak Dogu, Mehmet Kadri Aydinol](#)

1932 [Electrochemical Separation, Pumping, and Storage of Hydrogen or Oxygen into Nanocapillaries Via High Pressure MEA Seals](#)

[Ryan D Reeves, Nicholas R Schwartz, Gregory E Chester, Douglas S Diez, Mitchell L Solomon, Philip Cox, Justin J Hill](#)

1933 [High Resolution 3-Dimensional Chemical and Morphological Imaging of Single Li<sub>x</sub>FePO<sub>4</sub> Particles](#)

[Young-Sang Yu, David Shapiro, Maryam Farmand, Chunjoong Kim, Yijin Liu, Jordi Cabana](#)

1934 [Characterization of Lift Off Resist during Thermal Compression Wafer Bonding Based on Polydimethylglutarimide \(PMGI\)](#)

[Thomas Dushatinski, Takashi Matsumae, Tarek M Abdel-Fattah, Andrew D. Koehler, Jordan D Greenlee, Travis J Anderson, Helmut Baumgart, Karl D Hobart, Francis J Kub](#)

### **Z03-Impedance Technologies, Diagnostics, and Sensing Applications**

Physical and Analytical Electrochemistry/Corrosion/Industrial Electrochemistry and Electrochemical Engineering/Sensor

1935 [Development of Equivalent Circuits for Lithium-Air Battery Impedance Using Mixed and Isolated Diffusion Models](#)

[Ruben Nelson, Mark H Weatherspoon](#)

1936 [Covalently Cross-Linked Cholesterol Oxidase for an Indirect Detection Cholesterol Biosensor](#)

[Jarryd Noah Ashby, Ramaraja P. Ramasamy](#)

[1937 Analysis of Shunt Currents and Associated Corrosion of Bipolar Plates in PEM Fuel Cells](#)

[Vadim Lvovich, William Bennett, Mark Hoberecht](#)

[1938 Interpretation of Complex Capacitance Using Equivalent Circuit Involving Constant Phase Element](#)

[Yoshinao Hoshi, Kozue Tabei, Isao Shitanda, Masayuki Itagaki](#)

[1939 Suitable Position of Reference Electrode in Three-Electrode Cell for Impedance Measurements in Lithium-Ion Rechargeable Battery Investigated By Finite Element Method](#)

[Yoshinao Hoshi, Yuki Narita, Keiichiro Honda, Tomomi Ohtaki, Isao Shitanda, Masayuki Itagaki](#)

[1940 Time Domain Analysis on Current Response of Equivalent Circuit Involving Constant Phase Element](#)

[Masayuki Itagaki, Suguru Suzuki, Yoshinao Hoshi, Isao Shitanda](#)

[1941 Influence of Probe Size and Probe Position for Local Electrochemical Impedance Spectroscopy](#)

[Vincent Vivier, Molena de Assis Camila, Caio P. Abreu, Isolda Costa, Hercilio G. de Melo, Michel Keddam](#)

[1942 Finite Elements Approach to Predicting Impedance Response of Geometrically Convolved Samples](#)

[Petr Vanýsek, Petr Vyroubal, Jiří Haňka, Vitězslav Novák, Jiří Maxa](#)

[1943 On the Dielectric Properties of Human Skin](#)

[Mark E. Orazem, Annette Bunge](#)

[1944 Contribution of Surface Roughness to Constant-Phase Element \(CPE\) Behavior](#)

[Christopher L. Alexander, Bernard Tribollet, Mark E. Orazem](#)

1945[Using Internal Pressure Measurements to Fundamentally Understand the Aging of Lithium-Ion Batteries](#)

[David Alan Wetz, Anthony Matasso, Derek Nathan Wong](#)

1946[Development of Simultaneous Measurement Method of Potentiodynamic Polarization Curve and Impedance Spectra Determined By Wavelet Transformation](#)

[Seiya Kato, Yoshinao Hoshi, Isao Shitanda, Masayuki Itagaki](#)

## **Z04-Electrochemical Energy Summit (E2S)**

All Divisions

N/A [Electrochemical Energy Summit Plenary Address](#)

[Franklin M. Orr](#)

1948[The Joint Center for Energy Storage Research \(JCESR\): A New Paradigm for Energy Storage Research](#)

[George Crabtree](#)

1949[Overcoming Key Challenges for a Viable Lithium-Sulfur Transportation Battery](#)

[Kevin R Zavadil](#)

1950[Non-aqueous Redox Flow Batteries for Grid Storage](#)

[Fikile R. Brushett](#)

1951[Artificial Photosynthesis- Progress and Prospects](#)

[Harry A Atwater](#)

[1952New Advances in Stabilizing High-Efficiency Semiconductors for Use in Solar Fuels Applications](#)

[Matthew T. McDowell, Ke Sun, Shu Hu, Michael Frankston Lichterman, Xinghao Zhou, Matthew Shaner, Erik Verlage, Bruce Brunshwig, Nathan S. Lewis](#)

[1953Bringing Components to Solar Fuels Prototypes: Material Discovery, Interface Engineering, and Integration](#)

[Ian D. Sharp](#)

[1954U.S. Department of Energy Hydrogen and Fuel Cell Tech-to-Market Activities and National Laboratory Impact Initiatives](#)

[Sunita Satyapal, Chris Ainscough, Adam Z Weber, Sanjiv Malhotra, Dimitrios C Papageorgopoulos, Rick Farmer](#)

[1955Industry Invited Talks: "The Future of Battery and Fuel Cell Powered Cars: Challenges and Opportunities"](#)

[x TBD](#)

[1956The Center for Electrochemical Energy Science \(CEES\): An Overview](#)

[Paul Fenter](#)

[1957Center for Mesoscale Transport Properties: Probing the Limits of Electron and Ion Transport over Multiple Length Scales](#)

[Amy C Marschilok](#)

[1958Surface Reaction, Solvent Inhomogeneity, and Ion Transport in Electric Double Layers: Predictions from a Classical Density Functional Theory](#)

[Cheng Lian, Jianzhong Wu](#)

[1959Advancing Operando Tools to Probe Multiscale Complexity in Chemical Energy Storage](#)

[Karena W Chapman, Clare P Grey, Peter J Chupas, Philip Batson, Frederic Cosandey, Jordi Cabana, Shirley Meng, Guangwen Zhou](#)

1960 [A Single Material Battery](#)

[Chunsheng Wang, Fudong Han](#)

1961 [Structures, Devices, and Architectures for Nanoscale Solutions in Electrical Energy Storage](#)

[Gary W Rubloff, Sang Bok Lee](#)

1962 [Electrochemical Stiffness in Anodes and Cathodes for Lithium Ion Batteries](#)

[Andrew A. Gewirth, Hadi Tavassol, Elizabeth M. C. Jones, Jennifer Esbenshade, Nancy R. Sottos](#)

1963 [Atomic Force Microscopy Applications for Energy Storage: Detecting the Structure and Dynamics of Fluid/Electrode Interfaces](#)

[Jeremy Come, Jennifer Black, Sergei V. Kalinin, Nina Balke](#)

1964 [Understanding the Layered Oxides for High-Voltage Intercalation in Alkaline Ion Batteries](#)

[Shirley Meng](#)

1965 [Northeast Center for Chemical Energy Storage \(NECCES\)](#)

[M. Stanley Whittingham](#)

1966 [The Evolution of a High Capacity Electrode](#)

[YuHuang Wang, Chuan-Fu Sun](#)

1967 [Ionic Liquid Structure and Dynamics at Charged Graphene Interface](#)

[Ahmet Uysal](#)

1968 [The Role of Ultrathin Coatings on the Interfacial Reactions at  \$\text{LiMn}\_2\text{O}\_4\$  Surfaces](#)

[Jeffrey W Elam, Khalil Amine, Michael M. Thackeray, Larry Curtiss, Mark C. Hersam, Vinayak Dravid, Chris Wolverton, Andrew A. Gewirth](#)

1969 [Center for Mesoscale Transport Properties: Molecular to Mesoscale \(m2m\)](#)

[Esther S Takeuchi](#)

1970 [Addressing Fundamental Problems in Capacitive Energy Storage](#)

[Majid Beidaghi, Katherine L Van Aken, Boris Dyatkin, Kelsey B. Hatzell, David J Wesolowski, Yury Gogotsi](#)

1971 [Computational Studies of Lithium Manganese and Nickel-Manganese Oxide Spinel Surfaces](#)

[Hakim Iddir, Kah Chun Lau, Larry Curtiss](#)

1972 [Electronic Structure Calculations and Synergistic Experimental Work in the Nanostructures for Electrical Energy Storage \(NEES\) Energy Frontier Research Center](#)

[Kevin Leung](#)

1973 [Electrochemical Evolution of the Surface and Subsurface Properties of Layered Nickel-Rich Oxide Cathodes](#)

[Louis F.J. Piper, Shawn Sallis, Nathalie Pereira, Pinaki Mukherjee, Frederic Cosandey, Yiqing Huang, Nicholas F. Quackenbush, M. Stanley Whittingham, Glenn G Amatucci](#)

1974 [The Fluid Interface Reactions, Structures and Transport \(FIRST\) Energy Frontier Research Center](#)

[David J Wesolowski](#)

[1975An Integrated First Principles and Experimental Approach to Enabling Multi-Electron Lithium-Ion Battery Cathodes](#)

[Shyue Ping Ong, Yuh-Chieh Lin, Yiqing Huang, Bohua Wen, Nicholas F. Quackenbush, Youngmin Chung, Natasha Chernova, Fredrick Omenya, Louis F.J. Piper, M. Stanley Whittingham](#)

[1976The Challenge of 3D All Solid State Li-Ion Battery](#)

[A. Alec Talin, Dmitry Ruzmetov, Paul Haney, Andrei Kolmakov, Alexander C Kozen, Alex Pearse, Keith Gregorczyk, Tom Schmitt, Gary W Rubloff](#)

[1977Hybrid Li-Ion/Li-Oxygen Battery Materials](#)

[Maria K. Y. Chan, Alper Kinaci, Zhenzhen Yang, Chun Zhan, Chi-Kai Lin, Victor A. Maroni, Lynn Trahey, Zhenpeng Yao, Jinsong Wu, Fernando Castro, Qianqian Li, Vinayak Dravid, Chris Wolverton, Christopher Johnson, Jun Lu, Khalil Amine, Michael M. Thackeray](#)

## **Z05-Late Poster Session**

All Divisions

[1978Studies on Dielectric Properties of Annealed RF-Sputtered ZrO<sub>2</sub> Thin Films](#)

[Raul R. Mendoza, Giji Skaria, Adithya Prakash, Victor H. Velez, Kalpathy B Sundaram](#)