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at the address below.

The Electrochemical Society  
65 South Main Street, Building D  
Pennington, New Jersey 08534-2839  
USA

Phone: 1.609.737.1902

Fax: 1.609.737.2743

[ecs@electrochem.org](mailto:ecs@electrochem.org)

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**Meeting Abstracts —MA2017-01**

**231st ECS Meeting**

**May 28, 2017 - June 1, 2017 —New Orleans, LA**

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534 Analyzing High-Voltage Graphite/Lnmo Cells with a Novel Impedance Procedure Utilizing a Micro-Reference Electrode

Daniel Pritzl, Johannes Landesfeind, Hubert A. Gasteiger

535 Enhanced Heat Transfer in Porous Media for Reducing Degradation of the of Lithium-Ion Batteries

Masoud Jabbari, Ramez Kian

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536  $\text{Li}_2\text{S}$  Nanoparticles for for a Better Understanding of the First Charge Working Mechanism of Li-Ion/Sulfur Batteries: An Operando XAS/Xes Coupled with XRD Analysis



Alice Robba, Renaud Bouchet, Céline Barchasz, Jean-Francois Colin, Erik Elkaïm, Kristina Kvashnina, Gavin Vaughan, Matjaz Kavcic, Fannie Alloin

537 Three-Dimensional Lithium-Iodine Microbatteries for Implantable Devices

Michael A Citrin, Julia R Greer

538 Methodology for Assessing the Lithium-Sulfur Battery Degradation for Practical Applications

Vaclav Knap, Daniel Ioan Stroe, Rajlakshmi Purkayastha, Sylwia Walus, Daniel J Auger, Abbas Fotouhi, Karsten Propp

539 Investigation of Oxidizing Graphene Halides for Li/S Batteries

Eduardo Pardo, Edward Thai, Nathanael Dunham, Josue Alonso, Jonathan Garcia, Andrew Dinh, Ted H. Yu

540 Experimental Protocol for Magnesium Electrochemistry

Robert C Masse, Guozhong Cao

541 Intrinsic Conductivity in Magnesium-Oxygen Battery Discharge Products: MgO and MgO<sub>2</sub>

Jeffrey Gordon Smith, Junichi Naruse, Hidehiko Hiramatsu, Donald J Siegel

542 Investigation into the Mechanism and Causes of Gassing in Li<sub>4</sub>Ti<sub>5</sub>O<sub>12</sub> Based/ LiMn<sub>2</sub>O<sub>4</sub> Li-Ion Battery Systems

Jennifer Hoffmann, Mickdy S Milien, Brett Lucht, Jing Li, Martin Payne, John Sans, Scott Stephenson

543 Calculating Anisotropic Correlated Chemical Expansion of Oxygen and Lithium Vacancies in Li<sub>2</sub>MnO<sub>3</sub> to Determine Vacancy Concentrations

Christine James, Leah Nation, Juchuan Li, Nancy J Dudney, Brian W. Sheldon, Yue Qi

[544Current Redistribution and Uneven Heat Generation in a Lithium-Ion Battery Pack with Cells of Initial Performance Difference](#)

[Dan DAN, Zhe Li, Yangjun Zhang](#)

[545The Effects of Electrolyte Additives on  \$\text{Li}\_4\text{Ti}\_5\text{O}\_{12}\$  and How They Impact Gassing](#)

[Mickdy S Milien, Jennifer Hoffmann, Jing Li, Martin Payne, Scott Stephenson, John Sans, Brett L Lucht](#)

[546Comparative Studies of Ti Doped  \$\text{LiNi}\_{0.7}\text{Co}\_{0.3}\text{O}\_2\$  and  \$\text{LiNi}\_{0.7}\text{Co}\_{0.3}\text{O}\_2\$  Nano Cathode Material for High Energy Density Li-Ion Battery](#)

[Roshidah Rusdi, Norlida Kamarulzaman, Hashlina Rusdi](#)

[547Novel Lithium Manganese Silicate with Stable Structure upon Cycling As Positive Electrode for Lithium-Ion Batteries](#)

[Guillaume Lefèvre, Jean-Baptiste Ducros, Adrien Boulineau, Anass Benayad, Sebastien Martinet](#)

[548Thermal Model for High Capacity Lithium-Ion Battery at the Cell Scale and Experimental Validation](#)

[David Allart, Maxime Montaru, Hamid Gualous](#)

[549A Statistical Mechanical Model Incorporating Coupled Concentration-Strain Effects in Lithium Ion Battery Electrode](#)

[Hongjiang Chen, Hsiao-Ying Shadow Huang](#)

[550A Novel  \$\text{LiTi}\_2\text{O}\_{4-x}\text{C}\_x\$  As Li-Ion Battery Anode Material](#)

[Da Li, Anthony Robert Armstrong, John T. S. Irvine](#)

[551Engineered Current Collector Interface for High Energy Density Li-Ion Batteries](#)

[Lakshman K Ventrapragada, Ramakrishna Podila, Apparao M Rao](#)

[552 Composite Tin Dioxide-Titanium Dioxide Nanostructured Thin Film Electrodes As Lithium-Ion Anodes](#)

[Clayton Thomas Kacica, Louis S. Wang, Tandeep Singh Chadha, Pratim Biswas](#)

[553 Morphological, Structural and Electrochemical Analysis of  \$\text{NaN}\_3\$  Sacrificial Salt Containing  \$\text{P2-Na}\_{0.67}\[\text{Fe}\_{0.5}\text{Mn}\_{0.5}\]\text{O}\_2\$  Cathode and Hard Carbon Anode Sodium-Ion Battery](#)

[Jaione Mtz. de Ilarduya, Laida Otaegui, Juan Miguel López del Amo, Michel Armand, Gurpreet Singh](#)

[554  \$\text{Li}/\text{Ag}\_2\text{VO}\_2\text{PO}\_4\$  Batteries: The Roles of Composite Electrode Constituents on Electrochemistry](#)

[Andrea Bruck, David C Bock, Christopher J Pelliccione, Yiman Zhang, Kenneth J Takeuchi, Amy C Marschilok, Esther S Takeuchi](#)

[555 Ordered and Disordered Hybrid Tunnel Structured Manganese Oxides for Na-Ion Batteries](#)

[Bryan Byles, Ekaterina Pomerantseva](#)

[556 Study to Improve Electrolytes in Sodium Batteries](#)

[Dejuante Walker, Edward Thai, Tamunotelema Higgwe, Ted H. Yu](#)

[557 Chloride Ions Assisted Charge Transfer Reaction in Lithium-Ion Batteries with Ag As Cathode Materials](#)

[Huimin Wang, Yingshun Li, Jiaolong Zhang, Denis Y.W. Yu](#)

[558 Optimizing the Electrolyte for Glucose-Derived Carbon Based Na-Ion Battery](#)

[Ronald Väli, Thomas Thomberg, Alar Jänes, Enn Lust](#)

[559 Polymer-Sulfide Composite Solid State Electrolyte with Enhanced Interfacial Stability with Sodium Metal](#)

[Ye Zhang, Pu Hu, Yan Yao](#)

[560NaFe\(HPO<sub>4</sub>\)<sub>2</sub>: A New Polyanionic Cathode Material for Lithium and Sodium-Ion Batteries](#)

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[561Demonstration of Carbon-Free Lithium-Ion Redox Flow Couple](#)

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[Jiaolong Zhang, Denis Yau Wai Yu](#)

[563Application of Ordered Intermetallic Nanoparticles to Polymer Electrolyte Fuel Cells](#)

[Yubin Liu, Takao Gunji, Takashi Tsuda, Toyokazu Tanabe, Shingo Kaneko, Takeo Ohsaka, Futoshi Matsumoto](#)

[564Optimizing Design Parameters of Li-Ion Batteries for Phev and EV](#)

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[565Investigating SEI Formation on Lithium Metal Anodes](#)

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[566Dissolvable Conducting Polymers for Electrochemical Energy Storage](#)

[Virginia Diaz, Roseanne Warren](#)

[567Phase Content and Conductivity of Aluminum- and Tantalum-Doped Garnet-Type Lithium Lanthanum Zirconate Solid Electrolyte Materials](#)

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[568Reducing Inhomogeneous Current Density Distribution in Graphite Electrodes By Design Optimization](#)

[Frank M. Kindermann, Günter Ehlert, Patrick J. Osswald, Jörg Schuster, Alexander Rheinfeld, Andreas Jossen](#)

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[570Studies on Complex Electrolytes for Divalent Batteries](#)

[Laura Merrill, Sunil Upadhyay, Jennifer L. Schaefer](#)

[571Hybrid Cathode of LiFePO<sub>4</sub> and Activated Carbon Prepared with a Porous Al Current Collector and Its Battery Performance](#)

[Takashi Tsuda, Takao Gunji, Toyokazu Tanabe, Shingo Kaneko, Takeo Ohsaka, Naohiko Soma, Kaoru Itagaki, Futoshi Matsumoto](#)

[572Nanoimprinting of Woodpile Electrodes for 3D Lithium-Ion Microbatteries with Both High Capacity and Power](#)

[Wenhao Li, Yiliang Zhou, Irene Howell, Yue Gai, Kenneth R. Carter, James J. Watkins](#)

[573Hydrothermal Assembly of Submicron Si Recovered from Si Waste with Graphene and Carbon for Scalable Lithium Battery Anodes](#)

[Byeongyong Lee, Tianyuan Liu, Hankwon Jang, Hee Dong Jang, Seung Woo Lee](#)

[574A Steric Approach to Modifying Redox Potentials](#)

[Corrine F Elliott, Matthew D Casselman, Subrahmanyam Modekrutti, Chad Risko, Susan A Odom](#)

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[575 Synthesis of Graphene Nanosheets for the Energy Sector By Electrochemical Exfoliation of Graphite in Sulfonated Ionic Liquids](#)

[Edgar Cuara-Diaz, Diana Morales-Acosta, Salvador Fernández Tavizón, Roberto Benavides](#)

[576 Sulfonation of Graphene Oxide for Fuel Cells Electrode and Membrane Applications](#)

[Diana Morales-Acosta, Roberto Benavides, Edgar Cuara-Diaz, Jose Alberto Rodríguez-González, Salvador Fernández Tavizón](#)

[577 Synthesis and Characterization of  \$\alpha\$ -MnO<sub>2</sub>/Graphene Nanocomposites for Applications to in High Performance Super Capacitors](#)

[Rahul Singhal, Peter Lemaire, Amir Omidwar](#)

[578 First-Principles Calculation of Li-GIC Compounds: Van-Der Waals Interaction DFT Calculation](#)

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[579 Electropolymerization and Electrochemical Performance of Nickel Schiff Base Complexes on Reduced Graphene Oxide\(RGO\) Support for Supercapacitors](#)

[Fuhai Deng, Xinping Li, YuDong Wang, Jianling Li](#)

[580 CoMn<sub>2</sub>O<sub>4</sub> Anchored on N-Doped High-Dimensional Hierarchical Porous Carbon Derived from Biomass As a Bifunctional Oxygen Electrocatalyst](#)

[James Lincuna Digol, Maricor Fernandez Divinagracia, Marc Francis Maligsa Labata, Rinlee Butch Cervera, Joey Duran Ocon](#)

[581 DFT Simulation of Edge Halogenated Graphene Nanosheets As an ORR Catalyst in Fuel Cells](#)

[Roberto Rodriguez, Nicholas Humphrey, Gabriel Arias, William A Goddard, Ted H. Yu](#)

[582 Oxygen Electrocatalyst Based on Non-Precious Bifunctional Hybrid Material](#)

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[583 Study of Capacity Retention of Mcmb Anode Using Various Nanostructured Conductive Additives](#)

[Salahuddin Ahamad, Amit Gupta](#)

[584 \(Invited\) Freestanding Nanoscale SWCNT Films: Durability, Transport and Applications](#)

[Erik K. Hobbie](#)

[585 \(Invited\) Carbon Nanotube Films for Organic-Inorganic Hybrid Perovskite Solar Cells](#)

[Shigeo Maruyama, Il Jeon, Takahiro Sakaguchi, Clement Delacou, Shohei Chiashi, Esko Kauppinen, Yutaka Matsuo](#)

[586 \(Invited\) Polymer Wrapped Carbon Nanotubes As Highly Effective Hole Transporting Layers for New Perovskite and Quantum Dot Photovoltaic Devices](#)

[Robin J Nicholas, Severin N Habisreutinger, Nakita K Noel, Henry J Snaith, Andrew Watt, Yujiro Tazawa, Nanlin Zhang](#)

[587 \(Invited\) SWCNT:C60 Solar Cells from Aqueous Separation Techniques](#)

[Benjamin S Flavel](#)

[588 Controlled Addition of Carbon Nanotube Defects and Their Role in Limiting Solar Cell Performance](#)

[Jialiang Wang, Matthew J Shea, Michael S. Arnold](#)

[589 Trap-Limited Recombination and Energy Offset at the Carbon Nanotube – C<sub>60</sub> Interface](#)

[Matthew J Shea, Jialiang Wang, Michael S. Arnold](#)

[590\(Invited\) Photoluminescence Brightening in Single Walled Carbon Nanotubes](#)

[Zhentao Hou, Amanda Amori, Nicole Cogan, Todd D Krauss](#)

[591Diameter-Dependent Excitation Energy Transfer for Enhanced Semiconducting Single-Walled Carbon Nanotube Solar Photoconversion](#)

[Rachelle Ihly, Stein van Bezouw, Dylan Arias, Sofie Cambre, Jochen Campo, Andrew John Ferguson, Justin C. Johnson, Wim Wenseleers, Jeffrey L. Blackburn](#)

[592Geometries and Dynamics of Photoinduced Electron-Hole Pairs in Polyhexylthiophene-Fullerene Systems](#)

[Yasuhiro Kobori, Taku Miura, Ran Tao, Tomokazu Umeyama, Sho Shibata, Takashi Tachikawa, Hiroshi Imahori](#)

[593Structural Identification of 11 of the 19 Isomers of the Opv Acceptor Bispcbm Via <sup>13</sup>c NMR and UV-Vis Absorption Spectroscopy, and Cyclic Voltammetry, Coupled with DFT Simulations](#)

[Tong Liu, Alston J. Misquitta, Isaac Abrahams, John Dennis](#)

[594Purification and Frontier Orbital Characterisation of 19 Purified Isomers of the Opv Acceptor Bis\[60\]PCBM](#)

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[595\(Invited\) Organic Polymers for Thermoelectric Energy Conversion](#)

[Michael Chabinye](#)

[596\(Invited\) Less Is More: Thermoelectric Performance Enhancements in Polymer-Free Semiconducting Single-Walled Carbon Nanotube Networks](#)

[Andrew John Ferguson, Brenna Norton-Baker, Rachelle Ihly, Isaac E. Gould, Noah J. Stanton, Bradley A. MacLeod, Azure D. Avery, Zbyslaw R. Owczarczyk, Jeffrey L. Blackburn](#)



[597\(Invited\) Low Temperature Thermoelectric Power Factor from Completely Organic Thin Films Enabled By Carbon Nanostructures](#)

[Jaime Grunlan, Chungyeon Cho, Choongho Yu](#)

[598Thermally Chargeable All-Solid-State Flexible Supercapacitor for Waste Heat Harvesting and Storage](#)

[Arpan Kundu, Timothy Fisher](#)

[599\(Invited\) Flexible Mxene/Graphene Films for Ultrafast Supercapacitors](#)

[Jun Yan, Chang E. Ren, Christine Hatter, Babak Anasori, Patrick Urbankowski, Narendra Kurra, Kathleen Maleski, Asya Sarycheva, Yury Gogotsi](#)

[600Fullerene Nanostructures As High-Performance Supercapacitors and Beyond](#)

[Shushu Zheng, Xing Lu](#)

[601Fullerene-Grafted 3D Graphene As Electrical Energy Storage Material](#)

[Maira R. Cerón, Monika M. Biener, Patrick G. Campbell, Juergen Biener, Luis Echegoyen](#)

[602\(Invited\) Space-Confined Assembly of All-Carbon Hybrid Fibers for Capacitive Energy Storage](#)

[Yuan Chen](#)

[603Supercapacitor Stack Built from Monolithic Porous Glassy Carbon Electrodes](#)

[Artur Braun](#)

[604Direct Growth of Carbon Nanofibers on Nickel Foam and Its Application As Electrochemical Supercapacitor Electrodes](#)

[Deepak Sridhar, Sasha Omanovic, Jean-Luc Meunier](#)

[605The Modification of the Pore Characteristics of Activated Carbon, for Use in Electrical Double Layer Capacitors, through Plasma Processing](#)

[Marcelis L. Muriel, Rajaram Narayanan, Prabhakar R Bandaru](#)

[606Structural and Electrochemical Characterizations of Waste Cooking Oil Based Nano Carbons As Electrode Materials for Lithium Ion Capacitors](#)

[Arenst Andreas Arie, Lukito Hadisaputra, Ratna Frida Susanti, Joong Kee Lee, Hary Devianto](#)

[607Delignification Enhances Capacitance of Wood-Derived Electrodes](#)

[Yepin Zhao, Mohammad F. Islam](#)

[608\(Invited\) Nanographenes and Their Self-Assemblies for Highly Efficient Energy Devices](#)

[Hsing-Lin Wang, Gang Wu, Sergei Tretiak, Hung-Ju Yen, Edward F. Holby](#)

[609Electrochemical Lithiation-Delithiation of Sulfur in Single-Walled Carbon Nanotubes](#)

[Chengyin Fu, Guanghui Li, Robert C Haddon, Juchen Guo](#)

[610Vertical Aligned Graphene/Metal Sulfides/N-Doped Carbon Ternary Sandwich Hierarchical Structure for Sodium Storage](#)

[Dong Xie, Xinhui Xia, Jiangping Tu](#)

[611Theoretical Investigation of Oxygen- and Bromine-Functionalized Model Carbon Structures for Li-Redox Activity](#)

[Saurin Hiren Rawal, Gopi Krishna Phani Dathar, William A Shelton, Ye Xu](#)

[612Nanocarbon Current Collectors for Aqueous Batteries](#)

[John Hayden, Chuan-Fu Lin, Wei Luo, Gary W Rubloff, Liangbing Hu](#)

[613An Impedance Study on Porous Carbon/Lithium Titanate Composites for Li-Ion Battery](#)

[Zhaofeng Deng, Ching-Kit Ho, Chi-Ying Vanessa Li, Kwong-Yu Chan](#)

614[\(Invited\) Advanced Carbon Structures for PEMFC](#)

[Dusan Strmenik, Dongguo Li, Pietro Papa Lopes, Eric Coleman, Haifeng Lv, Nenad M Markovic, Vojislav Stamenkovic](#)

615[Graphene-Based “Core-Shell” Hierarchical Nanostructured Low-Pt Electrocatalysts for Proton Exchange Membrane Fuel Cells](#)

[Vito Di Noto, Enrico Negro, Ketì Vezzù, Angeloclaudio Nale, Yannick Bang, Federico Bertasi, Graeme Nawn, Gioele Pagot](#)

616[Preparation of Porous Graphene Via Covalent Functionalization for Efficient Electrocatalysis in Oxygen Reduction](#)

[Mohammad Shamsuddin Ahmed, young-Bae Kim](#)

617[\(Invited\) Electroreduction of Oxygen on Nitrogen-Doped Carbide-Derived Carbon Materials in Alkaline Media](#)

[Sander Ratso, Ivar Kruusenberg, Maike Käärìk, Mati Kook, Rando Saar, Martti Pärs, Jaan Leis, Kaido Tammeveski](#)

618[\(Invited\) Multifunctional Graphene-Coated Carbon Nanotube Aerogels](#)

[Mohammad F. Islam](#)

619[Carbon Nanotube-Based Non-Noble Metal Catalyst for Oxidation Reduction Reaction](#)

[Naotoshi Nakashima, Jun Yang](#)

620[Freestanding Graphene-Coated Carbon Nanotube Aerogels Decorated with Metal Nanoparticles As High Performance Electrodes for Ethanol Oxidation](#)

[Minghao Xie, Mohammad F. Islam](#)

[621DFT Simulation of the Oxygen Reduction Reaction on Graphene Catalyst Edges](#)

[Quang Ly, William A Goddard, Ted H. Yu](#)

[622Structures of Boron Loaded Turbostratic Graphene with Enhanced Performance in Solid Acid Fuel Cell](#)

[Mengkun Tian, Wesley Tennyson, Alexander Blair Papandrew, Ramez Ahmed Elgammal, Gyula Eres, Gerd Duscher, Alexander A. Puzosky, David B. Geohegan, Thomas Anthony Zawodzinski](#)

[623Nitrogen, Phosphorus Dual-Doped Ordered Mesoporous Carbon Electrocatalyst for Oxygen Reduction Reaction](#)

[Gang Zhao, Jianbo Xu, Tianshou Zhao](#)

[624Enhanced Visible Light Photocatalytic Activity of Carbon Nanotube Aerogels Decorated with Titania By Phase Selective Interface Engineering](#)

[Yao Xu, Siyuan Liu, Paul A Salvador, Gregory S. Rohrer, Mohammad F. Islam](#)

[625Electrochemical Behavior By DFT of Nanostructured Carbon Surfaces Modified By S or N](#)

[Elizabeth Montiel-Macias, Perla B Balbuena, Ysmael Verde Gómez](#)

[626Highly Active Transition Metal and Nitrogen Co-Doped Carbon Nanotube Based Cathode Catalysts for Anion Exchange Membrane Fuel Cells](#)

[Ivar Kruusenberg, Dilip Ramani, Sander Ratso, Kaido Tammeveski, Arunachala Mada Kannan](#)

[627Graphene-Based Electrocatalysts to Boost Electrocatalytic Reduction of Oxygen in Bioelectrochemical Systems](#)

[Barbara Mecheri, Valerio C.A. Ficca, Maida Aysla Costa de Oliveira, Alessandra D'Epifanio, Ernesto Placidi, Fabrizio Arciprete, Silvia Licocchia](#)

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[Abdolmajid Bayandori Moghaddam, Pegah Pojhan](#)

629 [\(Invited\) New Glycofullerenes for Ebola Virus Infection](#)

[Javier Ramos-Soriano, Alfonso Pérez, Laura Rodríguez-Pérez, Beatriz Illescas, Javier Rojo, Rafael Delgado, Nazario Martín](#)

630 [\(Invited\) On the Non-Covalent Functionalization of Carbon Nanostructures for Biomolecule Immobilization](#)

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631 [Electrocuring Tissue Adhesives](#)

[Terry WJ Steele](#)

632 [Graphene Catalytic Growth on Copper for Glucose Sensing Applications](#)

[Lorenzo Pedrazzetti, Fabio Bizzoni, Roberto Bernasconi, Andrea Lucotti, Peiman Soltani, Alessio Mezzi, Saulius Kaciulis, Luca Nobili, Luca Magagnin](#)

633 [\(Invited\) Single Carbon Nanotube Tracking Reveals Nanoscale Organization of the Extracellular Space in Live Brain Tissue](#)

[Laurent Cognet](#)

634 [\(Invited\) Synthetic Infrared Nanosensors for Brain Imaging of Modulatory Neurotransmitters](#)

[Markita Landry, Abraham Beyene, Jackson Travis Del Bonis-O'Donnell](#)

[635Graphene Quantum Dots: Emerging Carbon Nanomaterials](#)

[Caroline Hadad, Jose Miguel Gonzalez Dominguez, Akcan Istif, Tatiana Da Ros](#)

[636\(Invited\) Synthetic Protein Recognition Using Fluorescent Single-Walled Carbon Nanotubes](#)

[Gili Bisker, Michael S Strano](#)

[637Cellular Targeting of Carbon Nanotubes By Helical Polymers](#)

[Januka Budhathoki-Uprety, Rachel E Langenbacher, Prakrit Vaibhav Jena, Daniel A Heller](#)

[638\(Invited\) Noninvasive Detection and Spectral Triangulation of Single-Walled Carbon Nanotubes In Vivo](#)

[R. Bruce Weisman, Ching-Wei Lin, Sergei M. Bachilo, Kathleen M. Beckingham, Hailing Yang, Robert C. Bast](#)

[639Delivery of Large Volume Single Walled Carbon Nanotube Sensor Liquid Via Hydrogel Encapsulation](#)

[Nicole M Iverson, Eric M Hofferber, Sophia C Walsh, Joseph A Stapleton, Janelle J Adams, Victoria A Bart](#)

[640\(Invited\) Organelle-Specific Targeting and Localization of Single Wall Carbon Nanotubes](#)

[Kris Noel Dahl, Mohammad F. Islam](#)

[641Interaction of Single-Walled Carbon Nanotubes \(SWCNTs\) with Photosynthetic Organisms](#)

[Alessandra Antonucci, Nils Schuergers, Ardemis Anoush Boghossian](#)

[642Experimental and Computational Approaches to Explore the the Mechanisms of Carbon Nanotube Biosensing](#)

[Prakrit Vaibhav Jena, Jeetain Mittal, Daniel A Heller, Mohammad Safaee, Daniel Roxbury](#)

643[Single-Walled Carbon Nanotubes for the Quantification of Active Chemotherapy Drugs](#)

[Jackson Dean Harvey, Hanan Baker, Thomas Vito Galassi, Ryan M. Williams, Daniel A Heller](#)

644[Graphene Oxide: A Modifiable Platform for Drug Delivery Imaging and Sensing](#)

[Anton V Naumov, Elizabeth Sizemore, Md. Tanvir Hasan, Marais Culp](#)

645[\(Invited\) Single-Molecule Electronic Sensors to Monitor Conformational Dynamics in Nucleic Acids](#)

[Delphine Bouilly](#)

646[Toward Single-Color Carbon Nanotube Fluorescence Microscopy](#)

[Rachel E Langenbacher, Januka Budhathoki-Uprety, Daniel A Heller, Prakrit Vaibhav Jena, Daniel Roxbury, Ming Zheng, Jackson Dean Harvey](#)

647[Cylindrical Graphene Nanomaterials for Disease Assessment and Drug Development](#)

[Daniel A Heller, Januka Budhathoki-Uprety, Rune Frederiksen, Thomas Vito Galassi, Jackson Dean Harvey, Christopher Peter Horoszko, Prakrit Vaibhav Jena, Rachel E Langenbacher, Daniel Roxbury, Janki Shah, Yosef Shamay, Ryan M. Williams](#)

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[Avetik R Harutyunyan, Neal Pierce, Gugang Chen](#)

649[\(Invited\) The Evolution of W-Co-C Catalyst during the CVD Growth of Chirality-Selective Growth of Single-Walled Carbon Nanotubes](#)

[Shigeo Maruyama, Rong Xiang, Hua An, Akihito Kumamoto, Taiki Inoue, Shohei Chiashi, Yuichi Ikuhara](#)

[650 Carbon Nanotubes Electrosynthesized from CO<sub>2</sub> for Efficient Greenhouse Gas Removal](#)

[Stuart Licht, Jiawen Ren, Matthew J. Lefler, Marcus Johnson, Juan Vicini](#)

[651 \(Invited\) Tungsten-Based Intermetallic Compound As Catalyst for Structure-Specific Growth of Single-Walled Carbon Nanotubes](#)

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[652 Revealing the Structure of Catalyst for Diameter and Chirality Selective Growth of Single-Walled Carbon Nanotube Directly on SiO<sub>2</sub>](#)

[Rong Xiang, Akihito Kumamoto, Hua An, Yuichi Ikuhara, Shigeo Maruyama](#)

[653 \(Keynote\) Carbon Nanotubes ~Controllability of Nanostructure and Applications~](#)

[Morinobu Endo, Takuya Hayashi, Kenji Takeuchi, Hiroyuki Muramatsu](#)

[654 \(Invited\) Controlling Carbon Nanotubes By DNA: From Separation to Assembly](#)

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[655 \(Invited\) Facile Isolation of Adsorbent-Free Long Semiconducting Single-Walled Carbon Nanotubes Based on Supramolecular Chemistry](#)

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[656 Spectral Inhomogeneities in Swcnts Sorted By Nonlinear Dgu](#)

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[657 Displacement Kinetics of Single-Stranded DNA Wrapped Around Carbon Nanotubes](#)



[Yu Zheng, Sergei M. Bachilo, Stephen R. Sanchez, R. Bruce Weisman](#)

[658\(Invited\) Energetic Basis of Aqueous-Two-Phase Separation of Single Wall Carbon Nanotube Enantiomers](#)

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[659\(Invited\) Tube<sup>2</sup>](#)

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[660Effects of Chemically-Introduced Structures on Near Infrared Photoluminescence of Locally Functionalized Single-Walled Carbon Nanotubes](#)

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[661Diameter Selective Chemical Doping of Semiconducting Single-Wall Carbon Nanotubes](#)

[Melanie Achsnich, Marian Deutsch, Carina Muetzel, Tobias Hertel](#)

[662Origin of Highly Efficient Iodine Doping in Carbon Nanotubes Studied By Raman Spectroscopy and First-Principles Calculations](#)

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[663\(Invited\) Effects of Residual Wrapping Polymer on Charge and Exciton Transport in Semiconducting SWCNT Thin Films](#)

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[664\(Invited\) Developments in Modulating Carbon Nanotube Photoluminescence](#)

[Daniel A Heller, Januka Budhathoki-Uprety, Thomas Vito Galassi, Jackson Dean Harvey, Christopher Peter Horoszko, Prakrit Vaibhav Jena, Rachel E Langenbacher, Daniel Roxbury, Ryan M. Williams](#)

[665\(Invited\) Functionalization of Carbon Nanotubes in a Micellar Environment](#)

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[666\(Invited\) Honoring and Remembering Robert H. Hauge - Carbon Nanotube Research Contributions](#)

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[667\(Invited\) Evolution of Catalyst Role in Single Wall Carbon Nanotube Growth](#)

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[668\(Invited\) Autonomous Experimentation Applied to Carbon Nanotube Synthesis](#)

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[669\(Invited\) Toward the Electrochemical Growth of Single-Walled Carbon Nanotubes from Ambient Carbon Dioxide](#)

[Anna Douglas, Rachel E. Carter, Cary L. Pint](#)

[670\(Invited\) Establishing Thermodynamically-Stable Surfactant Structures Around Single Wall Carbon Nanotubes](#)

[Kirk J Ziegler](#)

[671\(Invited\) Functionalization of Carbon Nanotubes](#)

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[672\(Invited\) Diameter-Dependent Thermal Defunctionalization of Single-Walled Carbon Nanotubes](#)

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

[673\(Invited\) Recent Progress Toward Single Crystals of Single-Wall Carbon Nanotubes](#)

[Weilu Gao, Junichiro Kono](#)

[674\(Invited\) Teslaphoresis of Carbon Nanotubes](#)

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[675\(Invited\) Modification and Analysis of Carbon Based Structures By Metal Nanoparticulate Ions](#)

[John Albert Schultz, Robert Hauge, W. Wade Adams, Bruce E Brinson, Nam Dong Kim, Michael McCully, Ernest Lewis, Damon Barbacci, Carey Balaban, Ludovic Muller, Shelley Jackson, Amina Woods](#)

[676\(Invited\) Recent Advances in SWCNT Analytical Spectroscopy](#)

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[677\(Invited\) Functionalization and Environmental Dependent Emission Properties of Photoluminescent Defect States in Carbon Nanotubes](#)

[Stephen K. Doorn, Xiaowei He, Nicolai F. Hartmann, Brendan Gifford, Sergei Tretiak, Han Htoon, George Bullad, Jean-Hubert Olivier, Michael J. Therien](#)

[678\(Invited\) Probing Optical and Magneto-Optical Properties of Carbon Nanotubes Using Enriched Carbon Nanotube Materials](#)

[Erik H. Haroz](#)

[679\(Invited\) Effect of Physisorbed Oxygen on the Photoluminescence of Single-Walled Carbon Nanotubes Suspended By Single-Stranded DNAs](#)

[Sergei M. Bachilo, Yu Zheng, R. Bruce Weisman](#)

[680\(Invited\) From Carbon Nanotubes to Graphene, a Versatile Building Block in the Nanoscale World](#)

[Carter Kittrell, James M. Tour](#)

[681\(Invited\) Seamless Graphene-Carbon Nanotube \(GCNT\) Electrodes](#)

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[682\(Invited\) Soft Conductors from Carbon Nanotubes](#)

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[683\(Invited\) Electronic Measurements of Single- and Multi-Walled Carbon Nanotubes: Evidence for Unusual Behavior at Nanotube-Nanotube Junctions](#)

[Andrew R Barron, Chris Barnett, Cathren Gowenlock](#)

[684\(Invited\) Carbon and Non-Carbon Nanomaterials for Sustainable Energy](#)

[Sivaram Arepalli](#)

[685\(Invited\) Multifunctional Materials from Dispersions of Single-Walled Carbon Nanotubes and Biomolecules](#)

[Virginia A. Davis](#)

[686\(Invited\) Carbon Nanotubes from Synthesis, Assembly to Electrochemical Sensors](#)

[Noe Alvarez, Daoli Zhao, William R. Heineman, Vesselin N. Shanov, David Siebold](#)

[687\(Invited\) Carbon-Based Nanomaterials for Bioelectronics](#)

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[688Synthesis of Carbon Nanostructures over Catalytically Active Nanoporous Gold and Cu Foams](#)

[Enkeleda Dervishi, Bryce Tappan, William L Boncher](#)

[689The Electrochemical Performance of Nitrogen-Containing Carbon Nanotubes As the Electrode Material of Supercapacitors](#)

[Xinping Li, Guofeng Xu, Fuhai Deng, Jianling Li](#)

[690Photoluminescent Readout of Molecular Information Using Local Sites Functionalized on Single-Walled Carbon Nanotubes](#)

[Tomohiro Shiraki, Hisashi Onitsuka, Tomonari Shiraishi, Naotoshi Nakashima](#)

[691Quantitative Analysis of Aqueous Two Phase Separation of DNA-SWCNT Hybrids](#)

[Yoona Yang, Akshaya Shankar, Thibault Aryaksama, Ming Zheng, Anand Jagota](#)

[692Carbon-Based Electrodes for High Energy Electrochemical Capacitors](#)

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[693Carbon Nanotube Reinforced Structural Composite Supercapacitors](#)

[Andrew S Westover, Eti Teblum, Deanna Schauben, Anat Yitzhak, Nitin Muralidharan, Merav Muallem, Gilbert Nessim, Cary L. Pint](#)

[694\(Invited\) Modulation of Nanotube Optical Properties By Controlling the Dielectric Environment inside of Single-Wall Carbon Nanotubes](#)

[Jochen Campo, Bea Botka, Sofie Cambre, Wouter van Werveke, Wim Wenseleers, Jeffrey A. Fagan](#)

[695\(Invited\) Quasi Phase Transition in a Single File of Water Molecules Encapsulated inside \(6,5\) Carbon Nanotubes](#)

[Sofie Cambre, Xuedan Ma, Wim Wenseleers, Stephen K. Doorn, Han Htoon](#)

[696Optical Properties of a-Sexithiophene Dyes Aggregated inside Carbon and Boron Nitride Nanotubes](#)

[Etienne Gaufres, Charlotte Allard, Nathalie Tang, Frederic Fossard, Leonard Schué, Julien Barjon, Richard Martel, Annick Loiseau](#)

[697Variance Spectroscopy Monitors the Sonication-Induced Cutting and Debundling of Single-Walled Carbon Nanotubes](#)

[Stephen R. Sanchez, Sergei M. Bachilo, Yu Zheng, Jason K. Streit, R. Bruce Weisman](#)

[698\(Invited\) Excited-State Dynamical Studies of Positively and Negatively Charged Excitons in Polymer-Wrapped Single-Walled Carbon Nanotube Superstructures](#)

[Yusong Bai, Jean-Hubert Olivier, George Bullard, Michael J. Therien](#)

[699\(Invited\) Waveguide Integrated Electrically Driven Carbon Nanotube Light Sources](#)

[Ralph Krupke](#)

[700\(Invited\) Radiation-Hard Semiconducting Carbon Nanotube Thin-Film Complementary Circuits](#)

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[701\(Invited\) Prospects for Wavelength-Tunable Photodetectors with Carbon Nanomaterials](#)

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[702\(Invited\) Massively Parallel, Aligned Arrays of Semiconducting Carbon Nanotubes for Realizing Field Effect Transistors with Current Density Exceeding Silicon and Gallium Arsenide](#)

[Michael S Arnold](#)

[703Smart Carbon Nanotubes Assemblies for High Throughput Filtration Devices](#)

Laura Maggini, Davor Copic, Michael F. L. De Volder

704 Field Deployment of Printed Carbon Nanotube Gas Sensor Arrays for Natural Gas Leak Detection

Clinton J. Smith, Beomseok Kim, Gabriel Iftime, Austin Wei, Eric Cocker, Yong Zhang, M. Meyyappan, David Eric Schwartz

705 (Invited) Nanoscale Imaging of Exciton Localization in Carbon Nanotubes with Far-Field Microscopy

Noémie Danné, Antoine G Godin, Hyejin Kwon, Mijin Kim, Brahim Lounis, YuHuang Wang, Laurent Cognet

706 Quantum Optical Studies on Diazonium Doped Carbon Nanotubes

Xiaowei He, Nicolai F. Hartmann, Xuedan Ma, Weilu Gao, Junichiro Kono, Jeffrey L. Blackburn, Han Htoon, Stephen K. Doorn

707 (Invited) Environmental Effects in Cryogenic Carbon Nanotube Spectroscopy

Alexander Högele

708 Multi-Modal Spectroscopic and Microscopic Characterization of Thin-Film Networks of Semiconducting Carbon Nanotubes

Andrew Crandall Jones, Nicholas M Kearns, Thomas J McDonough, Martin Zanni

709 (Invited) Ultrafast Spectroscopy of Doped Carbon Nanotubes

Tobias Hertel, Klaus Eckstein

710 Quantum Near-Field Effects in Hybrid Carbon Nanotube Systems

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711 (Invited) Optical Signatures of Carbon Nanotube Excitons Coupled to Plasmonic Nanocavities and Metallo-Dielectric Antennas

[Stefan Strauf](#)

[712\(Invited\) Non-Markovian Decoherence and Purcell Effect: How to Enlarge the Bandwidth of a Carbon Nanotube Based Single-Photon Source](#)

[Adrien Jeantet, Yannick Chassagneux, Jean-Sébastien Lauret, Théo Claude, Jakob Reichel, Christophe Voisin](#)

[713\(Invited\) Optical Bistability in Air-Suspended Carbon Nanotubes](#)

[Yuichiro K. Kato](#)

[714\(Invited\) On the Theory of Nanotube-Graphene Crossiton: A New Class of Topological Solutions](#)

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[715Unique Architectural Fidelity of C<sub>60</sub>-Decorated Flavin-Wrapped Nanotubes](#)

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[716\(Invited\) Optical and Electrical Generation of Exciton-Polaritons in Single-Walled Carbon Nanotubes](#)

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[717\(Invited\) Single Ion Adsorption on Individual Isolated Single Walled Carbon Nanotube Field Effect Transistors](#)

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[718\(Invited\) Sensitizing Carbon Nanotube Transistors for Single Molecule Sensor Applications](#)

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[719\(Invited\) Endohedral Single Molecule Magnets](#)

[Thomas Greber](#)

[720\(Invited\) New Developments in Single Molecule Magnetism of Endohedral Metallofullerenes](#)

[Denis Krylov, Chia-Hsiang Chen, Fupin Liu, Stanislav Avdoshenko, Ariane Brandenburg, Aram Kostanyan, Thomas Greber, Alexey A. Popov](#)

[721\(Invited\) Highly Ordered Endohedral Fullerene Derivatives for an Ensemble of Controllable Qubits](#)

[Kyriakos Porfyrakis](#)

[722\(Invited\) Dielectric Response and Quantum Motion of Lithium Cations Trapped inside Carbon Cages](#)

[Shinobu Aoyagi](#)

[723\(Invited\) Modification of Lithium-Ion-Containing \[60\]Fullerene: Synthesis and Successful Preparation of Each \[5,6\]- and \[6,6\]-Isomer](#)

[Yutaka Matsuo, Hiroshi Okada, Hiroshi Ueno, Shinobu Aoyagi](#)

[724\(Invited\) Uranium Endohedrals: New Frontiers in Fullerene Chemistry](#)

[Jesse Murillo, Wenting Cai, Xingxing Zhang, Daniel Najera, Elkin L. Romero, Catalina Suarez, Alejandro J. Metta-Magana, Ning Chen, Luis Echegoyen](#)

[725\(Invited\) Actinide Endohedral Fullerenes: Uranium-Based Systems with Unique Bonding Motifs](#)

[Luis Echegoyen, Wenting Cai, Jesse Murillo, Ning Chen, Daniel Najera, Skie Fortier](#)

[726\(Invited\) Single Crystal Structures, Unique Bonds, Redox Properties and Photoluminescence Activity of Actinide Endohedral Fullerenes](#)

[Ning Chen, Yaofeng Wang, Xingxing Zhang, Luis Echegoyen, Lai Feng](#)

[727\(Invited\) High Pressure Measurements of Two Polymorphs of C<sub>60</sub>2S<sub>8</sub>](#)

[Marilyn M. Olmstead, Kamran B. Ghiassi, Christine M. Beavers](#)

[728\(Invited\) Molecular-Scale Evidence Provides New Insights into Fullerene Formation Mechanism](#)

[Lai Feng](#)

[729\(Invited\) Synthesis and Structural Elucidation of Y<sub>2</sub>C<sub>2</sub>@C<sub>2n</sub> \(2n = 86, 88 and 90\)](#)

[Changwang Pan, Xing Lu](#)

[730\(Invited\) Recent Crystallographic Studies of Endohedral Fullerenes](#)

[Alan L. Balch, Marilyn M. Olmstead, Xian B. Powers, Faye L. Bowles](#)

[731\(Invited\) Non-IPR Monometallic Clusterfullerenes Entrapping a Nearly Linear Metal Cyanide Cluster](#)

[Shangfeng Yang](#)

[732\(Invited\) Stabilization of Giant Fullerenes C<sub>2</sub>\(41\)-C<sub>90</sub>, D<sub>3</sub>\(85\)-C<sub>92</sub>, C<sub>1</sub>\(132\)-C<sub>94</sub>, C<sub>2</sub>\(157\)-C<sub>96</sub>, C<sub>1</sub>\(175\)-C<sub>98</sub>, D<sub>5</sub>\(450\)-C<sub>100</sub>, C<sub>3</sub>\(574\)-C<sub>102</sub> and C<sub>2</sub>\(816\)-C<sub>104</sub> by Encapsulation of a Large La<sub>2</sub>C<sub>2</sub> Cluster](#)

[Shasha Zhao, Wenting Cai, Xing Lu](#)

[733\(Invited\) Use of Support-Free Amines to Isolate Larger Cage Endohedral Metallofullerenes](#)

[Steven Stevenson, Hannah Thompson, Amelia Kirkhorn, Sarah K Budd, Brittany L Kime](#)

[734\(Invited\) Isolation and Structural Characterization of Lu<sub>2</sub>C<sub>2n</sub>](#)

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[735\(Invited\) Water and Water-Dimer Encapsulations into C70 and C84](#)

[Filip Uhlik, Zdenek Slanina, Takeshi Akasaka, Xing Lu](#)

[736\(Invited\) Extending the Spiral Algorithm to Non-Classical Isomers and Metallofullerenes](#)

[Li-Hua Gan, P.W. Fowler](#)

[737\(Invited\) Growth of Endohedral Metallofullerenes: The Transformation of Sc<sub>3</sub>n@D<sub>3</sub>-C<sub>68</sub> into Sc<sub>3</sub>n@C<sub>80</sub>](#)

[Josep M. Poblet, Laura Abella, Antonio Rodríguez-Forteza, Marc Mulet, Paul W. Dunk, Luis Echegoyen](#)

[738\(Invited\) Gas-Phase Self-Assembly of Group III-Based Nitride Clusterfullerenes By Laser Plasma Synthesis](#)

[Paul W. Dunk, Marc Mulet-Gas, Alan G. Marshall, Christopher L. Hendrickson, Edison Castro, Luis Echegoyen, Laura Abella, Antonio Rodríguez-Forteza, Josep M. Poblet](#)

[739\(Invited\) Efficient Fullerene-Based Electron Acceptors for Planar Perovskite Solar Cells](#)

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[740\(Invited\) Molecular Recognition and Assembly of Fullerene and Carbon-Based Materials with Biomolecules](#)

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[741\(Invited\) Epoxide-Type Oxygen-Doped Carbon Nanotubes and Their Applications for NIR Imaging Probes](#)

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[742 Experimental and Theoretical Investigation on the Molecular Structures of Pr@C72, Pr2@C72 and Their Functionalized Adducts](#)

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[743 \(Invited\) Functionalization of Graphene By CVD Using Transition Metal Carbonyls and Their Characterization](#)

[Kizhanipuram Vinodgopal, Xiao You, Eric Laws, Shawn Sendlinger, Nicole Sciortino, Guiping Dai, Joanna Atkin](#)

[744 \(Invited\) Effect of Covalent Chemistry on the Electronic Structure and Properties of the Carbon Allotropes](#)

[Elena Bekyarova, Mingguang Chen, Xiaojuan Tian, Matthew Moser, Wangxiang Li, Guanghui Li, Mikhail E Itkis](#)

[745 \(Invited\) Synthesis and Characterization of Unprecedented D<sub>2h</sub>-Symmetrical Trans-1-\(S,R,R,S-bis-pyrrolidine\)-Tetra-malonate Hexakis Adducts of C<sub>60</sub>](#)

[Edison Castro, Andrea Hernandez, Khalid Azmani, Shuming Liu, Antonio Rodríguez-Fortea, Josep M. Poble, Luis Echegoyen](#)

[746 \(Invited\) Stereodivergent-at-Metal Synthesis of \[60\]Fullerene Hybrids](#)

[Sara Vidal, Salvatore Filippone, Nazario Martín](#)

[747 \(Invited\) Polypeptides As Complexing Units](#)

[Nathalie Solladie](#)

[748 \(Invited\) Rotaxanes and SWNTs Tie the Knot](#)

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[749\(Invited\) Fullerene Cation-Mediated Demethylation/Cyclization to 5- and 7-Membered Cyclo\[60\]Fullerene Derivatives](#)

[Yutaka Matsuo, Keisuke Ogumi, Hiroshi Okada, Takafumi Nakagawa](#)

[750\(Invited\) Subphthalocyanine-Fullerene Conjugates](#)

[Tomas Torres, German Zango, Victor Mariñas, Hector Carrascosa, Giulia Lavarda, Diana Paola Medina, Nicolas Muñoz, Olga Trukhina, M. Salome Rodriguez-Morgade, M. Victoria Martínez-Díaz](#)

[751\(Invited\) 3D Fullerene - Based Metal Organic Frameworks](#)

[Catalina Suarez, Luis Echegoyen](#)

[752\(Invited\) Perixanthoxanthene \(PXX\) As Molecular Dye for Fullerene-Based Reaction Centers](#)

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[753\(Invited\) Multichromophoric Perylenediimide-Silicon Phthalocyanine-C<sub>60</sub> System As an Artificial Photosynthetic Analogue](#)

[Ángela Sastre-Santos, Francis D'Souza](#)

[754\(Nanocarbons Division Richard E. Smalley Research Award Address\) Artificial Photosynthesis Utilizing Nanocarbons](#)

[Shunichi Fukuzumi](#)

[755\(Invited\) Electron-Donor Behavior of Carbon Nanotubes and Graphene](#)

[Luis M Arellano, Myriam Barrejon, Maria Vizquete, María J. Gomez-Escalonilla, Fernando Langa](#)

[756\(Invited\) Electron Donor-Nanocarbon Electron Acceptor Composites Linked with Oligophenylene Bridge](#)

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[757\(Invited\) Axially Assembled Photosynthetic Antenna-Reaction Center Mimics](#)

[Christopher Obondi, Gary N. Lim, Paul Karr, Melanie Pilkington, ARt van der Est, Prashanth K. Poddutoori, Francis D'Souza](#)

[758\(Invited\) Tuning Molecular Singlet Fission – Strong Versus Weak Electronic Coupling](#)

[Dirk M. Guldi](#)

[759\(Invited\) Lif As a Surprisingly Non-Innocent Intermediate Layer in Fullerene-Based Electronic Devices](#)

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[760\(Invited\) Efficient Electron Transport Layer-Free Solar Cells Based on Innovative Perovskite:Fullerene Blends](#)

[Juan Luis Delgado, Nazario Martín, Silvia Collavini, Ramón Tena-Zaera, Jorge Pascual, Ivet Kosta, Rafael Sandoval-Torrientes, Inés García-Benito](#)

[761\(Invited\) High Temperature and High Magnetic Field Superconductivity in Fullerides](#)

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[762\(Invited\) Site-Selective Covalent Patterning of Epitaxial Graphene with Periodicity at the Nanometer Scale](#)

[Rodolfo Miranda, Emilio M Perez, Fabian Calleja, Juan Jesus Navarro, Amadeo L. Vazquez de Parga](#)

[763\(Invited\) Computational Studies on Exohedral Metallofullerenes and Multiadduct C<sub>60</sub> Systems](#)

[Antonio Rodriguez-Fortea, Antonio Moreno-Vicente, Khalid Azmani, Josep M. Poble](#)

[764\(Invited\) Separation and Photophysical Properties of C<sub>84</sub> Minor Isomer D<sub>2d</sub>\(I\)](#)

[Eric Booth, Sanichiro Yoshida, Yao Jin, Mandy Mitchell, Ju Chou](#)

[765\(Invited\) Excited State of Y-Nitride Clusterfullerene: Luminescence and EPR Spectroscopy Study](#)

[Denis Krylov, Michal Zalibera, Sandra Schiemenz, Frank Ziegs, Marco Rosenkranz, Anton Savitsky, Alexey A. Popov](#)

[766\(Invited\) Endohedral Metallofullerene-Based Lewis Acid-Base Pairs](#)

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[767\(Invited\) Metal-Bonding Electrons inside the Fullerene Cage: Electrochemical, Quantum Chemical and EPR Studies](#)

[Nataliya Samoylova, Steven Stevenson, Fupin Liu, Alexey A. Popov](#)

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[768Enhancing the Ion Detection of Graphene Field Effect Transistors at the Quantum Capacitance Limit](#)

[Ibrahim Fakih, Farzaneh Mahvash, Mohamed Sij, Thomas Szkopek](#)

[769Graphene Suspended on Silicon Nanowire Arrays for Enhanced Gas Sensing](#)

[Christoforos Panteli, Oleksiy Sydoruk, Kristel Fobelets](#)

[770Silver Nanoparticle/Boron-Doped Graphene Nanoribbon Nanocomposite for Effective Surface Enhanced Raman Scattering](#)

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[771Inkjet Printing of Graphene for Sensing and Energy Storage Applications](#)

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[772\(Invited\) Tailoring 2D Material-Based Aerogels for Energy Storage and Sensing Applications](#)

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[773High-Performance Supercapacitors of N-Doped Graphene Aerogel and Its Nanocomposites](#)

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[7752D Water-Coupled Metallic MoS<sub>2</sub> with Nanochannels for Ultrafast Supercapacitor](#)

[Hongli Zhu, Xiumei Geng](#)

[776Morphological Varied and Scalable MoS<sub>2</sub> for Electrochemical Energy Storage Devices](#)

[Mumukshu D. Patel, Eunho Cha, Nitin Choudhary, Chiwon Kang, Wonbong Choi](#)

[777Novel Lead-Graphene Positive Grids for a Motive Power Lead-Acid Battery](#)

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[Aniruddha Dive, Min-Kyu Song, Soumik Banerjee](#)

[779Graphene and Graphene Oxide in Low Temperature Fuel Cells for Enhanced Performance.](#)

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[780A First Principle Study of Vanadium Decorated Graphene Oxide As Novel Hydrogen Storage Material](#)

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[781 Modulation of the Electrostatic and Quantum Capacitances of Few Layered Graphenes through Plasma Processing](#)

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[782 Photovoltaic Properties of Monolayer 2D Lateral Heterojunction Devices](#)

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[783 Comparison of Graphene Materials for Supercapacitor Electrodes](#)

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[784 General Synthetic Method for N-Doped Macroporous Graphene-Encapsulated Mesoporous Metal Oxides and Its Application As New Anode Materials for Sodium-Ion Hybrid Supercapacitors](#)

[Min Su Kim, Eunho Lim, Jinwoo Lee](#)

[785 Raman Spectroscopy Studies of Large Area Graphene and Graphene Molecules](#)

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[787 Trends in Buckled and Planar Halogen-Doped Graphene for ORR Activity: A DFT Study](#)

[Reynaldo Marcelino Geronia, Ace Christian Serraon, Joy Marie Mora, Desiree Mae Suan, Allan Abraham Bustria Padama, Rinlee Butch Cervera, Joey Duran Ocon](#)

788[Enhancing the Electrocatalytic Activity of Graphitic Carbon Nitride Towards Oxygen Reduction Reaction Via Heteroatom Doping: A DFT Approach](#)

[Wilbert James Claridad Futralan, Maricor Fernandez Divinagracia, Ace Christian Serraon, Allan Abraham Bustria Padama, Rinlee Butch Cervera, Joey Duran Ocon](#)

789A [Comparative Study of Graphene-like Materials with and without Heteroatom Doping](#)

[Elo Kibena-Pöldsepp, Jaana Lilloja, Mati Kook, Urmas Joost, Väino Sammelselg, Kaido Tammeveski](#)

790[Tuning the Optical Band Gap of Graphene Oxide By Ozone Treatment](#)

[Md Tanvir Hasan, Brian Senger, Roberto Gonzalez-Rodriguez, Anton V Naumov](#)

791[Investigating Properties of Graphene Oxide As a Drug Delivery/Imaging Platform](#)

[Elizabeth Sizemore, Md Tanvir Hasan, Marais Culp, Anton V Naumov](#)

792(a href="#">Invited) Fundamentals of Oxo-Functionalized Graphene and Graphene Oxide

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793[Electrochemical Regeneration of Reduced Graphene Oxide - Metal Oxide Composite Adsorbents](#)

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795[Simultaneous Electrochemical Exfoliation and Functionalization of Graphene By Diazonium Compounds](#)

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796(Invited) Processing and Applications of Monodisperse Two-Dimensional Nanomaterial Inks

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797A New Form of Electrochemical Kinetics, at the Single Layer Graphene – Electrolyte Interface

Prabhakar R Bandaru, Rajaram Narayanan, Hidenori Yamada, Darren Lipomi, Brandon Marin

798Ionic Solutions of Two-Dimensional Materials

Patrick Linden Cullen, Kathleen M Cox, Mohammed K Bin Subhan, Loren Picco, Oliver D Payton, David J Buckley, Tom Miller, Stephen A Hodge, Neal T Skipper, Vasiliki Tileli, Christopher A Howard

799Liquid-Exfoliated Transition Metal Dichalcogenides: A Story of Excitons, Spectroscopic Metrics and Functionalisation

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800Heterostructures Beyond Van Der Waals

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801(Invited) Eau De Graphene : Additive Free, Single Layer Graphene in Water

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802Chemically Modified Graphene and Carbon Quantum Dots: Structural, Electronic and Chiroptical Characterization

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[803\(Invited\) Chemistry of Novel 2D Materials: Black Phosphorus and Antimonene](#)

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[804Substrate Modulated Reductive Graphene Functionalization](#)

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[805>24h Stabilization of Silicon Photoanode Operation in Aqueous Media Using a Fluorinated Graphene Protection Layer](#)

[Annelise C. Thompson, Adam C. Nielander, Nathan S Lewis](#)

[806\(Invited\) New Functionalities of 2-Dimensional Materials: Graphene, Doped-Graphene, Tough Fibers and Beyond](#)

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[807\(Invited\) Atomic-Scale Exploration of Synthetic Low Dimensional Materials](#)

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[808A Wafer-Scale Bernal Stacked Bilayer Graphene Film Obtained on a Cu\(0.5 %at Ni\) Foil Using Atmospheric Pressure Vapour Deposition](#)

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[809In Situ variable-Temperature Scanning Tunneling Microscopy Studies of 2D Graphene and Hexagonal Boron Nitride \(hBN\) Layer Growth Kinetic](#)

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[810Graphene Nanoribbon Heterojunctions with Dbtp Precursors on Ag\(111\)](#)

[Rodolfo Miranda, Borja Cirera, Roberto Otero, Jose M. Gallego, David Ecija](#)

[811Graphene Nanoribbon Synthesis with a Fluorinated Molecular Precursor](#)

[Hironobu Hayashi, Junichi Yamaguchi, Hideyuki Jippo, Shintaro Sato, Hiroko Yamada](#)

812 [Nanowire Templated Growth of Three-Dimensional Fuzzy Graphene](#)

[Tzahi Cohen-Karni, Raghav Garg, Sahil Rastogi, Thomas Nuhfer](#)

813 [Quantum Chemical Predictions for Alkaline Earth \(AE\)-Doped Graphene: A Density Functional Theory \(DFT\) Based Investigation for a Novel Class of Carbon-Based Two-Dimensional Nanomaterials Toward Electrochemical, Catalytic and Electronic Applications](#)

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842(Invited) Inorganic Solid-State Solar Cells Using Plasmon-Induced Charge Separation

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847(Invited) In-Situ Raman Observation of an Isolated Single-Walled Carbon Nanotube to Monitor Highly Localized Plasmon-Induced Reaction

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[961Room-Temperature Atomic Layer Deposition of Al<sub>2</sub>O<sub>3</sub> for Anticorrosion Coating on Metal Surfaces](#)

[Kensaku Kanomata, Makoto Ishikawa, Masanori Miura, Bashir Ahmmad, Shigeru Kubota, Kazuhiro Hirahara, Fumihiko Hirose](#)

[962Phenformin Effect on the Anodic Dissolution of Nickel in Acid Media](#)

[Francisco Vicente, Jeronimo Agrisuelas, Juan A Bastos, Mirta Barbosa, Jose García, Antonello Frau](#)

[963On-Line Atmospheric Corrosion Monitoring of Field-Exposed Steels Using a Electrochemical Probe](#)

[Da-Hai Xia, Shi-Zhe Song, Wei-Xian Jin, Jian Li](#)

[964In Situ XAFS Observation of Chemical Species Near Solid/Liquid Interface in a Model Reaction of Pitting Process](#)

[Ken'ichi Kimijima, Yasuhiro Niwa, Masao Kimura](#)

[965Capability Evaluation of Houttuynia Cordata Leaf Extract As Environmentally Eco-Friendly Inhibitor for Steel Corrosion in HCl 0.1 M](#)

[Hien Van Pham, Vu Si Hoai Nguyen, Tri Dinh Mai, Binh Minh Quoc Phan, Thu Thi Hanh Vu, Nam Dang Nguyen](#)

[966Enhanced Bio-Corrosion Resistance of Sn-Containing ZK60 Magnesium Alloy for Biodegradable Implants](#)

[Ahmad Zakiyuddin, Lee Kwangmin](#)



[967 Voltammetric Characterization of Nickel Hydroxide Grown on Nickel+Epoxy Mouldable Electrodes](#)

[Francisco Vicente, Juan A Bastos, Antonello Frau, Jose García, Jeronimo Agrisuelas, Mirta Raquel Barbosa](#)

[968 Improved Corrosion Resistance of Metastable Beta Ti-X \(X = 6Mn, 8Cr, and 36Nb\) Binary Alloys As a Function of 10.Wt% Mo Equivalence](#)

[Kim Sinhye, Lee Kwangmin](#)

[969 Corrosion of Austenitic Steels and Their Components in Molten NaCl–KCl–UCl<sub>3</sub>](#)

[Aleksandr V. Abramov, Ilya B. Polovov, Kirill V. Dedov, Vyacheslav V. Karpov, Arkadiy Yu. Zhilyakov, Sergey V. Belikov, Vladimir A. Volkovich, Oleg I. Rebrin](#)

[970 Corrosion Performance of New Composite Coatings Onto Carbon Steel By Electrochemical Methods](#)

[Florina Branzoi, Viorel Branzoi, Zoia Pahom](#)

[971 Role of Hydroxyl Group in Cerium Hydroxycinnamate Compounds in Enhancing the Corrosion Resistance of Mild Steel in Chloride Ion Media](#)

[Nam Dang Nguyen, Ha Thi Ngoc Phan, Vu Si Hoai Nguyen, Thu Thi Hanh Vu, Binh Minh Quoc Phan](#)

[972 A Study on the Interaction Between Rare Earth 4-Hydroxycinnamate and AS1020 and X65 Steel Microstructures in Carbon Dioxide Environment](#)

[Nam Dang Nguyen, Vu Si Hoai Nguyen, Mike yongjun Tan, Bruce Hinton, Maria Forsyth](#)

[973 Effect of Crevice Geometry on Corrosion Behavior of Carbon Steel in 5wt% NaCl Solution](#)

[Eiji Tada, Hatsumi Maeda, Atsushi Nishikata](#)

[974 The Effect of Film Thickness and Substrate Resistivity on Corrosion of Fe Thin Films](#)

David Sapiro, Ruishu Feng, Bryan Webler, Margaret Ziomek-Moroz, Paul R Ohodnicki

975Study on Pitting Corrosion of Carbon Steel Induced By Cerium (III) Ions

Shuai Hu, Zhenyu Chen

976The Effect of Cations on Carbon Steel Corrosion in Chloride Media

Prince Kumar Baranwal, Sudip Das, Prasanna Venkatesh Rajaraman

977Development of Metallic Bipolar Plate for PEFC By Coating Carbon Thin Film on Stainless Steel

Sunao Ioku, Kiyohiro Inoue, Hiroki Sugishita, Yoshitaka Chigi, Yosohiro Sugie

978Corrosion Resistance of Stainless Steel Coated with Hydrogen Silsesquioxane Based Spin-on-Glass Coatings Cured in Oxygen Deprived Atmosphere

Felix Lampert, Annemette Hindhede Jensen, Rameez Ud Din, Per Møller

979Study on the Use of Titania Nanoparticles As Synergy Inhibitor for Steel in Ethanol Fuel Blend

Vu Si Hoai Nguyen, Hien Van Pham, Ngan Oanh Kieu Nguyen, Binh Minh Quoc Phan, Thu Thi Hanh Vu, Nam Dang Nguyen

980Investigation of Corrosion Resistance for Annealed and Hardened Stainless Steels

Reyixiati Repukaiti, Cody Fast, Pratik Murkute, Julie Tucker, Burkan Isgor

981Electrochemical Behavior of Steels in CO<sub>2</sub>-H<sub>2</sub>O Systems for Direct Supercritical CO<sub>2</sub> Power Cycle Applications

Richard Repukaiti, Lucas Teeter, Margaret Ziomek-Moroz, Omer Dogan, Julie Tucker

982Corrosion of Carbon Steel in CO<sub>2</sub>-Saturated Brines Investigated By Rotating Disk Electrode and Scanning Vibrating Electrode Technique

[Ruishu Feng, Margaret Ziomek-Moroz, Joseph H Tylczak, Paul R Ohodnicki](#)

983 [Study on the Effect of Surface Finish on Corrosion of Carbon Steel in CO<sub>2</sub> Environment Revisited](#)

[Omar Jesus Yopez](#)

984 [Electrochemical Properties of Carbon Steel Corrosion in Boiler Water at Elevated Temperatures](#)

[Derek M. Hall, Michael F. Caravaggio, Stephen J. Shulder, Serguei N. Lvov](#)

985 [Silane-Based Coating on Hot-Dip Zn Steel Sheets for Hot Stamping](#)

[Jun-Kai Chang, Shun-Yi Jian, Chao-Sung Lin](#)

986 [Acetic Acid Corrosion of Mild Steel: Mechanism and Prediction](#)

[Aria Kahyarian, Srdjan Nesic](#)

## **D01-Emerging Materials for Post CMOS Devices/Sensing and Applications 8**

987 [\(Invited\) Graphene Synthesis and Transfer Improvements for Applications in the Semiconductor Industry](#)

[Steven Brems, Ken Verguts, Nandi Vrancken, B Vermeulen, Clement Porret, Lisanne Peters, Cheng Han Wu, Cedric Huyghebaert, Koen Schouteden, Chris Van Haesendonck, Stefan De Gendt](#)

988 [\(Invited\) Switchable White Graphene: Electrochemistry of the Boron Nitride Nanomesh](#)

[Stijn F. L. Mertens](#)

989 [\(Invited\) Electronics in Flatland](#)

[Sanjay K Banerjee](#)

[990\(Invited\) Energy Efficient Transistors with 2D Materials](#)

[Rajib Rahman, Hesameddin Ilatikhameneh, Tarek Ameen, Gerhard Klimeck](#)

[991\(Invited\) MOCVD of 2D Nanomaterials for Next-Generation Electronic and Optoelectronic Devices](#)

[Michael Heuken, Matthias Marx, Holger Kalisch, Andrei Vescan](#)

[992\(Invited\) Progress in Flexible 2D Nanoelectronics](#)

[Saungeun Park, Weinan Zhu, Deji Akinwande](#)

[993\(Dielectric Science and Technology Division Thomas D. Callinan Award Address\) Dielectrics for MOS Integrated Circuits](#)

[Hiroshi Iwai](#)

[994\(Invited\) Synaptic Plasticity in a Memristive Device below 500mV](#)

[S R Nandakumar, Bipin Rajendran](#)

[995\(Invited\) Phase Change Materials-based Synaptic Devices for Energy Efficient Implementation of Learning in Hardware](#)

[Yuhan Shi, Duygu Kuzum](#)

[996Effect of Resistive Switching-Layer Oxygen-Concentration on Nonvolatile Memory Characteristics for Carbon-Oxide Based Reram](#)

[Soo-Min Jin, Ki-Hyun Kwon, Dong Won Kim, Hye-Jee Kim, Do Jun Kim, Jea-Gun Park](#)

[997\(Invited\) Electrical Atomic Force Microscopy for 2D Transition Metal Dichalcogenide Materials](#)

[Umberto Celano, Olli Virkki, Marco Mascaro, Ankit Nalin Mehta, Hugo Bender, Daniele Chiappe, Inge Asselberghs, Kristof Paredis, Ilse Hoflijki, Alexis Franquet, Cedric Huyghebaert, Iuliana Radu, Wilfried Vandervorst](#)

[998\(Invited\) Diffusion and Depletion Effects in Chronoamperometry of Diazonium based Electrochemical Grafting](#)

[Brandon Hirsch, Peter Welke, Anton Brown, Steven De Feyter](#)

[999\(Invited\) Thermodynamic Modeling of W-C-O-H-S System for Controlled Growth of WS<sub>2</sub> Atomic Layers by True CVD](#)

[Sukanya Dhar, Anjali Lalithambika, Kranthi Kumar V, Srinivasan Raghavan](#)

[1000\(Invited\) Potentiometric Biochemical Sensors for Diagnostic Applications](#)

[Eric M Vogel](#)

[1001\(Invited\) Novel Dilute Nitride III/V-Semiconductor Laser System for the Monolithic Integration to Si-Micro- and Nanoelectronics](#)

[Peter Ludewig, Michael Volk, Kerstin Volz, Wolfgang Stolz](#)

[1002Resistivity and Barrier Height of Nano-Resistors Made from Zr-Doped HfO<sub>2</sub> High-K Dielectric on Si Wafer](#)

[Shumao Zhang, Yue Kuo](#)

[1003New, Novel Al<sub>2-x</sub>Hf<sub>x</sub>O<sub>3</sub> Materials for M O S Application](#)

[Annie Maria Mahat, Norlida Kamarulzaman, Nurhanna Badar](#)

[1004\(Invited\) Towards Understanding the Pre-Failure Thermo-Mechanical Issues in Electromigration of TSV Enabled 3D ICs](#)

[Christopher E Sunday, Dmitry Veksler, K. P. Cheung, Yaw S. Obeng](#)

[1005Failure Mechanism of Nano-Resistor Devices](#)

[Shumao Zhang, Yue Kuo](#)

[1006\(Invited\) Hot Carrier Reliability in High Voltage Ldmos in BCD \(Bipolar-CMOS-DMOS\) Technology](#)

[Jifa Hao](#)

[1007\(Invited\) Gallium Nitride on Silicon](#)

[Edwin L Piner](#)

[1008Reliability of Post Plasma Oxidation Processed ALD Al<sub>2</sub>O<sub>3</sub>/Hf<sub>1-x</sub>Zr<sub>x</sub>O<sub>2</sub> Thin Films on Ge Substrates](#)

[Md Nasir Uddin Bhuyian, Arijit Sengupta, Yiming Ding, Durga Misra, Kandabara Tapily, Robert D. Clark, Steven Consiglio, Cory S. Wajda, Gert J. Leusink](#)

## **D02-Plasma Nano Science and Technology**

[1009\(Invited\) Materials Design By Atmospheric Pressure Plasmas for Solar Energy Harvesting](#)

[Davide Mariotti](#)

[1010\(Invited\) Microplasmas Technologies for Engineering of Silicon Based Quantum Dot Solar Cells](#)

[Vladimir Svrcek, Tamil Velusamy, Mickael Lozach, Connor Rocks, Calum McDonald, Davide Mariotti](#)

[1011\(Invited\) Plasma Assisted Glancing Angle Deposition of Transparent and Conductive in-Plane Anisotropic ITO Thin Films](#)

[Julian Parra-Barranco, Juan Ramon Sanchez-Valencia, Francisco J. Aparicio, Francisco Garcia-Garcia, Francisco J. Ferrer, Victor Rico, Carmen Lopez-Santos, Ana Borrás, Agustin R. Gonzalez-Elipse, Angel Barranco](#)

[1012\(Invited\) Engineering Strategies for the Industrial-Scale Production of Readily Deployable Renewable Energy Devices](#)

[Sreeram Vaddiraju](#)

[1013\(Invited\) Rare Earth Doped Light Emitting Thin Film Materials for Silicon Photonics](#)

[Jonathan D. B. Bradley](#)

[1014Luminescent Si-Based Nanostructures Fabricated By Plasma Enhanced Chemical Vapour Deposition Techniques](#)

[Zahra Khatami, Jeremy William Miller, Jacek Wojcik, Peter Mascher](#)

[1015Synthesis of Nanoparticles Using Low Temperature Plasmas and Its Application to Solar Cells and Tracers in Living Body](#)

[Kazunori Koga, Hyunwoong Seo, Akiyo Tanaka, Naho Itagaki, Masaharu Shiratani](#)

[1016\(Invited\) Advanced Plasma Etching Processing: Atomic Layer Etching for Nanoscale Devices](#)

[Takayoshi Tsutsumi, Masaru Zaitzu, Akiko Kobayashi, Nobuyoshi Kobayashi, Masaru Hori](#)

[1017High-Rate Etching of Copper By High-Pressure Hydrogen-Based Plasma](#)

[Hiromasa Ohmi, Hiroaki Kakiuchi, Kiyoshi Yasutake, Yusuke Kubota](#)

[1018Nanoscale Spin-Transfer Torque Mram Etching Using Various Gases](#)

[Kyung Chae Yang, Sung Woo Park, Ho Seok Lee, Geun Young Yeom](#)

[1019Investigation on Crack Suppression by Thermal-Plasma-Jet Crystallization of Amorphous Silicon Films on Flexible Glass Substrate](#)

[Tatsuki Hieda, Hiroaki Hanafusa, Seiichiro Higashi](#)

[1020\(Invited\) Plasma Electrochemical Synthesis of Nanomaterials](#)

[Qiang Chen](#)

[1021\(Invited\) Electrolysis with Plasma Cathodes: Modeling and Experiments to Understand the Electrochemical Interface](#)

[David B. Go](#)

[1022Plasma Oxidation of Liquid Precursors](#)

[Mahendra Kumar Sunkara, Babajide Ajayi, Daniel Felipe Jaramillo-Cabanzo](#)

[1023\(Invited\) Engineering of Nanostructures Using Microplasmas for Catalysis and Biosensing](#)

[Wei-Hung Chiang](#)

[1024\(Invited\) Plasma Synthesis of Carbon Based Nanomaterials](#)

[Eva Kovacevic, Shahzad Hussain, Johannes Berndt, Cedric Pattyn, Thomas Strunskus, Mohammed-Ramzi Ammar, Aurelién Canizarès, Patrick Simon, Elena Tatarova, Ana Dias, Pierre-Yves Tessier, Chantal Boulmer-Leborgne](#)

[1025\(Invited\) Microplasma-Deposited Ni-Fe and Co Oxides for Oer and Supercapacitors](#)

[Andrew Pebley, Katherine Mackie, Michael Gordon](#)

[1026\(Invited\) Enhanced Cycle Capacity of Lithium Ion Batteries with Nanocomposite Si Anodes Produced By Rapid Co-Condensation in Plasma Spray PVD](#)

[Kohei Fukada, Ryoshi Ohta, Makoto Kambara](#)

[1027Optimization and Characterization of Plasma Sprayed Zirconium Diffusion Barriers on Uranium-Molybdenum Monolithic Nuclear Fuel Plates](#)

[Dustin Ray Cummins, Kendall Jon Hollis, Cheng Liu, James Anthony Valdez, David E. Dombrowski](#)

[1028\(Invited\) Nanotip-Defined High Local Electric Fields Accelerate CO<sub>2</sub> Reduction Heterogeneous Catalysts](#)



Min Liu, Edward H. Sargent

1029(Invited) An Aqueous Rechargeable Desalination System

Hui Ying Yang

1030(Invited) Plasma Based Synthesis of Conductive Polymers: Experimental Results and Some Remarks about General Strategies for Plasma Based Polymerization Processes

Johannes Berndt, Cedric Pattyn, Shahzad Hussain, Eva Kovacevic

1031(Invited) Plasma Deposition of Antibacterial Nano-Coatings on Polymeric Materials

Anton Nikiforov, Christophe Leys, Iryna Kuchakova, Myriam Vanneste, Pieter Heyse, Mike De Vrieze, Andrea Zille, Gheorghe Dinescu, Bogdana Mitu, Martina Modic, Uros Cvelbar

1032(Invited) Non-Thermal Plasmas for the Production of Sustainable Functional Materials

Alejandro Alvarez, Stephen Exarhos, Austin Woodard, Lorenzo Mangolini

1033A Novel Fabrication of Vertically Stacked Gate-all-around Silicon Nanowire Arrays

Lingkuan Meng, Qiuxia Xu, Jiang Yan

1034Poly-Si Planarization By ICP Plasma Etch at Finfet Technology Node

Yan Wang, Qiuhua Han, Haiyang Zhang

1035Novel Biomedical Electrosurgical Device Containing Nanostructured Surface Functionalization for Minimally Invasive Surgery: Characterization and Histological Evaluation in Rat

Han-Yi Cheng, Keng-Liang Ou, Shyuan-Yow Chen

1036Copper Oxide Nanowire Plasma-Assisted Growth Dynamics and Role of Underlying Oxide Layers

[Uros Cvelbar, Oleg Baranov, Gregor Filipič](#)

[1037 Facile Synthesis of Graphene Quantum Dots By Microplasma-Assisted Electrochemistry](#)

[Jih-Siang Yang, Wei-Hung Chiang](#)

#### **E01-Green Electrodeposition 4**

[1038 Evaluation of Key Factors for Preparing High Brightness Surfaces of Aluminum Films Electrodeposited from AlCl<sub>3</sub>-1-Ethyl-3-Methylimidazolium Chloride-Organic Additive Baths](#)

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

[1039 Effect of Additives on Electrodeposited Aluminum Alloy Films By Using Dimethylsulfone As an Organic Solvent](#)

[Ichiro Koiwa, Kyohei Matsubara, Yuya Ito, Nobuaki Watanabe](#)

[1040 Electrodeposition of Purified Aluminum Coatings from AlCl<sub>3</sub>-Dimethylsulfone\(DMSO<sub>2</sub>\) Electrolytes with Isopropylamine Hydrochloride](#)

[Sangjae Kim, Shota Kumeno, Kensuke Kuroda, Masazumi Okido](#)

[1041 Electrochemical Aluminum Deposition from Fluorinated Ionic Liquids](#)

[Francesco Liberale, Adriana Ispas, Andreas Bund, Luca Magagnin](#)

[1042 Effect of the Use of Pulse Plating Techniques in Electrodeposited Sn-Cu coatings for Pb-Free, Environmentally-Friendly Applications](#)

[Liang Wu, Andrew J Cobley](#)

[1043 Copper Electrodeposition from a Water-Containing Choline Chloride-Based Deep Eutectic Solvent](#)

[Priscila Valverde, Todd Green, Sudipta Roy](#)

[1044 Use of Ultrasound to Modified Electrodeposited Silver and Silver-Tin Microstructures and Composition without Chemical Additives](#)

[Aymeric Nevers, Loic Hallez, Francis Touyeras, Jean-Yves Hihn](#)

[1045 Development of a Functional Reach Compliant Trivalent Chromium Electroplating Process](#)

[Timothy D Hall, E. J. Taylor, Maria Inman, Stephen Snyder, Jing Xu, Rajeswaran Radhakrishnan](#)

[1046 Analysis of Cathodic Reaction Process of  \$\text{SiCl}\_4\$  in Ionic Liquids](#)

[Yasuhiro Tsuyuki, Tatsuki Fujimura, Masahiro Kunimoto, Yasuhiro Fukunaka, Piero A Pianetta, Takayuki Homma](#)

[1047 Molten Salt Electrorefining of Indium Metal from Indium Tin Alloy](#)

[Sang-Hoon Choi, Basit Ali, Soong-Keun Hyun, Jae-Jin Sim, Won Ju, Jae-Hong Lim, Taek-Soo Kim, Kyoung-Tae Park](#)

[1048 Application of Iron Based Alloy Electroplating to Environmental Friendly Industries-Hydrogen Generator](#)

[Sachio Yoshihara](#)

[1049 Electrodeposition of Sn-Ni Alloy As Anodes for Lithium-Ion Batteries](#)

[Jinqiu Zhang, Minjian Zhou, Miaomiao Chen, Peixia Yang, Maozhong An](#)

[1050 Electrodeposition of Nickel/Titanium Carbide Nanocomposite Coatings](#)

[Nurcan Acet, Damla Eroglu](#)

[1051  \$\text{TiO}\_2\$  Nanotubes As a Matrice for Electrodeposited Si, Au, and CdSe](#)

[Damian Kowalski](#)

[1052 Composition, Morphology and Electrical Properties of Electroplated Bite Thin Films](#)

[Kimin Hong, Hoyoung Suh, Jinsung Noh, Jihyun Kim, Younghwan Jin](#)

[1053 Electrophoretic Deposition of MoS<sub>2</sub> Thin Film As a Stable Counter Electrode for Quantum Dot Solar Cells](#)

[Hoang Thai Nguyen, Ngo Huy Phap, Thang Van Le, Nguyen Thi Minh Nguyet, Le Viet Hai](#)

[1054 Pulse Plated CuIn<sub>0.5</sub>Ga<sub>0.5</sub>Se<sub>2</sub> Films and Their Photoelectrochemical Properties](#)

[Kollegal Ramakrishna Murali](#)

## **E02-Metallization of Flexible Electronics**

[1055 \(Invited\) Transparent Electrode and Magnetic Permalloy Made from Novel<sup>2</sup> Nanopaper](#)

[Jinbo Chen, Meriem Akin, Lei Yang, Li Jiao, Fan Cheng, Pengbo Lu, Liao Chen, Detao Liu, Hongli Zhu](#)

[1056 Photopatternable, Electrochemically Plated Conductive Fabrics](#)

[Stefanie Taushanoff, Val M Dubin](#)

[1057 Rapid Characterization of Additives for Bottom-up Fill in Electroless Copper Plating](#)

[Ronald Zeszut, Uziel Landau](#)

[1058 All-Solution-Processing of Nanoporous and Wrinkled Electrodes on Polymer Substrates for Use in Electrochemical Biosensing](#)

[Christine Gabardo, Chris Adams-McGavin, Barnabas Fung, Jie Yang, Leyla Soleymani](#)

[1059 Transport and Reactants Concentration Effects in Electroless Deposition of Copper](#)

Ronald Zeszut, Uziel Landau

1060 Advanced Polymers Surface Preparation and Electrochemical Metallization for Flexible Concentrator Mirrors

Andrea Vittorio Oriani, Francesco Liberale, Paula Cojocaru, Luca Magagnin

1061 Anisotropic Electroless Deposition on Self-Assembled Biological Templates for Electronic Circuit Fabrication

Bibek Uprety, John N. Harb

1062 Selective Plating on Flexible Glass and Polymer Substrates with Laser-Drilled Holes

Kevin M Norelli, Val M Dubin

1063 (Invited) Redox Switchable Organic Conjugated Materials for Flexible Electrochromic Devices

Matteo Salamone, Riccardo Ruffo, Claudio Maria Mari, Luca Beverina

1064 Effect of Thin Film Platinum Microelectrode Granularity on Corrosion under Electrical Stimulation

Nha Uyen Huynh, Naoya Yamada, Hidemitsu Furukawa, George Youssef, Ajit Khosla, Sam Kassegne

1065 Flexible Non-Enzymatic Glucose Sensor Obtained Via Wet Metallization Coupled with Inkjet Printing

Roberto Bernasconi, Alessandro Mangogna, Lorenzo Pedrazzetti, Luca Magagnin

1066 All Polymeric Electrochemical Biochip Array of Patterned Gold on Silver Inkjet Printed Polyimide

Richa Pandey, Matteo Beggiato, Yelena Sverdlov, Alexandra Inberg, Danilo Demarchi, Yosi Shacham-Diamand

[1067](#)[Characterization of a Flexible Glucose Amperometric Sensor Obtained through Electroless Deposited Nip Electrodes](#)

[Martina Costa Angeli, Emanuele Cattarinuzzi, Dario Gastaldi, Pasquale Vena](#)

[1068](#)[One Step Cu-Zn-Sn Alloy Deposition As a Precursor for CZTS Absorber in Photovoltaics](#)

[Lorenzo Pedrazzetti, Claudio Marchi, Md Ibrahim Khalil, Andrea Lucotti, Alessia Le Donne, Simona Binetti, Luca Magagnin](#)

### **F01-Electrochemical Engineering General Session**

[1069](#)[\(Industrial Electrochemistry and Electrochemical Engineering Division Student Achievement Award Address\) Mathematical Modeling of Transport and Corrosion Phenomenon inside High-Temperature Molten Salt Systems for Next Generation Concentrated Solar Power Systems](#)

[Bahareh Alsadat Tavakoli Mehrabadi, Sirivatch Shimpalee, John W. Weidner, Brenda L. Garcia-Diaz, Michael J. Martinez-Rodriguez, Luke Christopher Olson](#)

[1070](#)[Electrochemical Method of Carbonate Melts Regeneration for Efficient Capture of  \$\text{SO}\_2\$  from Coal Combustion.](#)

[Valery Kaplan, Nurlan K Dosmukhamedov, Igor Lubomirsky](#)

[1071](#)[Production of Ethanol in Electrochemical Cell Using \*Saccharomyces Cerevisiae\* and \*Wickerhamomyces Anomalous\* As Counter Microbes](#)

[Jarina Joshi, Rejeena Shrestha, Krishna Manandhar, Lakshmaiya Sreerama, Tribikram Bhattarai](#)

[1072](#)[Electrochemical Oxidation of Psychoactive Pharmaceutical Caffeine in Aqueous Medium Using  \$\text{RuO}\_2/\text{IrO}\_2/\text{TaO}\_2\$  Coated Titanium Anode](#)

[Periyasamy Selvendiran, Muthuchamy Muthukumar](#)

[1073](#)[Anodic Reaction Investigation on Pt, Au and  \$\text{SnO}\_2\$  Electrodes in  \$\text{CaCl}\_2\text{-CaO}\$  Molten Salts](#)

[Mathieu Gibilaro, Laurent Massot, Pierre Chamelot, Olivier Lemoine](#)

1074 [Pulse/Pulse-Reverse Electrodeposition of Copper Electrocatalysts for CO<sub>2</sub> Reduction to Ethylene](#)

[Brian Skinn, Sujat Sen, Steven Michael Brown, Stephen Snyder, Fikile R. Brushett, Holly Garich](#)

1075 [Electrochemical Peroxide Generation](#)

[Santosh H. Vijapur, Timothy D Hall, Stephen Snyder, Maria Inman, E. J. Taylor, Brian Skinn, Carlos R Cabrera](#)

1076 [Advanced Photoelectrocatalysts for TEMPO-Mediated Alcohol Oxidations](#)

[David J Chadderdon, Ivy Wu, Matthew G Panthani, Wenzhen Li](#)

1077 [Combined Anodic Oxidation and Hydroxyapatite-Magntite Composites Adsorption Treatments for Aqueous Solution Containing Antibiotic Ciprofloxacin- a Novel Approach](#)

[G Sivarasan, D Prabha, Shanmugam Sabarathinam, C M Haneesh](#)

1078 [Electrochemical Treatment of 4-Hydroxyphenylacetic Acid in Olive Oil Mill Wastewater](#)

[Nelly Esther Flores, Pere Luis Cabot, Francesc Centellas, Enric Brillas, Ignasi Sirés](#)

1079 [Accelerated Electrochemical Machining Tool Design Via Multiphysics Modeling](#)

[Brian Skinn, Timothy D Hall, Stephen Snyder, K. P. Rajurkar, E. J. Taylor](#)

1080 [Platinum Electrodeposition Methods to Enable Incorporation of Low Density Foam-Lined Hohlräume](#)

[Corie Horwood, Michael Stadermann, Thomas Bunn](#)

1081 [Metal Alloy ICF Capsules Created By Electrodeposition](#)

[Corie Horwood, Michael Stadermann, Thomas Bunn](#)

1082 [Multi-Layer Electrodes for Electrochemical Antifouling](#)

[Christian Morig, Stefan Ackermann, Matthias Steimecke, Marco Rühl, Michael Bron, Andreas Heilmann, Uwe Spohn](#)

1083 [Incorporation of Conductive Internal Additives within Electro curing Adhesives](#)

[Terry WJ Steele](#)

1084 [Dual Stage Sodium Thermo-Electro-Chemical Converter \(Na-TECC\)](#)

[Alexander Limia, Shannon K. Yee](#)

1085 [Micelle Mediated Extraction of Neodymium and Electrochemical Characterization of AOT Reverse Micelles](#)

[Shannon Anderson, Egwu Eric Kalu, Clayton Clark, Mikael Nilsson](#)

1086 [Lithium Recovery from Used Li-Ion Batteries Using Innovative Electrodialysis Method with Lithium Ionic Superconductor](#)

[Tsuyoshi Hoshino](#)

1087 [Energy Saving Chlorine Electrolysis with Gas Diffusion Electrodes](#)

[Vinh Trieu, Andreas Bulan, Stefanie Eiden, Juergen Kintrop, André Rittermeier, Rainer Weber](#)

1088 [Effect of Composition and Temperature on Current Efficiency for Aluminium Electrolysis from Cryolite-Based Molten Alumina Electrolytes](#)

[Taiki Morishige, Geir Martin Haarberg, Henrik Gudbrandsen, Egil Skybakmoen, Asbjørn Solheim](#)

1089 [Chronoamperometric Study of Ammonia Oxidation in a Direct Ammonia Alkaline Fuel Cell Under the Influence of Microgravity](#)



[Carlos R Cabrera, Raul Acevedo, Camila Morales, Luis Echegoyen, Roberto Alexis Martínez-Rodríguez](#)

[1090 Numerical Analysis of the Effect of Diaphragm Length, Position and Porosity on the Electric Field and Mass Transport inside a Lithium Electrolysis Cell](#)

[Elaheh Oliaii, Martin Desilets, Gaétan Lantagne](#)

[1091 Low Frequency Behavior of Strong Univalent Electrolytic Solutions with a Highly-Sensitive Impedance Method](#)

[Vin-Cent Su, Kung-Chu Ho, Jia-Hao Ye, Chieh-Hsiung Kuan](#)

[1092 Mathematical Modeling of Ion Selective Membrane Systems Subject to Electrical Polarization](#)

[Matthew Thomas Flavin, Jongyoon Han, Daniel Freeman](#)

[1093 Synthesis of Co-Ni-Mo As Non-Noble Electrocatalysts for Ethanol Oxidation](#)

[Wasu Chaitree, Egwu Eric Kalu](#)

[1094 Quantifying Potential Contributions in the Hybrid Sulfur Electrolyzer at Elevated Temperatures](#)

[Taylor Reed Garrick, Cody Herbert Wilkins, Andrew T Pingitore, Alexander Gulledge, Brian Benicewicz, John W. Weidner](#)

[1095 Understanding of Transition from Gas-Phase to Material-Kinetic Limitations for Nonstoichiometric Oxides](#)

[Ho-Il Ji, Tim Davenport, Sossina M Haile](#)

[1096 High Efficiency Anodes for Hydrogen Separation Based on Solid Acid Electrolytes](#)

[David Leon Wilson, Thomas A. Zawodzinski](#)

[1097 A Reduced-Order Battery Degradation Model for Battery Management Systems](#)

[Jie Li, Nima Lotfi, Robert G Landers, Jonghyun Park](#)

[1098Mechanistic Studies of Hydrogen Evolution during Electroless Nickel-Phosphorus Deposition](#)

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[1099Electrochemical and Structural Characterization of Electrodeposited Tin: Influence of the Additive Alkoxyated  \$\beta\$ -Naphthol](#)

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[1362 \(Invited\) MoS<sub>2</sub> Field-Effect Transistors Gated with a Two-Dimensional Electrolyte](#)

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[1363 \(Invited\) Solution Processing and Structural Control of 2D Materials of Bi<sub>2</sub>Te<sub>3</sub>, MoS<sub>2</sub> and V<sub>2</sub>O<sub>5</sub> and Their Applications](#)

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[Friedemann Hegge, Severin Vierrath, Shohei Ogawa, Lukas Zielke, Melanie Bühler, Carolin Klose, Roland Zengerle, Shawn Litster, Simon Thiele](#)

[1515On the Experimental Investigation of the Clamping Pressure Effects on the Proton Exchange Membrane Water Electrolyser Cell Performance](#)



[Saher Al Shakhshir, Steffen Frensch, Søren Knudsen Kær](#)

1516 [Novel Liquid/Gas Diffusion Layers with Micro/Nano Surface Modifications for High-Efficiency Water Electrolysis](#)

[Feng-Yuan Zhang](#)

1517 [3D Printed Bipolar Plate for Water Electrolysis](#)

[Feng-Yuan Zhang](#)

1518 [Hydrogen Isotope Separation By Combined Electrolysis Fuel Cell](#)

[Hisayoshi Matsushima, Ryota Ogawa, Mikito Ueda](#)

1519 [New High Potential Membrane Material \(For Electrochemical Hydrogen Compression\)](#)

[Menno Koeman, Peter Jaime Bouwman, Doetze Sikkema, Martijn J.J. Mulder, Leonard F.J.M. Raymakers, Wouter Dalhuijsen, Daniel Semerel, Jonne Konink, Melissa Bosch, Joris J. M. Bleekman](#)

## **103-Renewable Fuels via Artificial Photosynthesis 2**

1520 [Biogas Upgrading in a 50 Kilowatt Solid Oxide Cells Based Demonstration Plant - Design and Operational Experiences Including Strategies to Counteract Degradation](#)

[John Bøgild Hansen](#)

1521 [Investigation on Nitridation Process of SrNbO<sub>2</sub>N Particles from SrNbO<sub>3</sub> for Photoelectrochemical Water Splitting](#)

[Masanori Kodera, Jeongsuk Seo, Masao Katayama, Takashi Hisatomi, Tsutomu Minegishi, Kazunari Domen](#)

1522 [In Situ Investigation of the Interface of Photoanodes and Electrocatalysts in Photoelectrochemical Water Oxidation Using Dual Working Electrode Photoelectrochemistry](#)

[Jingjing Qiu, Michael R. Nellist, Forrest A. L. Laskowski, Shannon W. Boettcher](#)

[1523 Spinel Ferrites  \$MFe\_2O\_4\$  \(M = Cu, Mg, Zn\) As Emerging Photoanodes for Water Oxidation: An in-Depth Analysis of the Photoelectrochemical Properties](#)

[Néstor Guijarro, Pauline Bornoz, Mathieu S. Prévot, Xiaoyun Yu, Melissa Johnson, Florian Le Formal, Kevin Sivula](#)

[1524 \(Invited\) Photoelectrochemical Investigation of Rate Limiting Processes and Mechanistic Understanding of Solar Water Oxidation with  \$CuWO\_4\$  Photoanodes](#)

[Thomas Hamann](#)

[1525 \(Invited\) Advancing Design and Discovery of New Materials for Solar Energy Conversion](#)

[Jason K. Cooper, Chang-Ming Jiang, Ian D. Sharp](#)

[1526 \(Invited\) Recent Progress in Fundamental Photoelectrochemical Studies Relevant to New Low-Cost Designs for Z-Scheme Solar Water Splitting Reactors](#)

[William Gaieck, Kevin Tkacz, Christopher D. Sanborn, Yuanxun Shao, Sasuke Breen, Houman Yaghoubi, Rohini Bala Chandran, Chengxiang \("CX"\) Xiang, Adam Z Weber, Shane Ardo](#)

[1527 Correlation of Photocatalytic Activity with Band Structure of Perovskite Lanthanum Titanium Oxide](#)

[Nianqiang \(Nick\) Wu](#)

[1528 Model Study for Photoelectrochemical Methylcyclohexane Production from Toluene and Water Using  \$SrTiO\_3\$  Photoanodes](#)

[Yosuke Kageshima, Tsutomu Minegishi, Kazunari Domen](#)

[1529 \(Invited\) First-Principle Simulations in Chalcopyrite Based Photoelectrode Development](#)

[Tadashi Ogitsu, Joel Varley, Nicolas Gaillard, Clemens Heske, Monika Blum](#)

[1530\(Invited\) Catalysts and Interfaces for Hydrogen Production By Solar Photoelectrochemistry](#)

[Thomas F Jaramillo](#)

[1531\(Invited\) Tunable Photoelectrochemical Property of ZnTe-AgInTe<sub>2</sub> Solid Solution Nanocrystals in the Near-IR Region](#)

[Tsukasa Torimoto, Kouta Sugiura, Susumu Kuwabata, Tatsuya Kameyama](#)

[1532\(Invited\) Novel Chalcopyrite Materials for Economical Photoelectrochemical Hydrogen Production](#)

[Nicolas Gaillard, Alexander D DeAngelis, Kimberly Horsley](#)

[1533Photo/ Catalytic Activation of Carbon Dioxide through Implementation of Plasmonic Metal Nanoparticles](#)

[Renata Solarska, Krzysztof Bienkowski](#)

[1534\(Invited\) Photo-Induced Force Mapping of Plasmonic Nanostructures](#)

[Isabell Thomann](#)

[1535\(Invited\) Observation of Plasmon-Induced Water Oxidation and Reduction Reactions By in-Situ Electrochemical Surface-Enhanced Raman Scattering](#)

[Kei Murakoshi](#)

[1536\(Keynote\) Development of Particulate Photocatalyst Systems for Efficient and Scalable Water Splitting](#)

[Kazunari Domen, Takashi Hisatomi](#)

[1537\(Invited\) Photocatalysis Based on Plasmon-Induced Charge Separation](#)

[Tetsu Tatsuma, Kun-Che Kao, Ling Wu, Yoshinori Kuroiwa, Hiroyasu Nishi](#)

1538 [\(Invited\) Artificial Photosynthesis Using Plasmon-Mediated Electron Transfer](#)

[Tomoya Oshikiri, Xu Shi, Kosei Ueno, Hiroaki Misawa](#)

1539 [Investigating the Plasmonic Hot-Carrier Injection Mechanism for CO<sub>2</sub> Reduction Using Nanostructured Ag Catalysts](#)

[Youngsang Kim, Erin Creel, Elizabeth Corson, Fen Qiu, Jeffrey J Urban, Bryan D McCloskey, Robert Kostecki](#)

1540 [\(Invited\) Mathematical Modeling of Novel Artificial-Photosynthesis Devices](#)

[Rohini Bala Chandran, Lien-Chun Weng, Shane Ardo, Alexis T. Bell, Adam Z Weber](#)

1541 [\(Invited\) High Performance Components for Solar-Driven Photoelectrochemical Fuel Generators](#)

[Frances A Houle](#)

1542 [\(Invited\) Novel Nanomaterials, Structures and Interfaces for Solar Fuel Production](#)

[Shihe Yang](#)

1543 [\(Invited\) Recent Advances in III-V Multijunction Semiconductor Photo-Electrochemical Water Splitting](#)

[Todd G Deutsch, James L. Young, Myles Steiner, Henning Döscher, John A Turner](#)

1544 [Understanding and Mitigating Degradation Phenomena in Photoelectrochemical Devices](#)

[Fredy Nandjou, Sophia Haussener](#)

1545 [Interplay Between Chemical and Optoelectronic Properties of III/V-Water Interfaces from Ab Initio Simulations](#)

[Brandon C. Wood, Tuan Anh Pham, Tadashi Ogitsu](#)

1546 [Binary and Ternary Earth-Abundant Transition Metal Phosphides As Electrocatalysts and Photocatalysts for Water Splitting](#)

[Dylan Daniel Rodene, Sushil Kumar Saraswat, Venkatesham Tallapally, Indika Arachchige, Ram B. Gupta](#)

1547 [Solar-to-Hydrogen Efficiency: Shining Light on Photoelectrochemical Device Performance](#)

[James L Young, Henning Döscher, John F Geisz, John A Turner, Todd G Deutsch](#)

1548 [Tuning Electrocatalytic Activity of Ultrathin Pd Shells: CO<sub>2</sub> to Fuels](#)

[David Fermin, Jo Humphrey, Veronica Celorrio](#)

1549 [Bimetallic Au-Cu Nanocatalysts with Enhanced Electrochemical CO<sub>2</sub> Conversion Activity](#)

[Douglas R. Kauffman, Dominic Alfonso, DeNyago Tafen](#)

1550 [Selective Electrocatalytic CO<sub>2</sub> Reduction to CO on Solid Nickel-Nitrogen-Doped Carbon Catalysts](#)

[Nathaniel Leonard, Wen Ju, Ana Sofia Varela, Julian Steinberg, Peter Strasser](#)

1551 (Invited) [Artificial Photosynthesis Using All-Solid-State Photocatalysts- Photocatalytic Conversion of CO<sub>2</sub> By H<sub>2</sub>O As an Electron Donor-](#)

[Kentaro Teramura](#)

1552 (Invited) [Fast Detection Method for Analyzing CO<sub>2</sub> Electroreduction Products](#)

[Fen Zhang, Anne C. Co](#)

1553 (Invited) [Modification of Electrocatalytic and Photoelectrochemical Interfaces Toward More Efficient Reduction of Carbon Dioxide](#)

Pawel J Kulesza, Anna Wadas, Ewelina Szaniawska, Sylwia Zoladek, Iwona Agnieszka Rutkowska

1554 Atomic Layer Deposition of an Ultrathin Al<sub>2</sub>O<sub>3</sub> Layer on TiO<sub>2-x</sub> Nanorods for Enhanced CO<sub>2</sub> Photoreduction with Water

Huilei Zhao, Ying Li

1555 CO<sub>2</sub> Conversion to Formic Acid in a Three Compartment Cell with Sustainion™ Membranes

Hongzhou Yang, Jerry Kaczur, Syed D. Sajjad, Richard I Masel

1556 Theoretical Investigations of Electrochemical CO<sub>2</sub> Reduction

Karen Chan, Xin-Yan Liu, Jianping Xiao, Jens Nørskov

1557 Electrochemical Carbon Dioxide Reduction on Cu-Zn Bimetallic Catalysts with Enhanced Ethanol Selectivity

Dan Ren, Boon Siang Yeo

1558 Insights in the Catalytic Product Selectivity Trends of Single Site Transition Metal-Nitrogen-Doped Carbons during the Electrochemical Reduction of CO<sub>2</sub> to CO

Wen Ju, Alexander Bagger, Guangping Hao, Ana Sofia Varela, Ilya Sinev, Beatriz Roldan, Stefan Kaskel, Jan Rossmeisl, Peter Strasser

1559 Surface-Modified Metal Sulfides As Stable H<sub>2</sub> Evolving Photocatalyst in Z-Scheme Water Splitting System with [Fe(CN)<sub>6</sub>]<sup>3-/4-</sup> Redox Mediator Under Visible Light Irradiation

Masanobu Higashi, Takashi Shirakawa, Osamu Tomita, Ryu Abe

1560 Experimental Demonstration of Integrated Photo-Electrochemical Hydrogen Generation Utilizing Concentrated Irradiation

Saurabh Tembhurne, Fredy Nandjou, Sophia Haussener

[1561 Controlling Strategies for Efficient Device Operation and Degradation Alleviation in Concentrated Integrated Photo-Electrochemical Devices](#)

[Saurabh Tembhurne, Sophia Haussener](#)

[1562 Self-sustaining Microbial Photoelectrosynthesis for Hydrogen Generation and Waste Water Cleaning](#)

[Lu Lu, Nicholas Williams, Zhiyong Ren, Jing Gu](#)

[1563 Cu<sub>4</sub>Sn/C As Electrocatalyst for Selective Electrochemical Reduction of CO<sub>2</sub> to CO: Investigation Via on-Line Mass Spectrometry and in-Line Gas Chromatograph](#)

[Mariana Romano Camilo, Wanderson Oliveira Silva, Fabio Henrique Barros de Lima](#)

[1564 CO<sub>2</sub> Conversion Via Nanoporous PS-PVP Block Copolymer: Revisiting the Pyridyl Radical](#)

[Habte Ghebremichael, Alexander Sidorenko](#)

[1565 Novel Band-Gap Engineered III-V Alloys for Unassisted Water Photoelectrolysis](#)

[Alejandro Martinez Garcia, Joshua M Spurgeon, James L Young, Todd G Deutsch, Mahendra Kumar Sunkara](#)

[1566 Electrochemical Reduction of CO<sub>2</sub> Using Cu-Au Nanoparticles: Effects of Size and Composition](#)

[Evan Michael Andrews, John Flake, Yuxin Fang](#)

[1567 Light Guided Placement of Platinum Catalysts on Silicon Microwire Array Photocathodes](#)

[Paul Andrew Kempler, Azhar I Carim, Nathan S Lewis](#)

[1568 Carbon Dioxide \(CO<sub>2</sub>\) Electrocatalytic Recycling on Electrodeposited Nanostructured Copper-Gold Electrodes](#)

[Karl Adrian Gandionco, Desiree Mae Sua-an, Julie Anne Dalmacio del Rosario, Joey Duran Ocon](#)

1569[Exploring the Electrodeposition, the Termal Treatment, and the Photoelectrochemical Application of Non-Doped and Co-Doped Sb<sub>2</sub>Se<sub>3</sub> Thin Films](#)

[Francisco Willian de Souza Lucas, Magno Barcelos Costa, Lucia Helena Mascaro](#)

1570[Evaluation of Material Properties and Performance of Zinc Ferrite \(ZnFe<sub>2</sub>O<sub>4</sub>\) for Photoelectrochemical Water-Splitting](#)

[Joeseoph Bright, Nianqiang Wu](#)

## **104-Solid-Gas Electrochemical Interfaces 2 - SGEI 2**

1571[\(Invited\) From in-Situ to in-Operando Evaluation of SOFC Cathodes for Enhanced ORR Activity and Durability](#)

[Eric D. Wachsman, Gil Cohn, Yi-Lin Huang, Christopher Pellegrielli](#)

1572[Identifying Continuous Series of Elementary Steps in Electrocatalysis By a Novel Isotope Exchange Method](#)

[Ilan Riess](#)

1573[\(Invited\) Atomic-Scale Surface Science Investigations for Understanding and Producing Electrochemical Interfaces](#)

[Ulrike Diebold](#)

1574[\(Invited\) Interaction of Ni Anode with Gd-Doped CeO<sub>2</sub> Studied By Adsorbed Species with Infrared Spectroscopy](#)

[Jun Kubota](#)

1575[Effect of a \(La,Sr\)<sub>2</sub>CoO<sub>4</sub> Phase on the Oxygen Exchange Reaction of Dense and Porous \(La,Sr\)CoO<sub>3</sub> Electrodes](#)



[Tatsuya Kawada, Keiji Yashiro, Shin-ichi Hashimoto, Koji Amezawa](#)

1576 [Assessing Doping Effects on Surface Chemical Stability By in Situ AP-Xps in Barium Perovskites,  \$\text{BaCe}\_x\text{Zr}\_{0.9-x}\text{Y}\_{0.1}\text{O}\_{2.95}\$  \( \$x = 0.9 ; 0.2 ; 0\$ \)](#)

[Angelique Jarry, Sandrine Ricote, Aaron Geller, Xiaohang Zhang, Christopher Pellegrinelli, Ichiro Takeuchi, Eric D. Wachsman, Bryan W. Eichhorn, Ethan J Crumlin](#)

1577 [Microstructure Degradation of Solid Oxide Fuel Cells Aged in Stack after Long Operation Time up to 20 000h using 3D Reconstructions by FIB Tomography](#)

[Atef Zekri, Martin Knipper, Thorsten Plaggenborg, Jürgen Parisi](#)

1578 [Impact of Dislocations on Surface Reactivity of Ceria with Single Atom Catalysts](#)

[Bilge Yildiz, Lixin Sun](#)

1579 [Correlating Cathode/Electrolyte Interface Characteristics to SOFC Performance](#)

[Julian Szász, Florian Wankmüller, Jochen Joos, Virginia Wilde, Heike Störmer, Dagmar Gerthsen, Ellen Ivers-Tiffée](#)

1580 (Invited) [The Effect of Dopants on the Stabilization of the Cubic BSCF Phase in  \$\text{O}\_2\$ - and  \$\text{CO}\_2\$ -Containing Atmospheres](#)

[Dagmar Gerthsen, Matthias Meffert, Heike Störmer, Virginia Wilde, Laura Almar, Fabian Sigloch, Lana-Simone Unger, Stefan F. Wagner, Ellen Ivers-Tiffée](#)

1581 (Invited) [Oxygen Exchange Kinetics on Technological Versus Model Type Electrodes](#)

[Peter Vang Hendriksen, Simona Ovtar, Đorđije Tripković](#)

1582 (Invited) [Contribution of Triple Phase Boundary Reaction in Mixed-Conducting SOFC Cathodes](#)

[Koji Amezawa, Yoshinobu Fujimaki, Keita Mizuno, Takashi Nakamura, Yuta Kimura,](#)

[Kiyofumi Nitta, Yasuko Terada, Fumitada Iguchi, Hiroo Yugami, Keiji Yashiro, Tatsuya Kawada](#)

1583 [\(Invited\) Descriptors, Defects, and DFT for Solid Oxide Fuel Cell Materials](#)

[Dane Morgan, Tam Mayeshiba, Shenzhen Xu, Ryan Jacobs, Wei Xie, Yueh-Lin Lee, Yang Shao-Horn](#)

1584 [Nanoscopic Metal-Solid Electrolyte Interfaces in Electrochemical Promotion of Catalysis](#)

[Yasmine M. Hajar, Kiran Patel, Ubaidullah Tariq, Elena A. Baranova](#)

1585 [\(Invited\) The Effect of \(La,Sr\)MnO<sub>3</sub> Cathode Surface Termination on Its Electronic Structure](#)

[Eugene Kotomin, Rotraut Merkle, Yuri Mastrikov, Maija Kuklja, Joachim Maier](#)

1586 [Theoretical Approach for Solid Oxide Fuel Cell Electrode](#)

[Michihisa Koyama, Takayoshi Ishimoto](#)

1587 [Understanding charge transfer at Mg/MgH<sub>2</sub> interfaces for hydrogen storage](#)

[ShinYoung Kang, Tadashi Ogitsu, Stanimir A. Bonev, Tae Wook Heo, Mark D. Allendorf, Brandon C. Wood](#)

1588 [Correlating the Onset of CO Disproportionation to Surface Chemistry on Ceria](#)

[Jiayue Wang, Sean R. Bishop, Qiyang Lu, Lixin Sun, Nikolai Tsvetkov, Gulin Vardar, Roland Bliem, Maximilian Jansen, Jean-Jacques Gallet, Fabrice Bournel, Iradwikanari Waluyo, Ethan J Crumlin, Bilge Yildiz](#)

1589 [\(Invited\) Towards an Improved Understanding of Electrochemical Oxygen Exchange Reactions on Mixed Conducting Oxides](#)

[Juergen Fleig, Ghislain M Rupp, Andreas Nennung, Alexander Schmid](#)

[1590\(Invited\) Understanding and Controlling Anionic Electrochemical Activity in High-Capacity Oxides for Next Generation Li-Ion Batteries](#)

[Ying Shirley Meng](#)

[1591\(Invited\) Cationic, Anionic & Electronic Disorder on Perovskite Oxide Surface for \(Electro\)Catalysis](#)

[William C Chueh](#)

[1592\(Invited\) In-Situ/Operando X-Ray Absorption Spectroscopy Technique for the Characterization of Electrode/Electrolyte Interfaces](#)

[Chenghao Wu, Miquel B Salmeron](#)

[1593Thermostatics of Concentration Polarization and the Possible Effects of Surface Ad-Ions in SOFC Composite Cathodes](#)

[Roberto Janny Teixeira, José Luís de Paiva](#)

[1594Promoted Cr-Poisoning Resistance of  \$\text{La}\_2\text{NiO}\_{4+\delta}\$ -Coated  \$\text{PrBa}\_{0.5}\text{Sr}\_{0.5}\text{Co}\_{1.5}\text{Fe}\_{0.5}\text{O}\_{5+\delta}\$  Cathode for Intermediate Temperature Solid Oxide Fuel Cells](#)

[Jun Li, Jin Li, Jian Pu](#)

[1595Selective Electrodes for Mixed Reactant Fuel Cells](#)

[Ilan Riess](#)

[1596Self-Assembled La-Sr-Co-O Composite PLD Films: Morphology, Sr Distribution, and Oxygen Exchange Activity](#)

[Rotraut Merkle, Sebastian Stämmeler, Joachim Maier](#)

[1597Extracting Material Properties from Relaxation Experiments](#)

[Sossina M Haile](#)

[1598 Mechanism of Enhanced Sulfur Tolerance on Sm-Doped CeO<sub>2</sub>: A Density Functional Study](#)

[Dong-Hee Lim, Sung Pil Yoon, Jonghee Han, Sun Hee Choi, Chang Won Yoon, Suk Woo Nam, Hyung Chul Ham](#)

[1599 Electrochemical Analysis of Ni Infiltrated Nanoporous GDC Scaffold for Metal Supported SOFCs Anode](#)

[Kunho Lee, Jaeseok Lee, Juhyun Kang, Joongmyeon Bae](#)

[1600 Understand the Hydrogen Electrode Reaction for Proton Conducting SOFC Via Controlled Poisoning Experiments Using Hydrogen Sulfide and Carbon Dioxide](#)

[Shichen Sun, Zhe Cheng](#)

[1601 Importance of the Formation of Dy<sup>4+</sup> in BaZr<sub>0.9</sub>Dy<sub>0.1</sub>O<sub>3-δ</sub> proton-Conducting Ceramics in Oxidizing Atmospheres](#)

[Sandrine Ricote, Grant Hudish, Christopher Beedle, Stanislas Tsoi, Jeffrey C Owrutsky, James O Brien](#)

[1602 \(Invited\) Sr and Mn Doped LaFeO<sub>3</sub> Perovskite Oxide As Active Cathode for High Temperature Electrolysis](#)

[Tatsumi Ishihara, Kuan-Ting Wu, Shijing Wang](#)

[1603 \(Invited\) Electrochemical Characterization of Complete La<sub>0.6</sub>Sr<sub>0.4</sub>Co<sub>1-x</sub>Fe<sub>x</sub>O<sub>3-δ</sub> Composition Phase Space By Microelectrode Impedance Spectroscopy](#)

[Christopher J Kucharczyk, Yangang Liang, Sihyuk Choi, Xiaohang Zhang, Ichiro Takeuchi, Sossina M Haile](#)

[1604 Effect of Fe Doping on Oxygen Anion Diffusion in PrBaCo<sub>2-x</sub>Fe<sub>x</sub>O<sub>5+δ</sub> Double Perovskite Electrodes for Solid Oxide Fuel Cells](#)

[Uzma Anjum, Manish Agarwal, Tuhin Suvra Khan, M Ali Haider](#)

[1605 Bulk defect chemistry of PCFC cathode materials: discussion of defect interactions](#)

Reihaneh Zohourian, Rotraut Merkle, Joachim Maier

1606 Operando Investigation of the Chemical Interaction of Water Vapor with Ceramic Proton Conductors

Artur Braun

1607 Understanding the Cathode Reaction Process for Proton Conducting Intermediate Temperature Solid Oxide Fuel Cells Using Comparison Between BSCF and Other Cathode Materials

Shichen Sun, Zhe Cheng

1608 Influence of the Activation Catalyst on the Polarization Resistance of Electroless Cu Electrodes on BaCe<sub>0.1</sub>Zr<sub>0.8</sub>Y<sub>0.1</sub>O<sub>3-δ</sub> proton-Conducting Ceramics

Sandrine Ricote, Neil Patki, James Douglas Way

1609 (Invited) Sulfur Poisoning of Ni-Based SOFC-Anodes – Short and Long Term Behavior

André Weber, Sebastian Dierickx, Niklas Russner, Ellen Ivers-Tiffée

1610 Assessment of Sulfur Poisoning of Ni/Cgo-Based SOFC Anodes

Matthias Riegraf, Atef Zekri, Vitaliy Yurkiv, Rémi Costa, Guenter Schiller, K. Andreas Friedrich

1611 Improve Activity and Stability of Ni-Ce<sub>0.8</sub>Sm<sub>0.2</sub>O<sub>1.9</sub> As the Anode of a Methanol Fuelled Solid Oxide Fuel Cell

Yicheng Zhao, Yongdan Li

1612 Electrochemical Promotion of Propene Combustion on Ag Catalytic Coatings

Ioanna Kalaitzidou, Thomas Cavoué, Antoinette Boreave, Elena A. Baranova, Mathilde Rieu, Jean-Paul Viricelle, David Horwat, Philippe Vernoux

## **I05-From Electrode to Systems: Invited Perspectives and Tutorials on Fuel Cell Technology in Memory of H. Russell Kunz**

1613([Invited](#)) [H. Russell Kunz: A Perspective on His Early Career](#)

[Roderick Kunz](#)

1614([Invited](#)) [Advancements and Prospects of DOE Fuel Cell Research and Development Activities](#)

[Dimitrios C Papageorgopoulos](#)

1615([Invited](#)) [Research By Students That Were Inspired By Russ Kunz in High Temperature Pemfcs, DMFCs, Analysis for Polarization Loses and FC Durability](#)

[James M Fenton, H. Russell Kunz](#)

1616([Invited](#)) [The Importance of the Cathode Catalyst Support in the Pursuit of Low-Cost PEM Fuel Cells](#)

[Wenbin Gu, Anusorn Kongkanand, Venkata Yarlagadda, Paul Taichiang Yu, Mark Mathias](#)

1617([Invited](#)) [High Temperature Membrane Electrode Assemblies for Intermediate Temperature Fuel Cells: Past, Present, and Future](#)

[Emory Sayre De Castro, Brian C Benicewicz, Xi Yin, Hoon T Chung, Piotr Zelenay](#)

1618([Invited](#)) [Alkaline Fuel Cells \(AFCs\) and Alkaline Membrane Fuel Cells \(AMFCs\)](#)

[Shimshon Gottesfeld](#)

1619([Invited](#)) [Key Contributions in the Fundamental Understanding of Carbonate Fuel Cells](#)

[Ramki Venkataraman, Chao-Yi Yuh](#)

1620([Energy Technology Division Research Award Address](#)) [MEA & DM Characterization/Optimization for Low Pt Loadings and High Current Densities](#)

[Alin Orfanidi, Christoph Simon, Gregor S. Harzer, Pankaj Madkikar, Hany A El-Sayed, Hubert A. Gasteiger](#)

[1621\(Invited\) Polymer Electrolyte Membranes for Fuel Cells: An Overview of Where We Have Been](#)

[Thomas A. Zawodzinski](#)

[1622\(Invited\) Advances in PEM and Phosphoric Acid Fuel Cells](#)

[William E Mustain, Leonard J. Bonville, Ugur Pasaogullari, Radenka Maric, Prabhakar Singh](#)

[1623\(Invited\) Phosphoric Acid Migration in Fuel Cells](#)

[Felix N Büchi, Jonathan Halter, Sebastian H. Eberhardt, Thomas J. Schmidt](#)

[1624\(Invited\) Using Heteropoly Acids As a Proton Conductor in High Temperature Proton Exchange Membrane Fuel Cells](#)

[Andrew M Herring, Andrew R Motz, Mei-Chen Kuo](#)

[1625\(Invited\) Hydroxide Exchange Membrane Fuel Cells](#)

[Yushan Yan](#)

[1626\(Invited\) Membrane Electrode Assembly for Alkaline Anion Exchange Membrane Fuel Cell](#)

[Hongmei Yu](#)

[1627\(Invited\) The Growing Importance of Hydrogen in Our Energy System and Extended Surface Electrocatalyst Development and Implementation](#)

[Shaun M Alia, Katherine Hurst, Scott A Mauer, K.C. Neyerlin, Shyam S. Kocha, Chilan Ngo, Sarah M Shulda, Svitlana Pylypenko, Bryan S Pivovar](#)

[1628\(Invited\) Development of Highly Active and Stable Pt and Pt Alloy Catalysts Evading the Draw-Back of the Nano-Sizing for PEFC Cathodes](#)

[Masahiro Watanabe, Hiroshi Yano, Hiroyuki Uchida](#)

[1629\(Invited\) Current Status on Ballard Fuel Cells and Future Catalyst Development](#)

[Siyu Ye, Dustin Banham, Lijun Yang, Shanna Knights](#)

[1630\(Invited\) From Fundamentals to PEMFC Systems](#)

[Haifeng Lv, Dongguo Li, Pietro Papa Lopes, Dusan Strmcnik, Rongyue Wang, Nenad M Markovic, Vojislav Stamenkovic](#)

[1631\(Invited\) How Oxygen-Containing Intermediates and Surface Charge Regulate Oxygen Reduction Reaction of Platinum Electrocatalysts](#)

[Jun Huang, Jianbo Zhang](#)

[1632\(Invited\) Pt/RuO<sub>2</sub>-TiO<sub>2</sub> \(RTO\) As Cell Reversal Tolerant Anode Catalyst for PEFCs](#)

[Amod Kumar, Dianne Atienza, Vijay K Ramani, Nilesh Dale](#)

[1633\(Invited\) High Performance Pt-Based Octahedral Nanocatalysts in Fuel Cells](#)

[Yu Huang, Zipeng Zhao](#)

[1634Characterization of Inkjet Printed Electrodes with Improved Porosity](#)

[Shantanu Shukla, David Stanier, Madhu S Saha, Beniamin Zahiri, Mickey Tam, Jürgen Stumper, Marc Secanell](#)

[1635\(Invited\) High-Performance PGM-Free Electrocatalysts for the Polymer Electrolyte Fuel Cell Cathode](#)

[Xi Yin, Hoon T Chung, Ling Lin, Geraldine M Purdy, Ulises Martinez, Piotr Zelenay](#)



[1636\(Invited\) Development of Non Platinum Group Metal Oxide Cathode without Carbon Support for PEFCs](#)

[Kenichiro Ota, Takaaki Nagai, Koichi Matsuzawa, Hideto Imai, Shigenori Mitsushima, Akimitsu Ishihara](#)

[1637\(Invited\) Fundamental and Practical Aspects of Implementing Non PGM Based Cathodes in Low and Medium Temperature PEM Fuel Cells](#)

[Sanjeev Mukerjee, Qingying Jia, Jingkun Li, Ryan Pavlicek](#)

[1638\(Invited\) Elucidating Optimal Carbon Morphologies and Structures in Highly Active PGM-Free Cathodes for PEM Fuel Cells](#)

[Gang Wu](#)

[1639\(Invited\) Porous Electrode Engineering for Platinum Group Metal-Free Oxygen Reduction Reaction Catalysts](#)

[Siddharth Komini Babu, Shohei Ogawa, Hoon T Chung, Piotr Zelenay, Shawn Litster](#)

[1640\(Invited\) Solid Oxide Fuel Cell Powered Small Unmanned Aerial Systems for Long Endurance](#)

[Deryn Chu](#)

[1641\(Invited\) Smart Electrolyte Matrix for Enhanced Carbonate Fuel Cell Life](#)

[Abdelkader Hilmi, Arun Surendranath, Chao-Yi Yuh](#)

[1642\(Invited\) The Effect of Heat-Treatment on Mechanical Property and Wetting Behavior of  \$\alpha\$ -LiAlO<sub>2</sub>](#)

[Liangjuan Gao, J. Robert Selman, Philip Nash](#)

[1643 Model-based Analysis of Carbon Corrosion in Start-up/Shutdown, Fuel Starvation, and Voltage Reversal of a Polymer Electrolyte Fuel Cell](#)

[Jixin Chen, Jingwei Hu, James Waldecker](#)

1644 [Numerical Study of Roughness and Contact Angle Effects on Water Transport in a Gas Channel](#)

[Alex Jarauta, Thomas Chan, Adam Z Weber, Pavel Ryzhakov, Jordi Pons-Prats, Marc Secanell](#)

1645 [Four-in-One Electrode for Micro Polymer Electrolyte Membrane Fuel Cells](#)

[Yinshi Li](#)

1646 [\(Invited\) Polymer Electrolyte Fuel Cell Diagnostics](#)

[Mike L. Perry, Robert M. Darling, Lalit M. Pant, Adam Z Weber](#)

1647 [\(Invited\) Tortuosity and Effective Transport Properties for Porous Materials in Electrochemical System](#)

[Thomas F Fuller, Andrew G. Star](#)

1648 [\(Invited\) Material Degradation in PEM Fuel Cell Electrodes](#)

[Rod L. Borup, Rangachary Mukundan, Andrew M. Baker, Dusan Spornjak, David A. Langlois, Sarah Stariha, Natalia Macauley, Karren L. More, Shyam S. Kocha, Adam Z Weber, Deborah J Myers, Rajesh Ahluwalia](#)

1649 [\(Invited\) Understanding Fuel Cell Materials Degradation through the Use of Advanced Microscopy Methods](#)

[Karren L. More](#)

1650 [\(Invited\) Imaging Techniques for Investigating Multiphase Transport Behaviour in Polymer Electrolyte Membrane Fuel Cells](#)

[Aimy Bazylak](#)

1651 [\(Invited\) Measuring Transport in Polymer Electrolyte Membranes](#)

[Cortney K Mittelsteadt](#)

1652([Invited](#)) [Open-Source Macro- and Meso-Scale Modeling of PEFCs](#)

[Marc Secanell, Andreas Michael Vincent Putz, Jie Zhou, Mayank Sabharwal, Alex Jarauta, Aslan Kosakian](#)

1653([Invited](#)) [An Activity Model for Swelling of Nafion<sup>®</sup> in Varied Solvents](#)

[Johna Leddy, Nadeesha Rathuwadu](#)

1654[Modeling of Performance Loss and pH Gradients in Hydroxide Exchange Membrane Fuel Cells Exposed to Carbon Dioxide](#)

[Brian P. Setzler, Yushan Yan](#)

1655([Invited](#)) [Hydrogen Fuel Cells for Small Unmanned Air Vehicles](#)

[Karen Swider-Lyons](#)

1656([Invited](#)) [Commercialization Road Map of Fuel Cell Commercial Vehicle \(FCCV\) at Telos Auto Power Systems Inc \(TAPS\)](#)

[Ruiming Zhang](#)

1657([Invited](#)) [The Fuel Cell Solution for Automobile Industry](#)

[Zhongjun Hou, Weiyu Shi, Keyong Wang, Danmin Xing, Dong Liang, Renfang Wang, Pingwen Ming](#)

## **I06-Crosscutting Metrics and Benchmarking of Transformational Low-Carbon Energy-Conversion Technologies**

1658([Invited](#)) [The U.S. Department of Energy's Energy Materials Network](#)

[Reuben Sarkar, William Joost, Eric L. Miller](#)

[1659\(Invited\) An Overview of Hydro GEN, a DOE Energy Materials Network Consortium Aimed at Accelerating the Development of Advanced Water Splitting Materials](#)

[Katie Randolph, Eric L. Miller, Huyen N. Dinh, Benjamin M Klahr](#)

[1660\(Invited\) Lightmat: A U.S. Dept. of Energy, Energy Materails Network](#)

[Darrell Herling](#)

[1661\(Invited\) Duramat - a Systems Driven Approach to Improving Module Material Durability in the Energy Materials Network](#)

[Teresa M. Barnes, Dana Olson, Margaret Gordon, David Ginley, Michael F Toney, Anubhav Jain, Randy Schunk, Sarah Kurtz](#)

[1662\(Invited\) The Electrocat \(Electrocatalysis\) Consortium](#)

[Adria R Wilson, Dimitrios C Papageorgopoulos, Deborah J Myers, Piotr Zelenay, Huyen N Dinh, Karren L. More](#)

[1663\(Invited\) An Overview of the Hydrogen Materials - Advanced Research Consortium \(HyMARC\), a DOE Energy Materials Network Consortium, to Accelerate Development of Hydrogen Storage Materials](#)

[Ned T Stetson, Mark D. Allendorf, Jesse Adams, Zeric Hulvey, Katie Randolph](#)

[1664\(Invited\) Chemcatbio: Chemical Catalysis for Bioenergy](#)

[Nichole Fitzgerald](#)

[1665\(Invited\) Integrating Theory and Experiment to Design and Develop Advanced Materials for the Production of Transportation Fuels Via Catalytic Fast Pyrolysis of Biomass: Transition Metal Carbides and Phosphides](#)

[Joshua Schaidle](#)

[1666\(Invited\) The Materials Project: Milestones, Challenges, and Opportunities in High-Throughput Computational Materials Science](#)

[Joseph H. Montoya, Kristin A Persson](#)

[1667\(Invited\) Design and Realization of New Thermochemically Active Materials](#)

[Lauren Garten, Shyam Dwaraknath, Riley Whitehead, Praneetha Selvarasu, Debora R. Barcellos de Oliveira, Zamyra Chan, Chuancheng Duan, Kevin Stone, Kristin A Persson, Ryan O'Hayre, Dan Nocera, David Ginley](#)

[1668\(Invited\) Exploring and Understanding Energy Conversion at Interfaces By Combining Simulations and X-Ray Spectroscopy](#)

[David Prendergast](#)

[1669\(Invited\) Rapid Computational Screening of Materials for Water Splitting Using Ab Initio and Machine Learned Models: Thermodynamic and Kinetics of Solar Thermal H<sub>2</sub> generation](#)

[Ryan Trottier, Samantha Miller-Millican, Christopher Bartel, Aaron M. Holder, Alan Weimer, Charles Bruce Musgrave](#)

[1670\(Invited\) Predicting Properties of Complex Interfaces for Photoelectrochemistry: Challenges and Strategies](#)

[Brandon C. Wood, Tadashi Ogitsu, Tuan Anh Pham](#)

[1671\(Invited\) Mesoscale Modeling Approaches for Hydrogen Generation and Storage](#)

[Tae Wook Heo, Tadashi Ogitsu, Brandon C. Wood](#)

[1672\(Invited\) Synthetic Screening of Electrolytes for Li-Air Batteries](#)

[Reese E Jones, Forrest S Gittleson, Michael E. Foster, Donald K Ward](#)

[1673\(Invited\) Integrating Theory and Experiment to Understand and Control Reaction Pathways](#)

[Michael F Toney](#)

[1674\(Invited\) Materials By Design for Energy Applications: Incorporating Metastability](#)

[William Tumas](#)

[1675\(Invited\) Crosscutting Research in the Critical Materials Institute](#)

[Eric Schwegler](#)

[1676\(Invited\) Large Scale Many-Body Perturbation Theory Calculations: Methodological Developments, Data Collections, Validation and Applications](#)

[Marco Govoni, Giulia Galli](#)

[1677\(Invited\) Water Splitting Catalyst Performance Benchmarking in the Joint Center for Artificial Photosynthesis](#)

[Frances A Houle, Charles C L McCrory](#)

[1678\(Invited\) Hydrogen Storage Characterization and Optimization Research Effort, Hyscore](#)

[Thomas Gennett](#)

[1679\(Invited\) The FC-PAD Consortium: Advancing Fuel Cell Performance and Durability](#)

[Rod L. Borup, Adam Z Weber, Deborah J Myers, Shyam S. Kocha, Rajesh Ahluwalia, Rangachary Mukundan, Karren L. More](#)

[1680\(Invited\) Benchmarking and Round Robin Testing for Polymer Electrolyte Membrane Water Electrolysis](#)

[Marcelo Carmo, Guido Bender, Tom Smolinka, Aldo Saul Gago, Nemanja Danilovic, Martin Müller, Fabrizio Ganci, Shaun M Alia, Arne Fallisch, Philipp Lettenmeier, K. Andreas Friedrich, Katherine E Ayers, Bryan S Pivovar, Jürgen Mergel, Detlef Stolten](#)

[1681Benchmarking Water Electrolysis Catalysts: Making the Right Comparisons](#)

[Katherine E Ayers, Nemanja Danilovic, Wayne L. Gellett, Chris Capuano](#)

[1682 Catalyst Activity Targets for Performance Parity in Hydroxide Exchange Membrane Fuel Cells](#)

[Brian P. Setzler, Jarrid A. Wittkopf, Zhongbin Zhuang, Yushan Yan](#)

[1683\(Invited\) A New Model for Materials Genome Initiative - Driven Research: The High Throughput Experimental Materials Science Virtual Laboratory](#)

[Martin L. Green](#)

[1684\(Invited\) The Center for Hierarchical Materials Design: Realizing the Promise of the Materials Genome Initiative](#)

[Peter W Voorhees, Juan DePablo, Greg Olson](#)

[1685\(Invited\) Datahub for Energy Materials Network](#)

[Chitra Sivaraman, Matt Macduff](#)

[1686\(Invited\) A Comprehensive Data Ecosystem to Accelerate Materials Research](#)

[John D. Perkins, Robert R White, Kristin Munch](#)

[1687\(Invited\) Best Practices for Building Robust and Usable Materials Datastores](#)

[Dan Gunter](#)

**K01-The 80th Birthday Trifecta in Organic Electrochemistry in Honor of Jean Lessard, Albert Fry, and Dennis Peters**

[1688\(Keynote\) Electroreduction of Nitrocyclopropanes and Nitrophenyl Cyclopropanes: Mechanism of Cleavage of the Radical Anion](#)

[Jean Lessard, Albert J. Fry](#)

[1689Metal- and Oxidant-Free Benzylic C-H/Aromatic C-H Cross Coupling Based on the Stabilized Cation Pool Method](#)

[Jun-ichi Yoshida, Ryutaro Hayashi, Akihiro Shimizu](#)

[1690Electrochemically Initiated Formation of Sulfonyl Radicals: Synthesis of Oxindoles Via Difunctionalization of Acrylamides Mediated By Bromide Ion](#)

[Chengchu Zeng, Yangye Jiang](#)

[1691Electrocatalytic Alkene Difunctionalization](#)

[Niankai Fu, Gregory S. Sauer, Song Lin](#)

[1692Bis-Annulation By Electrocatalysis](#)

[Syed Raziullah Hussaini, Kazuhiro Chiba, Yohei Okada, Yusuke Yamaguchi, Imada Yasushi, Takao Shoji](#)

[1693Photoredox Catalyst Based on an Arylimidazole Oxidative Electrochemical Mediator](#)

[Chiu Marco Lam, R. Daniel Little](#)

[1694Electrochemical Behavior of Toluene in Adiponitrile](#)

[Graham T. Cheek](#)

[1695Organic Electrochemistry at Abbvie: Expanding the API Synthetic Toolbox](#)

[Matthew D. Graaf](#)

[1696One-Pot Anodic Thiocyanation and Isothiocyanation of Alkenes](#)

[James Y. Becker, Avishai Levy](#)

[1697\(Keynote\) The Nature of the Interaction Between Electrogenated Anions and Tetraalkylammonium Cations](#)



[Albert Joseph Fry](#)

1698 [Tetranitrocalix\[4\]Arene Tetraradical Tetraanion As an Electrochemically Generated Ligand](#)

[Jiří Ludvík, Alan Liška, Pavel Vojtíšek](#)

1699 [Electrochemical Bio-Oil Upgrading at Mild Conditions](#)

[Jamelyn Holladay, Asanga Padmaperuma, Michael Lilga, Tedd E. Lister, Luis A. Diaz, Lucia M. Petkovic](#)

1700 [Asymmetric Synthesis of Substituted Piperidine Derivatives Based on the Indirect Cation Pool Method](#)

[Seiji Suga, Masahiro Haisa, Kazuki Yoshioka, Koichi Mitsudo](#)

1701 [Radical Cation Diels-Alder By Electrocatalyst](#)

[Yasushi Imada, Kazuhiro Chiba, Yohei Okada](#)

1702 [Unexpected H-Bond Dimers in Organic Electrochemistry: The Case of Phenylenediamines and Pyridines in Acetonitrile](#)

[Diane K. Smith, Laurie A. Clare, Tammy Pham, Lily Rafou](#)

1703 [Electrosynthesis of Linear PEDOT Fibers By Means of Bipolar Electrochemistry](#)

[Shinsuke Inagi, Masato Ohira, Yuki Koizumi, Hiroki Nishiyama, Ikuyoshi Tomita](#)

1704 [Decomposition of Strong Carboxylic Acids Redox Catalyzed By Carboxylate Ions; Chemical Grafting of Carbon Surfaces](#)

[Felipe J González, Vanessa Ramírez, Alia Mendez](#)

1705 [Trifecta of Ionic Liquid As Solvent, Electrolyte, and Mediator](#)

[Hisashi Shimakoshi, Kanako Takamatsu, Yoshio Hisaeda](#)

1706 [Functionality Impacts on Reaction Rates for Single Compounds and Simple Mixtures of Aldehydes and Ketones](#)

[Jamelyn Holladay, Michael Lilga, Asanga Padmaperuma](#)

1707 [Organic Electrochemistry Goes to Work: Genotoxicity Sensor Arrays](#)

[James F Rusling, Karteek Kadimisetty, Spundana Malla, Itti Bist](#)

1708 (Keynote) [Electrochemical Reduction of Bromobenzenes at Silver Cathodes](#)

[Michael Andrew Pence, Dennis G Peters, Mohammad S. Mubarak](#)

1709 [Role of the Unsaturated Groups in the Covalent Modification By the Carboxylate Oxidation: Mechanistic Aspects](#)

[Daniel Morales-Martínez, Felipe J González](#)

1710 [Electrochemical Nanoreactors of Mixed Metal-Oxide-Supported Noble- Metal-Nanoparticles for Efficient Oxidation of Dimethyl Ether and Ethanol](#)

[Iwona Agnieszka Rutkowska, Pawel J Kulesza](#)

1711 [Mechanistic Insight into the Electrocatalytic Hydrogenation and Electroreduction of Furfural](#)

[Xiaotong Chadderdon, David J Chadderdon, John Edward Matthiesen, Jean-Philippe Tessonier, Wenzhen Li](#)

1712 [Understanding the Metabolic Activation of Therapeutic Agents with Molecular Electrochemistry: The Example of Metallocifen Anti-Cancer Drug Candidates](#)

[Christian Andre Amatore, Olivier Buriez, Eric Labbe](#)

1713 [Electrochemical Properties and Reactions of Organoboron Compounds](#)

[Junji Suzuki, Masahiro Tanigawa, Yu Kuriyama, Kazuhiro Ohtsuka, Naoki Shida, Shinsuke Inagi, Toshio Fuchigami](#)

1714 [Chemical Modification of Surfaces By the Diazonium Chemistry](#)

[Daniel Bélanger](#)

1715 [Mechanistic Studies for the Formation of Dialkylated Nickel\(II\) Salen Involved in the Catalytic Reduction of \(Bromomethyl\)Cyclopropane](#)

[Clayton L Lambert, Mikaela E Enters, Shiva K Rastogi, Christopher T Brown, Ben A Shoulders, William J Brittain, Chang Ji](#)

1716 [Molecular Au<sub>25</sub>\(SR\)<sub>18</sub> Nanoclusters: Lifetime of Electrogenerated Species and Dielectric Properties of the Protecting Monolayer](#)

[Sabrina Antonello, Tiziano Dainese, Flavio Maran](#)

1717 [Developing New Synthetic Methods for the Construction of Complex Molecules and Complex Molecular Surfaces](#)

[Kevin D Moeller](#)

1718 [Electrochemical Characterization of Fischer Biscarbene Complexes of Chromium](#)

[Irena Hoskovicová, Radka Metelková, Hana Váňová, Tomáš Tobrman, Dalimil Dvořák, Jiří Ludvík](#)

1719 [Modification on Glassy Carbon Surfaces By Homogeneous Oxidation of Ferrocenecarboxylate in Presence of Ferrocenecarboxylic Acid and 1,4-Benzoquinone As Mediator](#)

[Nadia Gamboa-Valero, Felipe J González](#)

## **K02-Electron Transfer in Biological Systems**

1720 [Bio-Inspired Artificial Electron Transfer in Bioelectrocatalysis](#)

[Shelley D. Minteer](#)

1721 [Invited: Utilization of DNA As a Scaffold for Electrode Design for Efficient Bioelectrocatalysis in Fuel Cell Applications](#)

[Shelley D. Minteer](#)

1722 [Bioinspired Molecular Electrets: Bringing Proteomic Approaches to Charge-Transfer Systems](#)

[Valentine Ivanov Vullev](#)

1723 [Hydrogenation at Metal-Ligand Interfaces in CO<sub>2</sub> Electrochemical Reduction](#)

[Yuxin Fang, Xun Cheng, Ye Xu, John Flake](#)

1724 [Invited: Bio-Inspired Electrocatalysts for Electrochemical Processes](#)

[Plamen Atanassov, Alexey Serov, Kateryna Artyushkova, Ivana Matanovic](#)

1725 [Invited: Efficient Proton Transport in Rhodopsins Biohybrid Electrochemical Materials and Systems](#)

[Yan Xiang](#)

1726 [Invited: Microbiology Leads the Way: From Protein Nanowires to Hybrid Devices](#)

[Gemma Reguera](#)

1727 [Invited: Approaching Hydrogenase-like Performance with Molecular Electrocatalysts for H<sub>2</sub> Production](#)

[Eric S. Wiedner, Christina M. Klug, Allan J. Cardenas, Molly O'Hagan, Aaron M. Appel, Morris Bullock](#)

1728 [An Investigation into Capacitive Performances and Impedance Contributions Due to Structural Differences of Biochar Thin Film and Monolith Supercapacitor Electrodes](#)

[Daniel Yanchus, Donald W. Kirk, Charles Q. Jia](#)

1729 [Invited: Ammonia Generation at Algae Modified Electrodes: Some Mechanistic Considerations Drawn from Redox Potentials](#)

[Johna Leddy, Jacob Lyon, Timothy Paschkewitz](#)

1730 [Enhanced Harvesting of Photosynthetic Electrons from Isolated Thylakoid Membranes By Geometry-Optimized Microelectrodes](#)

[DongHyun Ryu, Yongjae Kim, Hyeonaug Hong, WonHyoung Ryu](#)

1731 [Prolonged Direct Harvesting of Photosynthetic Electrons from Living Algal Cells](#)

[Hyeonaug Hong, Yongjae Kim, Myungjin Han, Gu Yoo, Hyun Woo Song, Youngcheol Chae, Jae-Chul Pyun, Arthur Robert Grossman, WonHyoung Ryu](#)

1732 [Real-Time Imaging of Oxygenic Photosynthesis in Spinach Using Bio-LSI](#)

[Shigenobu Kasai, Yamato Sugiura, A. Prasad, Teruya Sato, Kumi Y. Inoue, Kosuke Ino, Tomokazu Matsue](#)

1733 [Photobioelectrochemistry of Intact Chloroplasts for Solar Energy Conversion](#)

[Kamrul Hasan, Ross D Milton, Matteo Grattieri, Shelley D. Minteer](#)

1734 [Orientational Control of Photosystem I on Electrodes](#)

[David E Cliffl, Evan Alexander Gizzie, Carson J Bryant](#)

1735 [Understanding Electron Transport in Photosynthetic Membranes for Electrochemical Energy Conversion](#)

[Ramaraja P. Ramasamy, Narendran Sekar](#)

1736 [Exploratory Analysis of Bacterial Raman Spectra in Electroactive Biofilms](#)

[Nikolai Lebedev, Sarah Strycharz-Glaven, Leonard M Tender](#)

1737 [Electrochemical Studies of Zinc/Cysteine Interactions](#)

[Michelle Y Doan, Matthew A. Worosz, Graham T. Cheek](#)

1738 [Electrodeposited Cadmium Oxide Semiconductor Electrodes for Protein Redox Characterization](#)

[Dennis G Peters, Benjamin Gerroll](#)

1739 [Extracellular Electron Transfer in Mixed Species Biofilms: The Role of Rikenella Microfusis](#)

[Matteo Grattieri, Sofiene Abdellaoui, Kamrul Hasan, Shelley D. Minter](#)

1740 [X-Ray Spectroscopic and Electroanalytical Studies on the Bio-Electic Interface of Metal Oxide Semiconductors and Algal Proteins and Biofilms](#)

[Artur Braun](#)

1741 [Real-Time Monitoring of NADPH Oxidase Inhibitory Effect of ROS Production from THP-1 Cells Using Iron-Porphyrin Modified Carbon Electrode](#)

[Shigenobu Kasai, A. Prasad, R. Matsuoka, A. Takahashi, Atsushi Nakagawa, Yamato Sugiura, Hiroki Koriyama, S. Aoyagi, T. Aikawa, T. Kondo, M. Yuasa](#)

1742 [Electron Transport Between an Electrode and Red Blood Cells](#)

[Irina V. Goroncharovskaya, Oleg V. Batishchev, Michael M. Goldin, Mark M. Goldin](#)

1743 [Direct Electrochemical Determination of Erythrocyte Concentration and Morphology](#)

[Mark M. Goldin, Anatoly K. Evseev, Natalia V. Borovkova, Oleg V. Batishchev, Michael M. Goldin](#)

1744 [Bactosomal Bioelectrode Design on a Cysteamine Self-Assembled Monolayer](#)

[Sadagopan Krishnan, Rajasekhara Nerimetla](#)

1745 [Nano/Micro Fabricated Sensor Chips for Human Sensing Platform](#)

[Li Li, Thomas Kelley, Minchul Shin, James Burgess](#)

1746 [Combined Covalent and Noncovalent Functionalization of Carbon Nanotubes for Sensitivity Improvement of Electrochemical Biosensors](#)

[Sadagopan Krishnan, Gayan Premaratne, Jinesh Niroula](#)

1747 [A Novel Graphene Modified Electrochemical Sensor for Ultrasensitive Detection of T1D Serum Autoantibody](#)

[Gayan Premaratne, Manoj Kumar Patel, Sadagopan Krishnan](#)

1748 [Equivalent Circuit Modeling of Microbial Fuel Cells Using Impedance Spectroscopy](#)

[Sindhuja M](#)

1749 [Advanced Biocathode and Its Application in Battery](#)

[Pei Zhang](#)

1750 [Biological Power Sources Based on Transparent and Capacitive Electrodes](#)

[Elena González-Arribas, Olga Aleksejeva, Sergey Shleev](#)

### **L01-Physical and Analytical Electrochemistry, Electrocatalysis, and Photoelectrochemistry General Session and Grahame Award Symposium**

1751 [A Self-Sustained Photoelectrochemical System with Anodic Rgo/ZnIn<sub>2</sub>S<sub>4</sub>/g-C<sub>3</sub>N<sub>4</sub> p-n-Hetero-Junction Catalyst for Antibiotic Wastewater Degradation](#)

[Tingting Yu](#)

1752 [Selective Nanomaterials for Glucose-to-Gluconate Oxidation in an Electrochemical Energy Converter: Cogenerating Organic Electrosynthesis](#)

[Kouakou Boniface Kokoh, Yaovi Holade, Karine Servat, Teko W. Napporn](#)

1753 [Influence of the Pore Shape and Size Distribution in Hierarchically Porous Electrodes on Energy and Power Densities of Electrochemical Devices](#)

[Enn Lust, Heisi Kurig, Eneli Härk, Rutha Jäger, Kersti Vaarmets, Silver Sepp, Jaak Nerut, Thomas Thomberg, Indrek Tallo, Alar Jänes, Tavo Romann, Rasmus Palm](#)

1754 [On the Use of LiCoO<sub>2</sub> Nanoparticles As Storage Material for Redox Flow Battery](#)

[Simon Rano, Christel Laberty-Robert, Kieu Ngo, Carlos Sanchez-Sanchez, Vincent Vivier](#)

1755 [Effect of CdSe Quantum Confinement on Charge Transfer Kinetics in Solar-Driven Hydrogen Production from Urea](#)

[James Radich, Rong Zhao](#)

1756 [Surface Enhanced Photoactivity of Hematite Films By Gold Nanostructures for Solar Fuels](#)

[Shanlin Pan](#)

1757 [Simultaneous Determination of Amlodipine and Nebivolol at PANI-CeO<sub>2</sub> Modified Carbon Paste Electrode](#)

[Nimsha Jadon](#)

1758 [Square Wave Bipolar Electrochemistry for the Detection of Proteins](#)

[Curtis Shannon, Songyan Yu](#)

1759 [Understanding Covalent and Noncovalent Functionalization of Carbon Nanotubes for Enzyme Electrocatalysis](#)

[Sadagopan Krishnan, James Moulton, Asantha Dharmaratne](#)



[1760Magnetite Nanospheres As Modifier of Carbon Paste Electrode for Determination of Inhibition Kinetics of Syzygiumpolyanthum extract Toward Xanthine Oxidase](#)

[Deden Saprudin, Gustria Ernis, Latifah K Darusman](#)

[1761Metal-Organic Framework-Derived Atomic Iron-Dispersed Carbon Electrocatalysts for Oxygen Reduction in Acidic Polymer Electrolyte Fuel Cells](#)

[Hanguang Zhang, Hoon T Chung, David A. Cullen, Karren L. More, Piotr Zelenay, Gang Wu](#)

[1762Nanocrystalline  \$\text{Co}\_{3-x}\text{Ni}\_x\text{O}\_4\$  with Low Ni Concentration: Enhanced Oxygen Evolution Activity Compared to  \$\text{Co}\_3\text{O}\_4\$](#)

[Aditi Singhal, Anuj Bisth](#)

[1763Iron Phosphide Nanoparticles As an Efficient Electrocatalyst for the Oxygen Evolution Reaction in Alkaline Solution](#)

[Siddesh Umaphathi, Jahangir Masud, Nikitaa Ashokan, Manashi Nath](#)

[1764Tunable Pt Alloys for Oxygen Reduction and Alcohol Oxidation](#)

[Anne C. Co, Eric J. Coleman, Heewon Choi](#)

[1765Combinatorial Synthesis of High-Efficiency Transition Metal Selenides As Oxygen Evolution Electrocatalysts](#)

[Xi Cao, Qingzhi Chen, Jahangir Masud, Manashi Nath](#)

[1766Highly Durable Carbon-Supported Pt Nanoparticles Electrocatalyst for Oxygen Reduction Prepared Using Protic Ionic Liquids As Adhesive Agent](#)

[Susumu Kuwabata, Reiko Izumi, Tetsuya Tsuda, Tsukasa Torimoto](#)

[1767CO Adsorption on Different Oxide-Supported Catalysts Studied By a Combination of in Situ X-Ray Absorption Spectroscopy \(XAS\) and Diffuse Reflectance Infrared Fourier Transform Spectroscopy \(DRIFTS\)](#)

[Christina Roth, Claudia Lentz, Julia Melke, Uwe Reinholz, Ana Guilherme Buzanich, Heinrich Riesemeier, Manoj Krishna Kayarkatte Narayan, Igor Derr, Nils van der Bosch](#)

1768 [An ATR-Seiras Study on Cu-Based Catalysts for CO<sub>2</sub> Electrochemical Reduction](#)

[Shangqian Zhu, Minhua Shao](#)

1769 [Electrochemical Imaging of Copper Contamination on Self-Assembled Organic Monolayer Modified Silicon Surfaces Following a 'Click' Reaction with Light-Addressable Potentiometric Sensors and Scanning Photo-Induced Impedance Microscopy](#)

[Fan Wu, Michael Watkinson, Steffi Krause](#)

1770 [Image Detection of Yeast \*Saccharomyces Cerevisiae\* By Light-Addressable Potentiometric Sensors \(LAPS\)](#)

[Dewen Zhang, Steffi Krause](#)

1771 [Ultrafast Double Optical Pump Technique for Probing Charge Transfer Processes at the Electrode-Electrolyte Interface](#)

[François Lapointe, Yujin Tong, R. Kramer Campen](#)

1772 [Direct EPR Evidence of Cathodic ECL Coreactant Intermediates of Benzoyl Peroxide and Ammonium Persulfate](#)

[Pradip Bastola, Wujian Miao](#)

1773 [Near-IR Photoelectrochemical Response of Colloidally Synthesized \(Cu<sub>2</sub>Ag\)<sub>2</sub>ZnSnS<sub>4</sub> solid Solutionnanocrystals](#)

[Tatsuya Kameyama, Ryosuke Kakudo, Susumu Kuwabata, Tsukasa Torimoto](#)

1774 [Mechanistic Analysis of Zr Dissolution in Acidic Fluoride Media Using Electrochemical Impedance Spectroscopy](#)

[M. S. Amrutha, M Tirumala Rao, S Ramanathan](#)

[1775 Impedance of Mediated Electrochemical Processes at Microelectrodes](#)

[Piotr Polczynski, Rafal Robert Jurczakowski](#)

[1776 Conduction Properties of Polyethersulfone/Carbon Nanotubes \(CNTs\)-Based Membranes for Water Treatment: Forecast By Electrochemical Impedance Spectroscopy](#)

[Edgard Ngaboyamahina, Nathan Bossa, Jeffrey T. Glass, Mark R. Wiesner](#)

[1777 Study of Low Frequency Electrolytic Behavior with an Accurate Impedance Method](#)

[Kung-Chu Ho, Vin-Cent Su, Jia-Hao Ye, Chieh-Hsiung Kuan](#)

[1778 \(Physical and Analytical Electrochemistry Division David S. Grahame Award Address\) Nanoscale Templates and Scaffolds for Electrochemical Device Applications](#)

[Viola Birss](#)

[1779 \(Invited\) Evidence for Magnetic Effects on Electron Transfer](#)

[Heung Chan Lee, Wayne L. Gellett, Shelley D. Minter, Krysti L. Knoche, Nadeesha Rathuwadu, Johna Leddy](#)

[1780 \(Invited\) Impact of Carbon Surface Functionalities on the Electrochemical Detection of Hemoglobin](#)

[Heather Anne Andreas, Justin Tom](#)

[1781 \(Invited\) Impedance Characterization of High-Temperature Spun Fiber Ceramic Materials](#)

[Petr Vanýsek, Vitězslav Novák, Klára Částková, Ladislav Chladil](#)

[1782 \(Invited\) Polyoxometalate Modified Biomass Carbon for Supercapacitor Electrodes](#)

[Matthew Genovese, Keryn Lian](#)

[1783\(Invited\) Build Effective Cathode Nanocatalysts to Improve Performance of Proton Exchange Membrane Fuel Cells](#)

[Jingbo Louise Liu, Sajid Bashir](#)

[1784Electrochemical and in Situ Characterization of Bi\(111\) Electrode in Ionic Liquid Mixtures with Halide Ions](#)

[Carolin Siimenson, Ove Oll, Georg Gorbatovski, Enn Lust](#)

[1785Enhanced Photoelectrocatalytic Activity in Ni-TiO<sub>2</sub> Nanocomposites Fabricated By Pulse Potential Deposition](#)

[Soha Mohajeri](#)

[1786Study of Charge Transfer Dynamics in Spray Deposited Cu<sub>2</sub>ZnSnS<sub>4</sub> \(CZTS\) Photoelectrodes for Performance Improvement](#)

[Animesh Mondal, James Radich](#)

[1787Effect of Fluoride Concentration on Niobium Anodic Dissolution](#)

[M Tirumala Rao, Ramanathan Srinivasan](#)

[1788Changes of Motional Resistance during the Electrochemical Deposition and the Anodic Dissolution of Copper in Diluted Sulphuric Solutions](#)

[Jeronimo Agrisuelas, Alejandro Cuenca, Jose García, Francisco Vicente](#)

[1789Palladium Electrocatalysts Synthesis: Probing Reducing Agent Effect By XRD, XPS and ORR](#)

[Teko W. Napporn, Yaovi Holade, Christine Canaff, Suzie Poulin, Karine Servat, Sandrine Arrii-Clasens, Kouakou Boniface Kokoh](#)

[1790Atomic Palladium](#)

[Erin L. Gawron, Steven M. Hira, Alex P Jonke, Mira A Josowicz, Jiri Janata](#)

[1791Effect of pH and Alkali Cations on Hydroxide Adsorption on Ir, Pt, and Au \(111\)](#)

[Ian T. McCrum, Michael J. Janik](#)

[1792Investigation of Polyaniline-Supported Au-Pd Bimetallic Catalysts for Propanol Oxidation Reactions in Alkaline Media](#)

[Nicole Goodwin, David Hatchett](#)

[1793Electrochemical Oxidation of Niobium and Tantalum Carbides in Aqueous Solutions](#)

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[Yuanbing Mao](#)

[1795Electrochemical Characterization of Magnetite Samples from Natural, Commercial, and Laboratory Sources and Implications for Remediation Research](#)

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[1796Hybrid Catalytic Materials for Determination and Speciation of Electrochemically Inert Analytes: Arsenic\(III\) and Arsenic\(V\)](#)

[Pawel J Kulesza, Weronika Ozimek, James A. Cox, Iwona Agnieszka Rutkowska](#)

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[Bogusław Pozniak, Daniel Scherson](#)

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1799 [Electrolytes Related Dynamic Mechanical Properties of Nanoconfined Water](#)

[Shah Haidar Khan, Peter Manfred Hoffmann](#)

1800 [Figures of Merit for the Assessment of the Electrocatalytic Activity of Electrode Materials for the Oxygen Reduction Reaction: A Critical Analysis](#)

[Nicholas Stefan Georgescu, Daniel Scherson](#)

1801 [Modeling Standing Waves in a Thin Layer Sonoelectrochemical System](#)

[Jeffrey Landgren, Gerhard Strohmer, Johna Leddy](#)

1802 [Electrochemical Kinetics and Dimensional Considerations at the Nanoscale](#)

[Hidenori Yamada, Prabhakar R Bandaru](#)

1803 [A Mechanistic Study of NiCo<sub>2</sub>O<sub>4</sub> Spinel As Cathode Material in Alkaline Media](#)

[Samgopiraj Velraj, Jiahong Zhu, Moises Israel Salazar-Gastelum, Erick Sandoval-Corona, Mara Beltrán-Gastélum, Sergio Pérez-Sicairos, Rosa María Félix-Navarro](#)

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[Kaushik Jayasayee, Suresh Kannan Balasingam, Svein Sunde, Thangavel Srinivas, Jae Sung Lee, Thirugnasambandam Manivasagam](#)

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[Alana Zülke, Paula Perroni, Eduardo Giangrossi Machado, Hamilton Varela](#)

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[1818High Performance Bioelectrocatalytic Interconversion Between Formate and Carbon Dioxide](#)

[Kenji Kano, Kento Sakai, Yuki Kitazumi, Osamu Shirai](#)

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[Xiaodan Cui, Yuxin Fang, Wangwang Xu, John Flake, Ying Wang](#)

[1820Adsorption of Benzyl Viologen Dichloride and Its Displacement By 3-Mercapto-1-Propanesulfonate during Copper Electrodeposition](#)

[Jing Lu, Dale P Barkey](#)

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[Balaji Kannan, Doe Kumsa, Adriel J.J. Jebaraj, Alia Albores, Nicholas Stefan Georgescu, Daniel Scherson](#)

## **L02-Ion-Conducting Polymeric (or, Polymer-based) Materials**

[1826\(Keynote\) Mechanisms in Ion Conducting Polymer Materials By Broadband Electrical Spectroscopy \(BES\)](#)

[Vito Di Noto, Keti Vezzù, Enrico Negro, Federico Bertasi, Gioele Pagot, Graeme Nawn, Giuseppe Pace](#)

[1827Ion Transport in Single-Ion Conducting Polymer Electrolytes for Lithium Batteries](#)

[Sunil Upadhyay, Jennifer L. Schaefer](#)

[1828Thermodynamics of Polymer Electrolyte Membranes in Contact with Concentrated Electrolyte Solutions](#)

[Jing Peng, Gabriel A. Goenaga, Thomas A. Zawodzinski](#)

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[Nachiket Paranjape, Haiqing Lin, Gang Wu, Praphulla Mandadapu](#)

[1830\(Energy Technology Division Supramaniam Srinivasan Young Investigator Award Address\) New Insights into PFSA Ionomers - from Membranes to Thin Films](#)

[Ahmet Kusoglu](#)

[1831\(Keynote\) Investigation the Effect of CO<sub>2</sub> Absorption in Anion Exchange Membrane By Electrical Conductivity and NMR](#)

[Jing Peng, Asa Logan Roy, Ramez Ahmed Elgammal, Thomas A. Zawodzinski](#)

[1832Controlled Ion Flow through Polymeric Anion Exchange Membranes](#)

[Demetra M Pantelis, Juliette Experton, Charles R Martin](#)

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[Syed D. Sajjad, Yan Gao, Zengcai Liu, Hongzhou Yang, Rich Masel](#)

[1834Pentablock Ionomer Based TEOS-TIP Hybrid Nanocomposites: Morphology, Physical Properties, and Ion Transport](#)

[Fei Huang, Wenjian Zheng, Chris Cornelius](#)

[1835Trade-Off Between Transport and Mechanical Properties in Ion-Containing Block Copolymers with Different Self-Assembled Morphologies: A Comparison Study Between Lamellar and Inverse-Hexagonal](#)

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[Yuchen Wang, Xiaoyao Qiao, Chen Zhang, Xiangyang Zhou](#)

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[Xiaoyao Qiao, Yuchen Wang, Chen Zhang, Xiangyang Zhou](#)

1839 [Formation/Dissolution of Conductive Silver Filaments through an Ionic Liquid/Polymer Electrolyte Thin Film](#)

[Zhongmou Chao, Garrison Crouch, Donghoon Han, Paul W. Bohn, David B. Go, Susan Fullerton](#)

1840 [Electrodeposition with Nanoparticles As Nano-Bioplax Electrodes](#)

[Garrison Crouch, Donghoon Han, Susan Fullerton, David B. Go, Paul W. Bohn](#)

1841 [Nanostructured Polypyrrole-Based Materials](#)

[Krzysztof Winkler, Monika Wysocka-Zolopa](#)

1842 [Sulfonated Block Copolyphenylchinoxalines As Proton Exchange Membranes](#)

[Silvia Janietz, Tatjana Egorov-Brening](#)

### **L03-Electrochromic and Chromogenic Materials**

1843 [\(Invited\) Durability of Electrochromic Films: Ageing Kinetics and Rejuvenation](#)

[Gunnar A. Niklasson, Rui-Tao Wen, Huiying Qu, Miguel A Arvizu, Claes-Goran Granqvist](#)

1844 [Influence of the Temperature on the Electrochromic Properties of Complementary and Symmetrical WO<sub>3</sub>/NiO Devices](#)

[Yingchun He, Mathias Da Rocha, Xungang Diao, Aline Rougier](#)

1845 [\(Invited\) Smart Optical Coatings for Energy Saving, Anticounterfeiting and More](#)

[Bill Baloukas, Francis Blanchard, Simon Loquai, Ludvik Martinu](#)

1846 [Reflective Electrochromic Device with Gelatin-Nanocomposite Electrolyte](#)

[Franciani C Sentanin, Rodrigo César Sabadini, Carla C Cavalheiro, Jerzy Kanicki, M. M. Silva, Agnieszka Pawlicka](#)

1847 [Near Infrared Selective WO<sub>x</sub>-Based Electrochromic Devices Regulated By Charge Transfer Impedance at the Counter Electrode](#)

[Praveen Pattathil, Riccardo Scarfiello, Roberto Giannuzzi, P. Davide Cozzoli, Michele Manca](#)

1848 [Effect of Oxygen Partial Pressure on the Fabrication and Characterization of LaB<sub>6</sub>-Doped-NiO<sub>x</sub> Thin Films Produced By Magnetron Sputtering](#)

[Mengying Wang, Xungang Diao](#)

1849 [\(Invited\) Ultrasonic Spray Coating of Electrochromic Nanomaterials](#)

[Anthony Maho, Laura Mancერი, Pierre Colson, Catherine Henrist, Bénédicte Vertruyen, Rudi Cloots](#)

1850 [\(Invited\) Aspects of Vibrational Spectroscopy in Investigation of Low-Temperature Pigmented V-Oxide Films](#)

[Angelja Kjara Surca, Goran Dražić, Mohor Mihelčič](#)

1851 [Multi-Color Electrochromism in Vanadium Oxide Thin Films](#)

[Giljoo Song, Issam Mjejri, Manuel Gaudon, Aline Rougier](#)

1852 [From Capacitance-Controlled to Diffusion-Controlled Electrochromism in Nb-Doped TiO<sub>2</sub> Nanocrystalline Electrodes](#)

[Mariam Barawi, Rafael Da Silva, Roberto Giannuzzi, Luca De Trizio, Liberato Manna, Michele Manca](#)

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[Junji Guo, Xungang Diao](#)

[1854 \(Invited\) Conjugated Polymers in Redox Active Devices: Electrochromism As a Case Study](#)

[John R Reynolds](#)

[1855 Preparation and Electrochromic Performances of Structural Derivatives and Hybrid Homo-/Co-Polymers of Poly\(3,4-ethylenedioxythiophene\)s](#)

[Shuai Chen, Jingkun Xu](#)

[1856 \(Invited\) Inkjet Printed Multifunctional Smart Windows](#)

[Guofa Cai, Pooi See Lee](#)

[1857 One-Step Process to Fabricate Transparent Polymer Gel Electrolyte for Electrochromic Window](#)

[Minji Lee, Hyungsub Kim, Dahyun Choi, Wonshik Chu, Dooman Chun, Caroline Sunyong Lee](#)

[1858 Structure-Dependent Response Characteristics of Electrochromic Dye-Modified Transparent Conductive Oxide Porous Electrode](#)

[Yuichi Watanabe, Kouji Suemori, Toshihide Kamata](#)

[1859 Insertion of Cesium in Prussian Blue Films](#)

[Francisco Vicente, Jeronimo Agrisuelas, Alejandro Cuenca, Antoni Francesc Roig, Jose García, Ana San Matías, Gema Alfonso](#)

[1860 \(Invited\) Solution-Processed Nanostructured Electrochromic Materials: Preparation and Application](#)

[Dongyun Ma, Zhongping Xu, Jinmin Wang](#)

1861 [\(Invited\) Organic Based Electrochromic and Thermochemical Materials: Design, Characterization and Integration in Flexible Devices](#)

[Luca Beverina, Mauro Sassi, Paolo Brazzo, Daniela Galliani](#)

1862 [Conductive PEDOT:PSS Electrodes in Electrochromic Devices](#)

[Michel De Keersmaecker, Augustus Lang, Anna Åsterholm, John R Reynolds](#)

1863 [Modification of Thin Films of Poly\(3,4-ethylenedioxythiophene\) for Enhanced Electrochromic Performance](#)

[Chung-Min Kao, Chih-Wei Hu, Ramamurthy Vittal, Kuo-Chuan Ho](#)

1864 [\(Invited\) Electrochemically Controllable Emission and Coloration Using Luminescent Europium\(III\) Complex and Electrochromic Viologen Derivatives](#)

[Kazuki Nakamura, Kenji Kanazawa, Norihisa Kobayashi](#)

1865 [Hydrothermal Growth of Hierarchical NiO Nanostructures and Their Application in a Complementary Electrochromic Device](#)

[Dongyun Ma, Hongzhi Wang, Jinmin Wang](#)

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[Khawla Zrikem, Mathias Da Rocha, Ahmed Ait Aghzzaf, M'Barek Amjoud, Daoud Mezzane, Aline Rougier](#)

### **M01-Sensors, Actuators and Microsystems General Session**

1867 [Low Frequency Analysis of Acidic and Neutral Electrolytes with a Highly-Sensitive Microfluidic Sensor](#)

[Jia-Hao Ye, Kung-Chu Ho, Vin-Cent Su, Chieh-Hsiung Kuan](#)

[1868 Simultaneous Multi-Analyte Detection of Neurotransmitters Using Polypyrrole-Based Molecularly Imprinted Conducting Polymers](#)

[Bo Si, Edward Song](#)

[1869 A Miniaturized High-Throughput Flow Injection Analysis System for Electrochemiluminescence Detection](#)

[Pablo Fanjul Bolado, Marta Maria Pereira Silva Neves, María Begoña González García, David Hernández Santos](#)

[1870 \(Invited\) Characterization of an Optically Transparent Thin-Film Electrode Chip for Spectroelectrochemical Sensors](#)

[Shirmir D. Branch, John Lynch, Job M. Bello, William R. Heineman, Samuel A. Bryan](#)

[1871 \(Invited\) T-Chip, a Biosensor Based on the Electron Tunneling: Theory and Experiment](#)

[Young June Park, Jun Yeon Yun, Won Cheol Lee, Young Eun Lee, Kyoung Yeon Kim](#)

[1872 Point-of-Use Detection of Organosulfate Contaminants Associated with Cyanotoxins in Water Using Electrochemical Methods](#)

[Christina Nicole Willis, Mano Misra, Swomitra Mohanty](#)

[1873 Penetrating Nanoelectrodes for Stimulation of Single-Cells](#)

[Komal Garde, Shyam Aravamudhan](#)

[1874 Boron-Doped Ultrananocrystalline Diamond Microelectrodes for Chronic Dopamine Monitoring](#)

[Gaurab Dutta, An-Yi Chang, Shabnam Siddiqui, Prabhu Arumugam](#)

[1875 Toward an in Situ Electrochemical Sensor Measuring Phosphate Concentration in Seawater](#)

[Carole Barus, Ivan Romanytsia, Nicolas Striebig, Véronique Garcon](#)

1876[Enzyme-Based Electrochemical Lactate Biosensors Capable of Operating in Low-Oxygen Environments](#)

[Aytekın Uzunoglu, Lia Stanciu](#)

1877(Invited) [Electrochemical Paper-Based Sensors for Clinical and Environmental Diagnostics](#)

[Charles S Henry](#)

1878[Integration of Graphene Oxide on Nylon/Polyester/Cotton Fabrics for a Wearable Electronic Nose Sensor](#)

[Eunji Lee, Yoonsung Chung, Doohee Lee, Jaesik Yoon, Christopher Lincoln, Bart Charles Prorok, Sungpil Woo, Youngsoo Yoon, Dong-Joo Kim](#)

1879[A Fully Inkjet-Printed Sensor for Electrochemical Detection of Heavy Metals](#)

[Hamed Shamkhalichenar, Jin-Woo Choi](#)

1880[An Electrochemical Ammonia Sensor on Paper Substrate](#)

[Praveen K. Sekhar, Jesse Kysar](#)

1881[Novel Films Based on Inexpensive and Readily Available Materials for Use As a Hydrocarbon Sensor](#)

[Holly Bri Sebastian, Roberto Pilonieta, Robert Matthew Mayall, Viola Birss, Steven Bryant](#)

1882[Preparation of High Charge Storage Capacity PEDOT/Functionalized Mwent Hybrid Nanocomposite for Neural Electrode Applications](#)

[D V Santhosh Kumar Gunapu, Siva Rama Krishna Vanjari](#)



[1883Effects of Block Ionomer Morphologies on the Electromechanical Performance of Ionomeric Polymer-Metal Composite Actuators](#)

[Wenjian Zheng, Chris Cornelius](#)

[1884Impedancemetric NO<sub>x</sub> Sensors Based on LSM and LSM-Au Sensing Electrodes](#)

[Nabamita Pal, Erica P Murray](#)

[1885Flow Cells with Integrated Electrodes Prepared By Digital Light Processing Projector-Based 3D Printing for Electrochemical Sensing Applications](#)

[Gregory William Bishop, Abdulhameed Hussain Alabdulwaheed, Ahmad Ajibola Muili](#)

[1886A Photovoltaic Device Based on PbS Quantum Dots](#)

[Taher Ghomian, Samaneh Farimand, Jin-Woo Choi](#)

[1887Silicon Anisotropic Etching in Ternary Solution Composed of TMAH+Triton+NH<sub>2</sub>OH](#)

[Veerla Swarnalatha, Avvaru Venkata Narasimha Rao, Prem Pal](#)

[1888\(Invited\) Suspended Polymer Nanobridge on a Quartz Resonator](#)

[Wuseok Kim, Seokyung Hwang, Heewon Yoon, Sangmin Jeon](#)

[1889Metal-Coated Fiber for Concentration Detection in Gas Mixtures Using the 3-Omega Excitation Method](#)

[Sampath Kommandur, Alireza Mahdavifar, Peter Hesketh, Shannon K. Yee](#)

[1890Elimination of Sensor Maintenance By Sensor Interrogation and Correction](#)

[Towner Scheffler](#)

[1891Self-Bridged ZnO Nanowires through Simple Annealing Process and Its Humidity Sensing Properties](#)

[Subeen Park, Byungkwan Kwak, Dongik Lee, Songjun Lee, Bongyoung Yoo](#)

[1892 Tailored Nickel Oxide Nanorods Via Hydrothermal Growth for Gas Sensors and Electrocatalysts](#)

[Yoonsung Chung, Eunji Lee, Doohee Lee, Jaesik Yoon, Christopher Lincoln, Bart Charles Prorok, Sungpil Woo, Youngsoo Yoon, Dong-Joo Kim](#)

[1893 Portable High Surface Area TiO<sub>2</sub> Nanotube Array Sensor for the Detection of Benzene at Room Temperature](#)

[Shruti Hegde, Swomitra Mohanty, Kerry E. Kelly](#)

[1894 Synthetic Polypyrrole/Titanium Dioxide \(Ppyl/TiO<sub>2</sub>\) Nanocomposite As Potential Electroactive Material for the Voltammetric Quantification of Sulfamoxole](#)

[AB Lateef Khan, Rajeev Jain](#)

[1895 Measurement of Thickness of High-Resistivity Substrate By Photoconduction Enhanced Capacitance Displacement Sensor](#)

[T. -H. Lee, M. -C. Lin](#)

[1896 Real Time Quantification of Phenolic Compounds in Oil and Gas Wells Produced Wastewater Using a QCM Sensor](#)

[Magda Lorena Lorena Barrera, Julio Andrés Pedraza, Fabián Alirio Ríos](#)

[1897 Patchable Ion Channel Pressure Sensors Inspired By Somatic Organs](#)

[Kyoung-Yong Chun, Young Jun Son, Chang-Soo Han](#)

[1898 Thin Layer Disposable Flow Cells As \(Spectro\)Electrochemical Detectors in FIA Systems](#)

[Pablo Fanjul Bolado, Hussein Kanso, María Begoña González García, David Hernández Santos](#)

[1899Effect of Incident Light Direction and Metallic Reflector Layer on Light Sensing of Amorphous Silicon Pin Diodes](#)

[Kai Henry, Yue Kuo](#)

[1900A Wearable Gas Sensor of GO and TiO<sub>2</sub> Composite with High Selectivity](#)

[Eunji Lee, Yoonsung Chung, Doohee Lee, Jaesik Yoon, Christopher Lincoln, Bart Charles Prorok, Sungpil Woo, Youngsoo Yoon, Dong-Joo Kim](#)

[1901Effect of Surfactant and Alcohol Additives on Etching Characteristics in Aqueous Potassium Hydroxide Solutions](#)

[Avvaru Venkata Narasimha Rao, Veerla Swarnalatha, Prem Pal](#)

[1902Electrooxidation of Hexacyanoferrate\(II\) Anions in the Microfabricated Electrochemical Sensor-Array System](#)

[Kätlin Pitman, Jaak Nerut, Enn Lust, Merlin Raud, Timo Kikas, Sami Franssila](#)

[1903A Printed Capacitor with Carbon Nanotube Electrodes for Energy Storage](#)

[Tallis H. da Costa, Jin-Woo Choi](#)

[1904Electrochemical Detection of Sulfanilamide at MWCNT Coated Conducting Polymer Modified Electrode](#)

[Shirinaz Khan, Rakesh Chillawar, Pradesh Digal, Ramani V Motghare](#)

[1905An LED-Based Portable Multi-Excitation Fluorometer](#)

[Young-Ho Shin, Jin-Woo Choi](#)

[1906Autonomous Silicate Electrochemical Sensor in Seawater](#)

[Dancheng Chen Legrand, Carole Barus, Nicolas Striebig, Véronique Garçon](#)

[1907Effect of Dry and Humidified Gases at Porous Electrolyte NO<sub>x</sub> Sensors](#)

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[1908A Novel Electrochemical Sensing Platform for the Simultaneous Trace Level Detection of Mercury, Cadmium and Copper](#)

[Afzal Shah, Faiza Jan Iftikhar](#)

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[Feifei -F. Huang, Zhengwei Wan, Ying Jin, Lei Wen](#)

[1911Movement Intention Prediction By Superficial Magnetic and Pressure Sensor](#)

[Mauricio Plaza, Mauricio Cifuentes](#)

## **M02-Nano/Bio Sensors**

[1912\(Invited\) Substance Release Triggered By Biomolecular Signals in Bioelectronic Systems](#)

[Evgeny Katz](#)

[1913Sensitive Double-Layer Coil Detector for the Detection of Salmonella Typhimurium Using Magnetoelastic Biosensors](#)

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1915 [Electrochemical Proximity Assay of Picomolar Platelet-Derived Growth Factor through Combined Surface Plasmon Resonance, Electrochemistry, and Fluorescence Spectroscopy Approach](#)

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1916 [Simultaneous Determination of Ascorbic Acid, Dopamine and Uric Acid By a Novel Electrochemical Sensor Based on N<sub>2</sub>/ Ar RF Plasma Assisted Graphene Nanosheet/Graphene Nanoribbon](#)

[Lavanya Jothi, Neogi S, Gomathi Nageswaran](#)

1917 [Interferogram Average over Wavelength \(IAW\) Reflectance Spectroscopy for Nanostructured Porous Silicon Refractive Index Optical \(Bio\)Sensors: A Novel Ultrasensitive Technique for Label-Free Biosensing](#)

[Stefano Mariani, Lucanos M Strambini, Giuseppe Barillaro](#)

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[David Eric Schwartz, Ping Mei, Brent Krusor, Yong Zhang, Robert Street, Jonathan Rivnay, Patrick Mercier, Joseph Wang](#)

1919 [Conducting Molecularly Imprinted Polymer \(MIP\) Chemical Sensors for Toxic N-Nitrosamines Selective Determination in Heat Processed Food of Animal Origin](#)

[Włodzimierz Kutner, Alvaro Garcia-Cruz, Patrycja Lach, Piyush Sindhu Sharma, Piotr Pieta, Karolina K. Golebiewska, Maciej Cieplak, Krzysztof R. Noworyta, Emmanuelle Schulz, Francis D'Souza](#)

1920 [Au Nanoparticles Decorated Hollow Pt-Pd Nanoassemblies As High Performance SERS Chemical Sensors](#)

[Jing-Wen Huang, Fang-Ching Chang, Chun-Hua Chen](#)

[1921Our Surface Plasmon Coupled-ELISA with Enhanced Sensitivity Will Help Realize Point-of-Care Applications for Sustainable Future](#)

[Achyut J Raghavendra, Jingyi Zhu, Apparao M. Rao, Ramakrishna Podila](#)

[1922Combining Electrochemistry and Biology to Create a Suite of Portable Biosensors for Water Analysis](#)

[Robert Matthew Mayall](#)

[1923\(Invited\) Bottom-up Fabrication of Unique Nanostructured Biosensors and Bioanodes](#)

[David W Schmidtke](#)

[1924Low-Overhead Thin-Film Approaches and Platforms for Spectroscopic Fingerprinting and Electronic Single-Molecule Sensing](#)

[Buddini Iroshika Karawdeniya, Y. M. Nuwan D. Y. Bandara, Julie C. Whelan, Jonathan W. Nichols, Jason R. Dwyer](#)

[1925High Volume Zero Power Low Cost PPB Level Printed Nano-Sensors for Iot](#)

[Joseph R Stetter, Michael T Carter](#)

[1926Fabrication of Three-Dimensional Woodpile Cerium Oxide Nanostructure Via Solution-Based Soft Nanoimprint Lithography for Enzymatic Glucose Sensor](#)

[Yiliang Zhou, Sema Demirci Uzun, Alejandro L. Briseno, Kenneth R. Carter, James J. Watkins](#)

[1927Rapid and Selective Determination of Acetaminophen in Surem Via Intermolecule Hydrogen Bonding with Arginineon Graphene](#)

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1931 [Interactions of TiO<sub>2</sub> Nanotubes with Contaminants of Emerging Concern for Applications in Point-of-Use Electrochemical Detection](#)

[Ashley Timmerman, Swomitra K. Mohanty, Krista Carlson](#)

1932 [Characterizing the Ionic Transport through Nanoporous AAO Membranes: Effect of Surface Charge Due to Biomolecule Functionalization](#)

[Agnivo Gosai, Pranav Shrotriya](#)

1933 [A Paper-Based Lateral Flow Strip for Protein Biomarker Detection](#)

[Nianqiang \(Nick\) Wu, Xuefei Gao](#)

1934 [Design and Fabrication of a Folding- and Dynamics-Based Electrochemical DNA Sensor on Indium Tin Oxide](#)

[Kenneth Neal Hipp, Andrew Olson, Anita J. Zaitouna, Patrick H. Dussault, Rebecca Y. Lai](#)

1935 [Carbon Nanotube-Based Bioanalytical Sensors](#)

[Daniel A Heller, Prakrit Vaibhav Jena, Thomas Vito Galassi, Ryan M. Williams, Januka Budhathoki-Uprety, Rachel E Langenbacher, Daniel Roxbury, Yosef Shamay, Janki Shah, Rune Frederiksen, Christopher Peter Horoszko, Jackson Dean Harvey](#)

1936 [Surface Plasmon Immunoarrays for Non-Glucose Diabetes Biomarkers](#)

[Sadagopan Krishnan, Vini Singh, Manoj Kumar Patel, Jinesh Niroula](#)

1937 [Development of an Electrochemical Impedimetric Biosensor for the Detection of Telomerase Activity in Cancer Cells](#)

[Carlos R Cabrera, Diana C Diaz-Cartagena, Griselle Hernandez, Lisandro Cunci Perez, Carlos I. Gonzalez](#)

1938 [Electrochemical Peptide-Based \(E-PB\) Sensor for the Detection of Uranium](#)

[Channing Christine Thompson, Rebecca Y. Lai](#)

1939 [Preparation of Glucose Sensor for Low Invasive In Vivo Measurement](#)

[Mikito Yasuzawa, Jiang Li, Shinsaku Nakataki, Yusuke Fuchiwaki, Toshihiko Harada](#)

1940 [NAD-Glucose Dehydrogenase Immobilized on Gold Via Iron-Sulfur Based Molecular Wires for Biosensing Applications](#)

[Aishwarya Mahadevan, Sandun Fernando](#)

1941 [Electrochemical Biosensors Using Multi-Enzyme Cascade Reactions](#)

[Ramaraja P. Ramasamy, Yi Fang](#)

1942 [Fabric Based Wearable Biosensor for Continuous Monitoring of Steroids](#)

[Pandiaraj Manickam, Renny Edwin Fernandez, Shekhar Bhansali](#)

1943 [Non-Enzymatic Glutamate Sensor Based on Nickel Oxide Nanoparticle](#)

[Mamun Jamal, Sumon Chakrabarty, Han Shao, David McNulty, Mohammad A. Yousuf, Kafil M. Razeeb](#)

1944 [Hierarchical in Situ functionalized TiO<sub>2</sub> Nanotubular Substrate for Sensing Volatile Organic Compounds Associated with Tuberculosis](#)



Yalda Saffary, Christina Nicole Willis, Mano Misra, Swomitra K. Mohanty

1945 A Low-Cost Aptamer Immobilization Technique for the Selective Detection of Protein Biomarkers Using Electrochemical Impedance Spectroscopy

Niazul Islam Khan, Edward Song

1946 CuO-MWCNTs for Enzyme-Less Electrochemical Detection of Glucose and Dopamine

Sathiyathan Felix, Chella Santhosh, Andrews Nirmala Grace

1947 Disposable Chlorine Sensor Based on Pencil Graphite Electrode

Mamun Jamal, Apu K. Dutta, Juel Islam, Han Shao, Mohammad A. Yousuf, Kafil M. Razeeb

1948 Development of WO<sub>3</sub> Nanoparticle Based pH Sensor

Mamun Jamal, Irani Akhter, Han Shao, Mohammad A. Yousuf, Kafil M. Razeeb

1949 Hydrothermal Synthesis of Metal Oxide (NiO, CuO, ZnO and WO<sub>3</sub>) Nanoparticles and Their Antimicrobial Properties

Junaid U. Ahmed, Han Shao, Mohammad A. Yousuf, Kafil M. Razeeb, Mamun Jamal

1950 Nanomaterial Labels for Signal Amplification in Electrochemical Immunosensors

Pandiaraj Manickam, Shekhar Bhansali, Khalid Pasha, Hui Huanghan

1951 Cyclic Voltammogram of Paclitaxel Nanoparticles

Steven T Miller, Dongwon Lee, Shradha Prabhulkar, Gary W Williams, Vuong N Trieu

1952 Paper Microfluidic Electrochemical Sensor for Salivary Cortisol Analysis

Renny Edwin Fernandez, Pandiaraj Manickam, Shekhar Bhansali

1953 [Automatically Turn-Off EOF Pump Based on Conical Nanopores with Lead Sensor](#)

[Wei Huang Xu](#)

1954 [Precision Plating of Electrogenic Cells on Microelectrodes Enhanced with Nanoporous Platinum for Cell-Based Biosensing Applications](#)

[Nilab Azim, Frank Sommerhage, Megan Aubin, James Hickman, Swaminathan Rajaraman](#)

1955 [Functionalized Deoxynucleotides and DNA Primers for Electrochemical Diagnostics of Disease Predispositions](#)

[Ahmed Mehdi Debela](#)

1956 [Glycated Albumin Detection Using Electrochemical Aptasensor for Screening and Monitoring of Diabetes Mellitus](#)

[Sasinee Bunyarataphan, Lalita Maruset, Kittiphong Paiboonsukwong, Suthat Fucharoen, Tararaj Dharakul, Deanpen Japrungr](#)

### **Z01-General Student Poster Session**

1957 [Improvement of Electrochemical ORR Activity and Its Durability with Pt Electrocatalyst Nanoparticles Anchored on MO<sub>x</sub>/Cup-Stacked Carbon Nanotube in Acidic Aqueous Media](#)

[Fuma Ando, Toyokazu Tanabe, Takao Gunji, Shingo Kaneko, Takeo Ohsaka, Futoshi Matsumoto](#)

1958 [Insulator-Based Dielectrophoresis As an Anti-Fouling Strategy for Nanoporous Silicon-Nitride Membrane Filters](#)

[Tonghui Wang, Jirachai Getpreecharsawas, Jack Wurzer, Blanca H Lapizco-Encinas, James L. McGrath, Hitomi Mukaibo](#)

1959 [Impact of Native Oxide on the Capacitance-Voltage Characteristic of Pseudo-Mos Structure](#)

[Isao Yarita, Shingo Sato, Yasuhisa Omura](#)

1960 [Principal Fin Structure Factor to Reduce the Body Effect in DRAM Cell](#)

[IL-Woo Jung, Byoung-deog Choi, Hyoung-Sub Kim, Gyo-Young Jin](#)

1961 [Fabrication of Porous Current Collectors for Li Ion Capacitor with Pico-Second Pulse Laser and Acceleration of Li<sup>+</sup> Ion Pre-Doping Reaction to Laminated Graphite/Porous Current Collector Anodes](#)

[Takashi Tsuda, Fuma Ando, Yasumasa Mochizuki, Takao Gunji, Toyokazu Tanabe, Shingo Kaneko, Takeo Ohsaka, Kaoru Itagaki, Naohiko Soma, Futoshi Matsumoto](#)

1962 [Optical Characterization of CaCu<sub>3</sub>Ti<sub>4</sub>O<sub>12</sub> thin Films](#)

[Giji Skaria, Kalpathy B Sundaram](#)

1963 [A Novel Approach for the Preparation of Carbon Supported Intermetallic Cu<sub>3</sub>Sn Nanoparticles and Their Electrocatalytic Performance for CO<sub>2</sub> Reduction](#)

[Yubin Liu, Takao Gunji, Toyokazu Tanabe, Shingo Kaneko, Takeo Ohsaka, Masahiro Miyauchi, Futoshi Matsumoto](#)

1964 [The Influence of Inverse Opal Template and Substrate Type on Electrodeposited 3D Macroporous Oxides](#)

[Sally O'Hanlon, David McNulty, Colm O'Dwyer](#)

1965 [Real Time Quantification of Phenol in Aqueous Solutions Using a Quartz Crystal Microbalance](#)

[Magda Lorena Lorena Barrera, Julio Andrés Pedraza, Fabián Alirio Ríos, Germán Alexander Garzón](#)

1966 [Interaction of Thiol Ligands with Gold in Electrocatalytic CO<sub>2</sub> Reduction](#)

[Xun Cheng, Yuxin Fang, Ye Xu, John Flake](#)

[1967Optical Reflectance Spectroscopy of Spin-Coated Multilayered ZnO and Al:ZnO Thin Films](#)

[Darragh Buckley, Robert McCormack, David McNulty, V.Z. Zubialevich, Peter J. Parbrook, Colm O'Dwyer](#)

[1968Catalyst and Electrode Advances for High Performing PEM and AEM Fuel Cells](#)

[Xiong Peng, Travis J Omasta, William A. Rigdon, Lianqin Wang, John Varcoe, William E Mustain](#)

[1969Work Function Extraction of Indium Tin Oxide Used As Transparent Gate Electrode for Mosfet](#)

[Shraddha Nehate, Kalpathy B Sundaram](#)

[1970High Capacity Carbon-Coated Honeycomb Ni-Mn-Co-O Inverse Opal Anode for Li-Ion Batteries](#)

[David McNulty, Hugh Geaney, Colm O'Dwyer](#)

[1971Nano-Architected 3D Ultra Low-k Dielectrics](#)

[Max L. Lifson, Min-Woo Kim, Bong-Joong Kim, Julia R Greer](#)

[1972Formation and Evaluation of Cyanide from Cyanide Free Solution By Electroplating](#)

[Takuya Kitago, Kazuma Tamaki, Shoei Mizuhashi, Ichiro Koiwa](#)

[1973Preparation and Evaluation of Electroplated Cu-Mo Alloy Films](#)

[Atsushi Murayama, Kota Akahori, Sho Kawamura, Susumu Takemura, Ichiro Koiwa](#)

[1974Electrochemical and Structural Investigation of Metal-Electrodes for an Energy-Efficient CO<sub>2</sub>-Reduction Process](#)

[Fabian Bienen, Norbert Wagner, K. Andreas Friedrich, Dennis Kopljar, Armin Löwe, Elias Klemm](#)

[1975 Exploring the Energetics of the Lithium Ion-Organic Carbonate Interaction: A Temperature-Dependent FTIR Study](#)

[Kaylee Woodard, Kristen D'Ann Fulfer, Daniel G Kuroda](#)

[1976 Solvation of Sodium Salts in Glymes](#)

[Susith R Galle Kankanamge, Daniel G Kuroda](#)

[1977 Effects of Oximes on the Electrodeposition of Cobalt for Interconnect Applications](#)

[Tyler W. Lyons, Qiang Huang](#)

[1978 Flexible Paper Photodetectors Based on 2D BN Nanosheets](#)

[Chun-Ho Lin, Meng-Lin Tsai, Hui-Chun Fu, Jr-Hau He](#)

[1979 Electrodeposition of Compositionally Modulated NiFe Alloys in Porous Anodic Alumina](#)

[Keaton M. Ramsey, William D. Sides, Qiang Huang](#)

[1980 Transferring the Incremental Capacity Analysis to Lithium-Sulfur Batteries](#)

[Vaclav Knap, Theodoros Kalogiannis, Rajlakshmi Purkayastha, Daniel Ioan Stroe, Szymon Beczkowski, Erik Schaltz, Remus Teodorescu](#)

[1981 Hydrogen Ion Role on the Reduction of Poly-\(Neutral Red\)](#)

[Jeronimo Agrisuelas, Alejandro Cuenca, David Ferrus, Antonello Frau, Jose García, Francisco Vicente](#)

[1982 Hydrogen Production and Storage By Means the Poly-\(Azure A\)](#)

[Jeronimo Agrisuelas, Alejandro Cuenca, David Ferrus, Antonello Frau, Jose García, Francisco Vicente](#)

[1983 Characterization of Scaling in Ultra-Thin Poly-Si and Analysis of the Scaling Limit of Thin Film Thickness](#)

[Hwan Lee, Jin-Hong Park](#)

[1984 Theoretical UV-Vis Spectral Fingerprints for Li-S Reaction Intermediates in an Ether Based Electrolyte](#)

[Dunyang Wang, Tod Pascal, Nitash P Balsara, David Prendergast](#)

[1985 Electrical Characteristics Improvement of NAND Flash Memory on Experiment to Replace 49BF2+ with 11B+ in Implantation of Ions](#)

[Hyun-Mook Choi, Yonghan Roh](#)

[1986 Electrochemical Investigation on the Reduction of Oxygen at a Perovskite Modified Au Microelectrode](#)

[Oliver Rodriguez, Alan Rogerio Ferreira Lima, Alex Silva Lima, Mauro Bertotti, Guy Denuault](#)

[1987 Towards Synthesis of Steel Foams through Carbothermal Reduction of Iron Oxide Nanoparticles and Renewable Biopolymers](#)

[Joshua Craig Sparks, Monsur Islam, Rodrigo Martinez-Duarte](#)

[1988 Stretchable Smart Skin Based on 2D Piezoelectric Semiconductors](#)

[Ruoxing Wang, Wenzhuo Wu](#)

[1989 Controllable Synthesis of Tellurium Nanowires for Stretchable and Wearable Piezoelectric Device](#)

[Yixiu Wang, Wenzhuo Wu](#)

[1990 The Effect of Polypyrrole in the Capacity Retention of Fe<sub>3</sub>O<sub>4</sub>/Polypyrrole Composite Electrodes in Lithium-Ion Batteries](#)

Andrea Bruck, Cara N Gannett, David C Bock, Paul F Smith, Amy C Marschlok, Esther S Takeuchi, Kenneth J Takeuchi

1991Simultaneous Optical and Electrochemical Imaging of Shewanella Oneidensis

Margaret C Calhoun, David Crisostomo, David E Cliffl

1992Reducing Electrolyte Consumption of Silicon-Electrodes through Capacity-Limited Cycling

Morten Wetjen, Daniel Pritzl, Roland Jung, Sophie Solchenbach, Hubert A. Gasteiger

1993in-Situ Electrochemical-AFM and CV Measurement Study on the Nucleation and Growth in Reduced Graphene Oxide Electrode Contacts

Sung Gyu Pyo

1994Transition Metal Oxide-Based Conversion Reaction for High-Capacity Lithium-Ion Batteries

Eunho Cha, Wonbong Choi

1995Enhanced Thermal Durability with High Performance Lanthanum Nickelate Cathode Materials for Intermediate Temperature Solid Oxide Fuel Cells

John In Lee, Jayoon Yang, Youdong Kim, Jun-Young Park

1996Bifunctional Activity of Transition Metals Sulfides-Based Catalysts

Rana Arslan Afzal, Nam-In Kim, Sung Won Lee, Jun-Young Park

1997Enhancement of Bifunctional Catalytic Activity and Stability of Perovskite Oxide-Based Catalysts

Nam-In Kim, Sung Ryul Choi, Sung Won Lee, Rana Arslan Afzal, Jun-Young Park

1998Preparation and Characterization of New Pt/Rh/SnO<sub>2</sub> Nanoparticle Catalysts for Ethanol Oxidation Reaction to CO<sub>2</sub>

Tu Phuong Mai, Masanobu Chiku, Eiji Higuchi, Hiroshi Inoue

1999Studying the Attraction of T. Brucei to Different Materials and Landscapes

Josie Duncan, Natalie Hanson, Mary Grace Heustess, Emily Kluttz, Faith Mitchell, Rodrigo Martinez-Duarte

2000Comparison of Electropolishing Behavior of Two Grades of Brass Alloys

Chloé Rotty, Audrey Mandroyan, Marie-Laure Doche, Jean-Yves Hihn

2001Studying the Behavior of T. Brucei Under Electric Field Gradients Implemented Using Optoelectronic Tweezers

Emily Gullette, Natalie Hanson, Emily Kluttz, Callie Stuart, Meredith Hammer, Anna Pitman, Kayla Wallace, Devin Monroe Keck, Rodrigo Martinez-Duarte

2002Planar Mesoporous Silicon Flakes with Microns Thicknesses As an Anode Material for Li-Ion Batteries: Fabrication, Characterization and Electrochemical Tests

A. Klimenko, I. Kashko, V. Bondarenko, E. Astrova, V. Zhdanov, Alexander Mikhaylovich Rumyantsev, P. Amoros, M. Gomez, A. Cantarero, E. Matveeva

2003Modeling and Simulation of Degradation Mechanisms in Li-Ion Batteries

Venkatasailanathan Ramadesigan, Shravan Kumar Reddy

2004PV Absorber Layered Materials Formation Using Potential Pulse Atomic Layer Deposition (PP-ALD).

Peter W Sisk, Justing Czerniawski, John Lewellen Stickney

2005Carbon-Electrode Dielectrophoresis for Concentrating Trypanosoma Brucei

Josie Duncan, Emily Gullette, Meredith Hammer, Mary Grace Heustess, Anna Pitman, Kayla Wallace, Monsur Islam, Rodrigo Martinez-Duarte



[2006Transport Limitations in Binary Electrolytes: The Temperature Dependence of the Electrolyte Transport Parameters](#)

[Johannes Landesfeind, Maximilian Graf, Hubert A. Gasteiger](#)

[2007Electrochemical Nucleation and Growth of Binary Antimony Telluride Compounds](#)

[William D. Sides, Qiang Huang](#)

[2008Nickel Phosphides as Catalysts for Direct Electrochemical CO<sub>2</sub> Reduction to Important Renewable Polymers](#)

[Karin U. D. Calvinho, Anders B. Laursen, Timothy A. Goetjen, Martha Greenblatt, Gerard Charles Dismukes](#)

[2009Studies on the Interfacial Impedance of Superconcentrated Non-Aqueous Electrolytes in Contact with Li-Ion Conductive Ceramic Membranes](#)

[Thomas M Arruda, Daniel J Donnelly, Charles J. Patrissi](#)

[2010A Molecular Dynamics Study of Interfacial Structure and Ion Transport of Mixed Carbonate/LiPF<sub>6</sub> Electrolytes Near Graphite Electrode Surfaces](#)

[Mathew J Boyer, Gyeong S Hwang](#)

[2011First-Principles Evaluation of the Catalytic Activity of Nanostructured Carbon for the Oxygen Reduction Reaction at Fuel Cell Cathodes](#)

[Gregory Peter Hartmann, Gyeong S Hwang](#)

[2012Theoretical Analysis of SiCl<sub>4</sub> Reaction Mechanism for Si Electrodeposition Process in Tmha-Tfsi As Ionic Liquids](#)

[Tatsuki Fujimura, Yasuhiro Tsuyuki, Masahiro Kunimoto, Yasuhiro Fukunaka, Takayuki Homma](#)

[2013Redox-Active Hybrid Materials for Pseudocapacitive Energy Storage](#)

[Muhammad Boota, Yury Gogotsi](#)

2014 [Electrical Studies on the ZnO/SiNWs P-N Junction Prepared from Si Nanowires Grown By Electroless Etching](#)

[Victor H. Velez, Kalpathy B Sundaram](#)

2015 [Nanotechnology for Water-Less Cleaning of Solar Panels<sup>†</sup>](#)

[Sanjana Das, Stephanie Silic, Biswajit Das](#)

2016 [Zinc-Ferricyanide: A Model-Validated Cost-Effective Flow Battery for the Grid](#)

[Rose Xiaoya Ma, Yushan Yan](#)

2017 [Performance of Conducting Polymers Electropolymerized Under Various Conditions for Redox–Magnetohydrodynamics \(R-MHD\) Pumping](#)

[Foysal Z Khan, Ingrid Fritsch](#)

2018 [Nafion Film Investigations Using Ferricyanide As a Probe Molecule](#)

[Marissa Kayle Reynolds, David W Paul](#)

2019 [Influence of Cathode Surface Structure on Decomposition Behavior of Li<sub>2</sub>O<sub>2</sub> and Li<sub>2</sub>CO<sub>3</sub> in Lithium Air Battery Investigated By First Principles Molecular Dynamics](#)

[Mashiro Soeno](#)

2020 [Challenges of Simultaneous Measurement of Catecholamines in Mixtures: Steps Toward Neural Probes Suitable for In Vivo Analysis](#)

[Mahsa Lotfi Marchoubeh, Mengjia Hu, Ingrid Fritsch](#)

2021 [Effect of Added Bases on the Redox-Responsive Dimerization of a 4 H-Bond Array Containing a Phenylenediamine Redox Couple](#)

[Katrina Vuong, Laurie A. Clare, Diane K. Smith](#)

[2022The Electrochemistry of 1-Ferrocenyl-3-Phenylurea \(FcUHH\) in the Presence of the Diamide Guest, 1,4-Dimethylpiperazine-2,3-Dione \(PZD\)](#)

[Megan Jackson, Laurie A. Clare, Diane K. Smith](#)

[2023Redox-Dependent Binding to an Electroactive Urea: Comparison of One and Two Electron Redox Couples](#)

[Kyle Logan, Laurie A. Clare, Diane K. Smith](#)

## **Z02-Nanotechnology General Session**

[2024The Improved Photocatalytic Ability for  \$\text{Ag}\_3\text{PO}\_4\$  through the Use of a PEDOT:PSS Layer](#)

[Ming-Tong Syue, Jyh-Ming Ting](#)

[2025Waste Water Purification By  \$\text{TiO}\_2\$ anodically Grown in Different Geometries](#)

[Beatriz Sanabria, Maria Vittoria Diamanti, MariaPia Pedferri](#)

[2026Synthesis and Characterization of a Novel Plasmonic Nanocomposite Photocatalyst:  \$\text{Ag}/\text{MoS}\_2\$  Nanodots/ \$\text{TiO}\_2\$  Mesoporous Beads](#)

[John Peter Miras Alido, Jyh-Ming Ting](#)

[2027Atomic Layer Deposition \(ALD\) of Transparent and Conducting Ta-Doped ZnO Thin Films](#)

[Zhengning GAO, Yoon Myung, Xing Huang, Rohan Mishra, Ravi Kanjolia, Jeunghee Park, Parag Banerjee](#)

[2028Efficiency Optimization of Pyramid-Textured Crystalline Solar Cells with Metal-Assisted Chemical Etching](#)

[Vin-Cent Su, Yan-Chun Liu, Chieh-Hsiung Kuan](#)

[2029Carbon Nitride/TiO<sub>2</sub> Nanocomposite in Treatment of Water Contaminated with Phenol](#)

[Halema Ali Al-Kandari, Aboubakr Moustafa Abdullah, Shekhah Ali Al-Kandari, Ahmed meslam Mohamed](#)

[2030Bi-Continuous Nanoporous Metal Formation Via Compound Decomposition](#)

[Qing Chen, Congcheng Wang](#)

[2031Effects of Additives on the Electrodeposition of Nano-Grained Ni-Mo Alloys](#)

[Y.N. Shi, J. Hu, X.G. Zheng, K. Lu](#)

[2032Atom Probe Tomography of Dealloyed Materials](#)

[Ayman A. El-Zoka, Roger C. Newman, Brian Langelier](#)

[2033Electrochemical Nature of Silver Halide Underpotential Deposition on Au\(111\)](#)

[Jesse A. Phillips, Heather Morgan, Lauren E. Jackson, Greg H. Jones, Erin V. Iski](#)

[2034Enzymes Confinement in Gold Nanospikes Electrodes Fabricated By Metal-Assisted Chemical Etching for Enhanced Electron Transfer](#)

[Hyeryeong Lee, Yooseok Lee, Soo-Kyung Lee, Jae-Hyung Jang, In Seop Chang](#)

[2035Copper Nanowire Array Electrodes with Electropolymerized Polyaniline Corrosion Barrier](#)

[Jorge Moncada, Carlos Carrero, Tae-Sik Oh](#)

[2036Fabrication of Ultra-Small Zirconia Nano-Islands Using Thermal Atomic Layer Deposition](#)

[Nazek El-Atab, Junkyo Suh, Raisul Islam, Krishna C. Saraswat, Ammar Nayfeh](#)

[2037 Synergistic Effect of Acid Treatment and Metal Oxide Co-Catalyst Loading on Inactive Rutile TiO<sub>2</sub> Nanorods for Enhanced Photocatalytic Degradation of Orange \(II\) Dye](#)

[Love Kumar Dhandole, Mahadeo A Mahadik, Su-Gyeong Kim, Min Cho, Hee-Suk Chung, Jung Ho Ryu, Jum Suk Jang](#)

[2038 Redox Responsive Fluorescent Probe Development for Super Resolution and Fluorescence Lifetime Microscopy](#)

[Jeremiah Woodcock, Eric Choudhary, Brynna Jones, James Marr, Abishek Kumar, Jeffrey W. Gilman, Stephan J. Stranick, J. Alexander Liddle, Veronika Ann Szalai](#)

[2039 Dye - Sensitized Solar Cell Photoanode Based on Silver – Doped Titanium Dioxide Nanoparticles](#)

[Hoang Thai Nguyen, Long Thanh Vo, Lan Thi Kim Nguyen, Hien Quoc Nguyen](#)

[2040 Mechanical and Electrical Properties of Electrostatic Sprun Carbon Nanotubes Embedded in P3HT:PCBM](#)

[Te-Hua Fang, Zhe-Wei Chiu, Yu-Jen Hsiao](#)

[2041 A Way to New Smart Materials – Hierarchical 3D Structures Produced Via Self-Organization of Nanowires](#)

[Galina Strukova, Gennadii Strukov](#)

[2042 Synthesis and Characterization of Green Emitting Erbium Doped BaY<sub>2</sub>ZnO<sub>5</sub> Nanophosphors](#)

[Vinod Bala Taxak](#)

[2043 Sol-Gel Synthesis and Photoluminescent Investigation of SrZnV<sub>2</sub>O<sub>7</sub>:Eu<sup>3+</sup> Nanophosphors](#)

[Satyender Pal Khatkar](#)

[2044 Dissolution and Shape Controlling of Crystalline ZnO](#)

Ji Yong Chung, Taekyung Yu

2045 Aqueous-Phase Synthesis of Metal Nanoparticles Using Phosphates As Stabilizers

Inho KIM, Taekyung Yu

### **Z03-Solid State Topics General Session**

2046 A Study of the Conduction Processes in Organic Schottky Diodes

Munira Raja

2047 Air Dependence of Electrical Performance Parameters in Polymeric Organic Solar Cell

Victor Samuel Balderrama, Jose G. Sanchez, Magali Estrada, Josep Pallares, Josep Ferré-Borrull, Lluís F Marsal

2048 Using Memristor Formalism in Semiconductor Device Modeling

Rodrigo Picos, Eugeni Garcia-Moreno, M. Moner Al Chawa, Leon O. Chua

2049 Effect of the Metal-Organic Interfaces in Analytical Modeling of Organic Solar Cells

J. a. Jiménez Tejada, P. López Varo, O. Marinov, C. H. Chen, M. Jamal Deen

2050 Charge-Based Compact Model for DC Current in Organic TFT Including Non-Linear Injection Effects with a Close Link to Electrical Device Parameter

Alexander Kloes, Franziska Hain, Michael Graef, B. Iniguez

2051 Use of Microdischarge Lithography for Development of Organic Electronic Devices over Large Areas

Angel Luis Alvarez, Fernando Borrás, Jorge Sebastián Moreno, Miguel García-Vélez, Juan Jiménez-Trillo, Carmen Coya

2052 [Physics of Graphene/Organic Heterojunction Devices](#)

[Chang-Hyun Kim, Ioannis Kymissis](#)

2053 [Physical SPICE Model of Organic Thin Film Transistor](#)

[Yvan Bonnasieux, Sungyeop Jung, Gilles Horowitz](#)

2054 [Newly Introduced Green Solvent for Organic Photovoltaics Processing](#)

[Mahmoud Farhat, Chih-Wei Chu](#)

2055 [Effect of Inserting Nanoscale-Thick Inorganic Interlayer Between Metal Electrode and Organic Layers on Photo-Sensitivity Enhancement of Organic Photo Diodes](#)

[Joo-Hyeong Park, Seung-Hyun Song, Min-Won Kim, Hyo-Jun Kwon, Jae-Gon Kim, Ui-Hyeon Jung, Hyo-Won Baik, Jea-Gun Park](#)

2056 [Development of Printed OTFTs and Logic Circuits](#)

[Ta-Ya Chu, Afshin Dadvand, Neil Graddage, Py Christophe, Stephen Lang, Ye Tao](#)

2057 [High Throughput Experimental Solutions for Solid State Lithium-Ion Battery Research](#)

[Han Song, Parker Liu, Tanglin An, Hui Fang, Genxiang Zhu, Xiaoping Jiang](#)

2058 [Investigation of Alternative Mixed-Conducting Oxides for SOFC Anode Applications](#)

[Edward M. Sabolsky, Xingbo Liu, John W. Zondlo, He Qi, Tony Thomas, Richard Hart, Erik Jezek](#)

2059 [Metal-Organic Framework-Based Flexible Resistive Switching Memory Devices](#)

[Myung-Joo Park, Jang-Sik Lee](#)

[2060 Stable Switching in HfO<sub>2</sub>-Based Crossbar Conducting- Bridge Resistive Switching Memory Device](#)

[Umesh Chand, Md Abdullah Al Hafiz, Meshal Alawein, Hossein Fariborzi](#)

[2061 Mapping Changes Induced By Few Monolayers of Al<sub>2</sub>O<sub>3</sub> on a CuO Nanowire Surface](#)

[Sriya Banerjee, Zhengning Gao, Yoon Myung, Parag Banerjee](#)

[2062 Frequency and Area Dependence of High-K/Ge Mos Capacitors](#)

[Ivan Mitevski, Yiming Ding, Durga Misra](#)

[2063 Hydrothermally Synthesized Copper Gallium Delafossite Nanoflakes for \(Photo\)Electrocatalytic Water Splitting](#)

[Yuanbing Mao, Swati Mohan](#)

[2064 Raman Mapping and Delineation of III-V Semiconductor Band Bending Characteristics](#)

[Michael Frankston Lichterman, Azhar I Carim, Bruce S Brunschwig, Nathan S Lewis](#)

[2065 Photoluminescence Properties of Pr<sup>3+</sup>-Activated Ca-Based Perovskites Prepared By Amorphous Complex Method Using Aqueous Metal Complex Solutions](#)

[Yasushi Sato, Yuta Ohashi, Yuta Iguchi, Tomohiro Watanabe, Ayami Sugino, Masato Kakihana](#)

[2066 Au Core-TiO<sub>2</sub> Shell Nanoparticles Produced By RT Atomic Layer Deposition](#)

[Fumihiko Hirose, Kensaku Kanomata, Masanori Miura, Ko Kukuchi, Bashir Ahmmad, Shigeru Kubota](#)

[2067 Synthesis and Highly Effective Purification of Silver Nanowires to Enhance the Transmittance at Low Sheet Resistance with Simple Polyol and Scalable Selective Precipitation Method](#)



[Molla Bahiru Gebeyehu, Tolosa Fita Chala, Shao-Yen Chang, Chang-Mou Wu, Jiunn-Yih Lee](#)

2068 [Pulsed Photoinitiated Synthesis of Nanocrystalline Iron Oxides-Reduced Graphitic Oxides in-Situ Nanocomposite Thin Film As Anode Materials for Silicon-Based Micro-Supercapacitor](#)

[Sijun Luo, Moses Oguntoye, Song Zhang, Noshir Pesika, Douglas Chrisey](#)

2069 [A Novel Photodetector Based on Azo/SiO<sub>x</sub>/N-Si Heterojunction Structure](#)

[Tsung-Cheng Tien, Tsung-Eong Hsieh, Bing-Chien Wu](#)

2070 [Preparation of Cu<sub>2</sub>ZnSn\(S<sub>x</sub>Se<sub>1-x</sub>\)<sub>4</sub> \(CZTSSe\) Single-Phase Sputtering Target By Sintering Binary Alloy Powders and Its Applications to CZTSSe Thin-Film Solar Cell](#)

[Meng-Huan Lee, Yu-Pin Lin, Tsung-Eong Hsieh](#)

## **Z04-Sustainable Materials and Manufacturing 2**

2071 [\(Invited\) Development of High Temperature Materials and Technologies for Electrochemical Storage and Conversion](#)

[Grigorii L. Soloveichik](#)

2072 [A Novel Approach to the Sustainable Synthesis of Carbon Fibers](#)

[Devin Monroe Keck, Monsur Islam, Rodrigo Martinez-Duarte](#)

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