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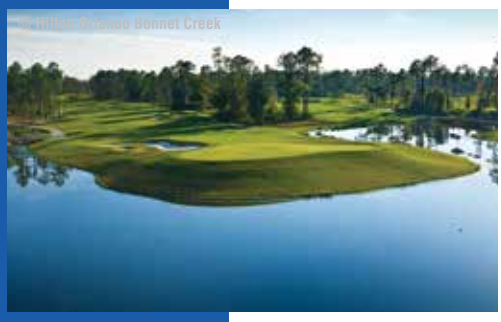

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225th ECS Meeting

ORLANDO, FL

May 11-16, 2014

Hilton Orlando Bonnet Creek

Call for Papers

General Information

The 225th ECS Meeting will be held from **May 11-16, 2014**. This major international conference offers a unique blend of electrochemical and solid-state science and technology; and serves as a major forum for the discussion of interdisciplinary research from around the world through a variety of formats, such as oral presentations, poster sessions, exhibits, and tutorial sessions.

Abstract Submission and Deadlines

Abstracts are due no later than November 15, 2013.

Note: Some abstracts may be due earlier than November 15, 2013. Please carefully check the symposium listings for any alternate abstract submission deadlines. For complete details on abstract submission and symposium topics, please see www.electrochem.org.

Submit one original meeting abstract electronically via www.electrochem.org, no later than **November 15, 2013**. Faxed abstracts, emailed abstracts, late abstracts, and abstracts more than one page in length will not be accepted. In January 2014, all presenting authors will receive an email from ECS headquarters office notifying them of the date, time, and location of their presentation. Only authors with non-U.S. addresses will receive a hardcopy acceptance letter. Other hardcopy letters will be sent only upon request.

Meeting abstracts should explicitly state objectives, new results, and conclusions or significance of the work. Abstracts must be properly formatted and no more than one page in length. Please use the ideal preformatted two column template located at: http://www.electrochem.org/meetings/assets/abs_template.doc. Programming for this meeting will occur in January 2014, with some papers scheduled for poster presentation. Check the ECS website for further program details.

Paper Presentation

All authors selected for either oral or poster presentations will be notified in January 2014. Oral presentations must be in English. Both LCD projectors and laptops will be provided for oral presentations. **Presenting authors are no longer required to bring their own laptops to the meeting for presentation; however, you MUST bring your presentation on a USB flash drive to be used with the laptop that will be provided in each technical session room.** If a presenting author would like to use his/her own laptop for presentation, we strongly suggest that the author verify laptop/projector compatibility in the presentation room prior to the start of the session or all other presentations. Speakers requiring additional equipment must make written request to the ECS headquarters office at least one month prior to the meeting and appropriate arrangements will be worked out, subject to availability, and at the expense of the author. Poster presentations should be displayed in English, on a board approximately 3 feet 10 inches high by 3 feet 10 inches wide (1.17 meters high by 1.17 meters wide), corresponding to the abstract number and day of presentation in the final program.

Manuscript Publication

ECS Meeting Abstracts—All meeting abstracts will be published on the ECS website, copyrighted by ECS, and all abstracts become the property of ECS upon presentation.

ECS Transactions—All full papers presented at ECS meetings are eligible for submission to the online proceedings publication, *ECS Transactions* (ECST). Each meeting is represented by a "volume" of ECST, and each symposium is represented by an "issue."

Some symposia will publish their issue to be available for sale "AT" the meeting. Please see each individual symposium listing in this Call to determine if there will be an "AT" meeting issue. In this case, submission to ECST is mandatory, and required in advance of the meeting.

Some symposia will publish their issue to be available "AFTER" the meeting, and all authors are encouraged to submit their full papers. To determine acceptance in ECST, all submitted manuscripts will be reviewed, either by the symposium organizers or by the ECST Editorial Board. After the meeting, all accepted papers in ECST will be available for sale, either individually, or by issue.

Please visit the ECST website (http://ecsdl.org/ECST/) for additional information, including overall guidelines, deadlines for submissions and reviews, author and editor instructions, a manuscript template, and much more.

Authors presenting papers at ECS meetings, and submitting to ECST, are encouraged to submit to the Society's technical journals: the *Journal of The Electrochemical Society, ECS Journal of Solid State Science and Technology, ECS Electrochemistry Letters*, or *ECS Solid State Letters*. Although there is no hard deadline for the submission of these papers, it is considered that six months from the date of the symposium is sufficient time to revise a paper to meet the stricter deadlines of the journals. "Instructions to Authors" are available from the ECS headquarters office, the journals, or the ECS website.

If publication is desired elsewhere after presentation, written permission from ECS is required.

Financial Assistance

Financial assistance is very limited and generally governed by the symposium organizers. Individuals may inquire directly to the symposium organizers of the symposium in which they are presenting their paper to see if funding is available. Individuals requiring an official letter of invitation should write to the ECS headquarters office; such letters will not imply any financial responsibility of ECS. Students and early career/young faculty members seeking financial assistance should consider awarded travel grants (*see Travel Grant Application forms beginning on page 20*).

Hotel Reservations • Deadline April 11, 2014

The 225th ECS Meeting will be held at the The Hilton Bonnet Creek Hotel, 14100 Bonnet Creek Resort Lane, Orlando, FL 32821. Please refer to the 225th ECS Meeting website for the most up to date information on hotel availability and a block of rooms where special rates have been reserved for participants attending the 225th ECS Meeting.

Meeting Registration • Early-bird Deadline April 11, 2014

All participants—including authors and invited speakers of the 225th ECS Meeting—are required to pay the appropriate registration fees. Hotel and meeting registration information will be posted on the ECS website (www.electrochem.org) as it becomes available. **The deadline for early-bird registration is April 11, 2014.**

Short Courses • Advance Registration Required

A number of short courses will be offered on Sunday, May 11, 2014 from 9:00 AM-4:30 PM. Short Courses **require advance registration** and may be cancelled if enrollments are too low. As of press-time, the following Short Courses are tentatively planned for the meeting: Basic Impedance Spectroscopy, Fundamentals of Electrochemistry, Grid Scale Energy Storage, Solar Energy Conversion, Battery Safety, Chemical/Biological Sensors, and Survey of Materials Characterization Techniques. Please check the ECS website for the final list of offerings.

Technical Exhibit

The 225th ECS Meeting will also include a Technical Exhibit, featuring presentations and displays by more than 40 manufacturers of instruments, materials, systems, publications, and software of interest to meeting attendees. Coffee breaks are scheduled each day in the exhibit hall along with evening poster sessions to increase traffic. Please contact dan.fatton@electrochem.org or 737.1902, ext.115.

Sponsorship Opportunities

ECS biannual meetings are wonderful chances to market your company through sponsorship. Sponsors receive recognition benefits based upon their level of support.

Sponsorships are available for the plenary and keynote talks and other special events. Special event sponsorships will be assigned by the Society on a first-come, first served basis. For custom opportunities, please contact dan.fatton@electrochem.org

Advertising opportunities in the Meeting Program as well as in *Interface* are available. Please see the ECS website for further details.

Contact Information

If you have any questions or require additional information, contact The Electrochemical Society, 65 South Main Street, Pennington, Building D, New Jersey, 08534-2839, USA, tel: 609.737.1902, fax: 609.737.2743, e-mail: ecs@electrochem.org.

www.electrochem.org

SYMPOSIUM TOPICS

A — Batteries and Energy Storage

A1 — Battery and Energy Technology Joint General Session

A2 — Material and Electrode Designs for Energy Storage and Conversion

A3 — Mechanical-Electrochemical Coupling in Energy Related Materials and Devices

A4 — Stationary and Large Scale Electrical Energy Storage Systems 4

B — Chemical and Biological Sensors

B1 — Sensors, Actuators, and Microsystems General Session (Chemical and Biological Sensors)

B2 — Practical Implementation and Commercialization of Sensors

B3 — Sensors for Power Production and Energy Conversion

B4 — Ubiquitous Sensing, Energy Harvesting, and the Internet of Things

C — Corrosion Science and Technology

C1 — Corrosion General Session

D — Electrochemical/Electroless Deposition

D1 — Electrodeposition for Micro- and Nano-Battery Materials

D2 — Electroless Plating: Principles and Applications 3

E — Electrochemical Engineering

E1 — Industrial Electrochemistry and Electrochemical Engineering General Session

E2 — Characterization of Porous Materials 6

E3 — Electrochemical Engineering for the 21st Century 4

E4 — Electrolysis and Electrochemical Processes

E5 — Materials for Low Temperature Electrochemical Systems

F — Fuel Cells, Electrolyzers, and Energy Conversion

F1 — Characterization of Interfaces and Interphases

F2 — Computational Studies on Battery and Fuel Cell Materials

F3 — Electrochemical Utilization of Solid Fuels 2

F4 — Ionic and Mixed Conducting Ceramics 9

F5 — Solar Fuels and Photocatalysts 3

F6 — State-of-the-Art Tutorial on Durability in Low Temperature Fuel Cells

G — Organic and Bioelectrochemistry

G1 — Students in Bioelectrochemistry

G2 — Manuel Baizer Memorial Award Symposium in Organic Electrochemistry 11

G3 — Timely Challenges in Bioelectrochemistry: Unprecedented Analysis

H — Physical and Analytical Electrochemistry, Electrocatalysis, and Photoelectrochemistry

H1 — Physical and Analytical Electrochemistry General Session

H2 — Symposium in Honor of Andrzej Wieckowski

H3 — Biofuel Cells 6

H4 — Charge Transfer: Electrons, Protons, and Other Ions 2

H5 — Physical Chemistry of Electrolytes

H6 — Rare-Earth and Actinide Electrochemistry

H7 — Scanning Probe Microscopy 2

H8 — Spectroelectrochemistry 2

H9 — Symposium in Honor of Richard Buck

M — Carbon Nanostructures and Devices

M1 — Carbon Electronics: Interfaces to Metals, Dielectrics, and Electrolytes

M2 — Carbon Nanostructures for Energy Conversion

M3 — Carbon Nanostructures in Medicine and Biology

M4 — Carbon Nanotubes - From Fundamentals to Devices

M5 — Endofullerenes and Carbon Nanocapsules

M6 — Fullerenes - Chemical Functionalization, Electron Transfer, and Theory

M7 — Graphene and Related Structures

M8 — Nanostructures for Energy Conversion

M9 — Porphyrins, Phthalocyanines, and Supramolecular Assemblies

N — Dielectric Science and Materials

N1 — Dielectrics for Interconnect, Interposers, and Packaging

N2 — Dielectrics for Nanosystems 6: Materials Science, Processing, Reliability, and Manufacturing

N3 — More than Moore

P — Electronic Materials and Processing

P1 — Chemical Mechanical Polishing 13

P2 — Silicon Compatible Materials, Processes, and Technologies for Advanced Integrated Circuits and Emerging Applications 4

Q — Electronic and Photonic Devices and Systems

Q1 — Integrated Optoelectronics 7

Q2 — Wide Bandgap Semiconductor Materials and Devices 15

R — Luminescence and Display Materials, Devices, and Processing

R1 — Nanoscale Luminescent Materials 3

S — Physical Sensors

S1 — Sensors, Actuators, and Microsystems General Session (Physical Sensors)

Z — General

Z1 — General Student Poster Session

Z2 — Nanotechnology General Session

Z3 — Solid State Topics General Session

A—Batteries and Energy Storage

A1 Battery and Energy Technology Joint General Session
Battery Division / Energy Technology Division

Papers are solicited on the fundamental and applied aspects of energy storage and conversion not covered by the other symposia in the Battery and Energy Technology Divisions. Of particular interest are new materials chemistries, materials structures, novel device designs, new insights from modeling and simulations, and performance studies. Energy storage and conversion systems include, but are not limited to, batteries, fuel cells, and supercapacitors.

An issue of *ECS Transactions* is planned to be published "AFTER" the meeting. All authors accepted for presentation are encouraged to submit their full text manuscript for the issue no later than June 20, 2014. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Yangchuan Xing**, University of Missouri, email: xingy@missouri.edu; **Vito Di Noto**, University of Padova, email: vito.dinoto@unipd.it; and **John Muldoon**, Toyota Research Institute North America, email: john.muldoon@tema.toyota.com.

A2 Material and Electrode Designs for Energy Storage and Conversion
Battery Division / Energy Technology Division / Industrial Electrochemistry and Electrochemical Engineering Division

High-energy lithium ion batteries have been widely applied in portable electronics market and are now considered as the most promising technology for hybrid electric vehicles (HEVs) and plug-in hybrid electric vehicles (PHEVs). Next-generation technologies such as lithium-air, lithium-sulphur batteries and redox flow cells are also under intensive investigation to be deployed for long-range electrical vehicles (EV) and large-scale stationary storage of electricity. One of the critical challenges in these technologies is the rational design of materials and electrodes to meet different but ever-increasing requirements on the system energy densities. This symposium will be the venue for discussing the latest progresses on 1) identification of new energy-bearing materials; 2) novel synthesis that can improve the electrochemical properties of active materials; 3) electrode architectures; 4) 3D battery electrode design; 5) theoretical modeling; and 6) advanced characterization techniques that can boost the understanding of fundamental mechanisms involved in the electrochemical process.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Jie Xiao**, Pacific Northwest National Laboratory, email: jie.xiao@pnnl.gov; **James J. Wu**, NASA Glenn Research Center, email: james.j.wu@nasa.gov; **Karim Zaghib**, IREQ, email: Zaghib.karim@ireq.ca; and **Vibha Kalra**, Drexel University, email: vibha.kalra@drexel.edu.

A3 Mechanical-Electrochemical Coupling in Energy Related Materials and Devices
High Temperature Materials Division / Battery Division / Energy Technology Division

Significant coupling often exists between the electrical, chemical and mechanical responses of the materials used for batteries, fuel cells, chemical separators, and other high performance energy conversion/storage devices. In these systems, electrochemical reactions affect stress evolution, deformation, and fracture. Similarly, stress evolution, deformation, and fracture can also affect electrochemical properties, device performance, and durability. This symposium will provide a forum for the presentation of original research concerned with the interplay between mechanics and electrochemistry. Topics of interest include, but are not limited to, experimental and/or modeling studies of:

a) the effect of stress and strain on: the surface and bulk atomic structure of electrochemically active materials; the defect thermodynamics (point defect concentrations, chemical expansion coefficients, etc.) of electrochemically active materials; diffusion kinetics (diffusion coefficients, surface exchange coefficients, etc.); catalytic activity; the electronic structure of electrochemically active materials; reaction pathways; phase transformations (phase-boundary shifting, ferroelastic domain switching, strain-induced self-assembly, etc.) in electrochemically active materials; the microstructural evolution of electrochemically active materials; and the performance and durability of electrochemically active materials and devices.

b) stress, strain, and/or fracture resulting from: electrochemical insertion; intercalation; phase transformations; electrode reactions; and other electrochemical processes and/or device operation;

c) new approaches to understand, model and and/or control mechano-chemical coupling and/or degradation in electrochemical systems;

d) novel *in-situ* and *ex-situ* characterization tools;

e) electrochemical actuation based on Faradaic and non-Faradaic interactions

f) mesoscale perspective on mechano-electrochemical interplay.

Confirmed invited speakers include: Jake Christensen (Bosch), Alejandro Franco (Laboratoire de Réactivité et de Chimie des Solides), Sergei Kalinin (Oak Ridge National Lab), Tatsuya Kawada (Tohoku University), Igor Lubomirsky (Weizmann Institute), Jose Santiso (Centre D'Investigacio en Nanociencia I Nanotechologica), Brian Sheldon (Brown), Bilge Yildiz (MIT), and Ting Zhu (Georgia Tech).

Papers from this symposium will be considered for a planned September 2014 Journal of the Electrochemical Society Focus Issue on Mechano-Electro-Chemical Coupling in Energy Related Materials and Devices. All authors accepted for presentation are encouraged to submit full manuscripts for inclusion in either the JES Focus Issue or an "AFTER" meeting issue of ECS Transactions. The full manuscript submission deadline for both options is June 20, 2014.

An issue of *ECS Transactions* is planned to be published "AFTER" the meeting. All authors accepted for presentation are obligated to submit their full text manuscript for the issue no later than June 20, 2014. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Jason D. Nicholas**, Michigan State University, email: jdn@msu.edu; **Yue Qi**, General Motors R&D, email: yue.qi@gm.com; **Partha Mukerjee**, Texas A&M University, email: pmukherjee@tamu.edu; and **Sean Bishop**, I2CNER, Kyushu University, email: bishop@i2cner.kyushu-u.ac.jp.

A4 Stationary and Large Scale Electrical Energy Storage Systems 4

Energy Technology Division / Battery Division / Industrial Electrochemistry and Electrochemical Engineering Division

Electrical energy storage is critical for supporting the integration of renewable energy generation and increasing the capacity and reliability of the future electricity grid. Electrochemical systems have the potential to fulfill this need. This symposium seeks oral and poster presentations on materials and technology advances, design studies, results of performance demonstrations, and economics studies. The technologies of interest include redox-flow systems, metal-air rechargeable batteries, electrolyzers, capacitors and other rechargeable electrochemical energy storage systems that have the potential to meet the cost and efficiency requirements of large-scale deployment.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Sri Narayan** , University of Southern California, email: srnaraya@usc.edu; **Adam Weber**, LBNL, email: azweber@lbnl.gov; **Jeremy Meyers**, EnerVault, email: jmeyers@enervault.com; **Bor Yann Liaw**, University of Hawaii, email: BLiaw@hawaii.edu; and **Gerardine Botte**, Ohio University, email: botte@ohio.edu.

B—Chemical and Biological Sensors

B1 Sensors, Actuators, and Microsystems General Session (Chemical and Biological Sensors)

Sensor Division

This symposium will address all aspects of chemical and biological sensors, actuators and microsystems. A companion symposium concerning the corresponding aspects of physical sensors and actuators may be found under Topic S. Chemical and biological sensors find extensive application in environmental monitoring, health care, food security and industrial quality assurance, safety and process control. Sensors and actuators are often integrated into "smart" microsystems: microfabricated sensors and/or actuators combined with electronics which enable, for example, signal conditioning and data processing. The need for multifunctional, smart technologies, which depend on sensors, actuators and electronics, is expected to increase in coming years as further demands and expectations are placed on systems and devices. This general session welcomes papers on all aspects of chemical and biological sensors, actuators and microsystems not covered in other sessions. This symposium intends to bring together a range of interdisciplinary topics and covers all materials aspects of sensors, actuators and microsystems. Primary emphasis will be placed upon applied aspects of the materials, synthesis, evaluation and development strategies of novel materials/device configurations for sensing and actuating functions as well as integrated microsystems. Papers are solicited in, but not limited to, the following areas: (1.) physics and chemistry of sensor and actuator materials, fabrication, and characterization of novel compositions; (2.) novel sensor and actuator concepts, design, modeling, and verification, system integration and actuating functions; (3.) sensing systems that include sampling systems and actuators, like sensor arrays, and electronic noses/tongues; (4.) chemical and biological sensors and actuators based on various transduction mechanisms including electrochemical, resistive, fluorescence, surface plasmon resonance, surface-enhanced Raman scattering, fiber optics, radio frequency, microwave and surface acoustics; (5.) emerging technologies and applications including chemical and biological sensors based on nanotechnology, (6.) wireless integrations; and (7.) novel techniques to expand and ensure sensor stability and reliability.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Nick Wu**, West Virginia University, email: Nick.Wu@mail.wvu.edu; **Gary Hunter**, NASA, email: gary.w.hunter@nasa.gov; **Larry Nagahara**, NIH, email: nagaharl@mail.nih.gov; **Ajit Khosla**, Simon Fraser University, email: ajit_khosla@sfu.ca; **Alexandr Simonian**, Auburn University, email: als@eng.auburn.edu; **Sushanta Mitra**, University of Alberta, email: Sushanta.Mitra@ualberta.ca; and **Zoraida P. Aguilar**, Ocean Nanotech, email: zapaguilar@yahoo.com.

B2 Practical Implementation and Commercialization of Sensors

Sensor Division

Chemical sensor research and development is an active pursuit in academics and industry worldwide. Chemical sensing is becoming an increasingly important aspect of our daily lives in such diverse areas as transportation security, caring for and preserving the independence of an aging population, the emerging use of point of care diagnostic devices and the increasing importance of clean air and water. There is a growing trend toward ubiquitous sensor deployment, enabled by a high degree of internet connectivity to and from a variety of devices. Many exciting and potentially enabling developments with direct application to sensing and detection have been reported including advances in nanomaterials and nanotechnology, MEMS devices, plasmonics, printed electronics and new biorecognition strategies. Despite the on-going basic scientific progress in chemical sensors, the translation into practical commercial products remains a challenge with its own set of issues that are distinct from the science and technology. A number of technical and nontechnical factors come into play in commercialization that are not often addressed in technical forums. The goal of this symposium is to bring together sensor scientists and engineers from industry, academia and government to discuss challenges and successes in commercialization of new sensor technologies. The symposium will examine, through invited and contributed papers, a range of issues that bear on successful transition of science into technology and then to the marketplace. Topics of interest include, but are not limited to: business development issues for chemical sensors, case studies in sensor product development and recent success stories as well as failures with instructive lessons learned. All types of chemical sensors and applications areas are of interest, the only restriction being that the papers focus on the commercial problem. Contributions from industry as well as academic groups that have spun out or commercialized technologies are invited.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Mike Carter**, KWJ Engineering, email: mtcarter62@comcast.net; **Gary Hunter**, NASA, email: gary.w.hunter@nasa.gov; **Vadim Lvovich**, NASA, email: vlvovich@ameritech.net; and **Joe Stetter**, KWJ Engineering, email: jrstetter@gmail.com.

B3 Sensors for Power Production and Energy Conversion

Sensor Division / Battery Division / Energy Technology Division / High Temperature Materials Division

Sensors and sensor systems are being used increasingly in various energy production and conversion systems in order to increase efficiency and mitigate pollution. Heightened concerns regarding the availability of fossil fuels are leading to more stringent regulations on the efficiency of existing energy conversion devices. Moreover, there is significant investment in the development of highly efficient commercial energy conversion systems using fuel cells. Simultaneously, there is increased public awareness of the environmental effects of various pollutants emitted by these energy conversion systems. Improvements to currently available sensor technology are critical in improving the efficiency of and monitoring the emissions from these systems.

This symposium will provide a forum for the discussion of the latest advancements in chemical sensor research and development. The primary focus will be on sensor and sensor systems used in power plants, boilers, vehicles and environmental monitoring applications. Researchers from Industries, Universities, and National Laboratories that work in the field of chemical sensors are invited to participate. Papers on all sensing mechanisms (e.g. electrochemical, resistive/semiconductive, acoustic, optical, gravimetric and thermal) that address novel materials, synthesis, device configuration, evaluation techniques and system design for these applications are welcome.

Papers are solicited, but not limited to the following topics of interest: 1) Sensors for the monitoring of gases including nitrogen oxides, sulfur oxides, carbon monoxide, ammonia, hydrocarbons, and halogens in process control and environmental applications 2) Sensors for fuel cell systems including hydrogen, carbon-monoxide, sulfur, humidity and methanol sensors 3) Sensors for automotive emission systems including oxygen, nitrogen oxide, hydrocarbon, and carbon monoxide sensors 4) Novel processing methods used in the manufacture of electrochemical, resistive/semiconductive, optical, thermal and acoustic-based sensors for these applications and 5) The development and analysis of sensor arrays for the simultaneous detection of multiple analytes.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Rangachary Mukundan**, LANL, email: mukundan@lanl.gov; **Bryan Chin**, Auburn University, email: bchin@eng.auburn.edu; **A. Simonian**, Auburn University, email: als@eng.auburn.edu; **Mike Carter**, KWJ Engineering, email: mtcarter62@comcast.net; **Gary Hunter**, NASA, email: gary.w.hunter@nasa.gov; **Enrico Traversa**, University of Rome, email: traversa@uniroma2.it; **Jean St-Pierre**, HNEI, email: jsp7@hawaii.edu; and **Bor Yann Liaw**, University of Hawaii, email: bliaw@hawaii.edu.

B4 Ubiquitous Sensing, Energy Harvesting, and the Internet of Things

Sensor Division / Energy Technology Division / Physical and Analytical Electrochemistry Division / New Technology Subcommittee

This symposium will address various issues in ultralow power sensors, sensor arrays and networks, with respect to ubiquitous sensing. Ambient power harvesting to drive low power sensors is also a key component of this topic. The internet and wireless connectivity continue to expand at a rapid pace, creating such enabling concepts as the Internet of Things (IoT), supplementation of cell phones with various sensor technologies and wearable and implantable sensors for a variety of uses. Processes, people, buildings, workplaces and practically all other interior and exterior environments have the potential to be monitored at an unprecedented level, with implications for personal health and safety and general societal and environmental well-being. Energy efficiency is of interest for reducing power costs where sensors are used and increasing the lifetime of portable, battery operated devices.

Central to this trend is the need for ultralow power, small, efficient physical and chemical sensors to enable ubiquitous coverage of a particular environment. These energy efficient sensors and networks, coupled with power harvesting strategies are emerging in applications such as building HVAC controls, chemical leak detection, water contamination monitoring and environmental monitoring. The use of highly internet-connected, wireless sensor systems is also seeing increasing use in industrial settings and process control.

This symposium will bring together scientists and engineers from industry, academics and government to discuss recent topics in ultralow power chemical sensors, power harvesting and applications. Potential topics of interest include, but are not limited to, energy efficient sensors, arrays and networks, chemical surveillance & security, sensor-enabled health monitoring and environmental monitoring. All methods of signal transduction are invited for both chemical and physical low power sensing. Array and network aspects of ultralow power sensor problems are also of interest.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Mike Carter**, KWJ Engineering, email: mtcarter62@comcast.net; **Peter Hesketh**, Georgia Tech, email: peter.hesketh@me.gatech.edu; **Jing Li**, NASA, email: jing.li-1@nasa.gov; **Gary Hunter**, NASA, email: gary.w.hunter@nasa.gov; **Shelley Minteer**, University of Utah, email: minteer@chem.utah.edu; **Ajit Khosla**, Simon Fraser University, email: ajit_khosla@sfu.ca; and **Scott Calabrese Barton**, Michigan state university, email: scb@msu.edu.

C—Corrosion Science and Technology

C1 Corrosion General Session

Corrosion Division

Oral and poster presentations concerning all aspects of corrosion and associated phenomena in liquid and gaseous phases are welcome. Theoretical analyses, experimental investigations, descriptions of new techniques for the study of corrosion, and analyses of corrosion products and films are of interest.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizer: **Rudolph G. Buchheit**, The Ohio State University, email: buchheit.8@osu.edu.

D—Electrochemical/Electroless Deposition

D1 Electrodeposition for Micro- and Nano-Battery Materials

Electrodeposition Division / Battery Division / Energy Technology Division

This symposium will cover advances in electrochemical deposition (electrolytic, electroless, chemical bath or electrochemical ALD) for energy storage materials and devices. The electronics industry has demonstrated electrochemical processing at micro and nano dimensions for interconnect, barrier layer, magnetics and solder applications for metals, alloys and composites. A large number of relevant energy storage materials can also be deposited, structured and post-processed electrochemically for use in advanced batteries.

Contributions are sought which deal with the key challenges for electrochemical processing that can be applied to next generation battery materials at the micro and nanoscale. This will include the examination of theoretical and practical limits for support and active materials processing, including nanowires, nanotubes, nanolaminates and core/shell materials. Structuring energy storage materials to go beyond the standard 2D planar electrode arrangement for microbatteries and larger scale cells is a significant challenge.

Computational modelling and experimental studies of novel materials and structures processed electrochemically and assessments of the interfacial reactions are of interest, including high energy materials such as lithium metal. Reaction mechanism assessment for energy storage materials in aqueous, organic or ionic liquids in addition to solid state, polymer or polymer gel electrolytes is welcomed. Analyses are sought of materials for applications in Li-ion, Na-ion, divalent alternatives and particularly the next generation or disruptive energy storage devices such as Li-sulphur or Li-air cells.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **James Rohan**, Tyndall National Institute, University College Cork, email: james.rohan@tyndall.ie; **John Owen**, University of Southampton, email: J. R.Owen@soton.ac.uk; **Sanjeev Mukerjee**, Northeastern University, email: s.mukerjee@neu.edu; and **K. M. Abraham**, Northeastern University, email: kmabraham@comcast.net.

D2 Electroless Plating: Principles and Applications 3

Electrodeposition Division

The research achievements in the area of electroless deposition have contributed to numerous developments and applications for a variety of industries. Applications of electroless deposition are found in the electronics, energy conversion, aerospace, biomedical, automotive and aerospace industries. In addition, new applications in the area of metallization of polymers, ceramics and fabrics, production of various powders, corrosion and wear resistant coatings, decorative and catalytic surfaces etc. are being developed. Electroless deposition is also very attractive for the field of nanotechnology.

The aim of this symposium is to bring together scientists, researchers and engineers in order to review and discuss the latest developments and to suggest the future directions in the field of electroless deposition. The papers of interest include, but are not limited to:

1. Galvanic or displacement deposition
2. Autocatalytic deposition
3. Mechanistic aspects and kinetics of electroless deposition
4. Surface activation for electroless deposition
5. Metallization of non-conductive surfaces via electroless deposition
6. Applications for electronics, energy device, aerospace, automotive, biomedical etc. industries
7. Deposition of semiconductors from chemical baths
8. Electroless deposition and nanotechnology

Materials of interest include thin or thick films and powders of metals, alloys or compounds (e.g. oxides, salts, polymers).

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Stojan Djokic**, ElChem Consulting, email: sdjokic@telus.net; **N. Dimitrov**, Binghamton University, email: dimitrov@binghamton.edu; **J. Stickney**, University of Georgia, email: Stickney@chem.uga.edu; and **Luca Magagnin**, Politecnico di Milano, email: Luca.Magagnin@polimi.it.

E—Electrochemical Engineering

E1 Industrial Electrochemistry and Electrochemical Engineering General Session

Industrial Electrochemistry and Electrochemical Engineering Division

Papers are solicited in areas of industrial electrochemistry and electrochemical engineering that are not covered by other symposia at this meeting. Of particular interest are papers concerning: design, operation, testing, and/or modeling of industrial electrochemical systems; electrochemical waste treatment technologies; methods for electrosynthesis; electrolytic recovery of process materials; new electrode materials; new electrochemical cell designs; and electrocatalysis. Presentations on industrially significant areas, such as chlor-alkali and fluorine production; manufacture of aluminum and other metals; the use of electrochemical methods in pulp and paper bleaching; and generation of environmentally-friendly bleaching chemicals and other active oxidants are also encouraged. Papers may contain both theoretical and experimental work, and papers dealing with either area will be considered.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Gerri Botte**, Ohio University, email: botte@ohio.edu; **John Weidner**, University of South Carolina, email: weidner@cec.sc.edu; and **E. J. Taylor**, Faraday Technology, email: jenningstaylor@faradaytechnology.com.

E2 Characterization of Porous Materials 6

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

This symposium provides a forum for recent advances in experimental techniques and mathematical models to characterize the properties of porous materials employed in a wide range of electrochemical applications. Porous materials are used in practical applications of electrocatalysis, batteries, supercapacitors, fuel cells, and other electrochemical technologies. The understanding of porous materials through characterization techniques and models is critical to improve the performance, durability, and reliability of these devices. Papers dealing with every aspect of the electrochemistry of porous electrode materials will be accepted, including theory of porous materials, description of the preparation procedure, property characterization and modeling techniques including (but not limited to) electronic and ionic conductivity, porosity, reactivity, gas and liquid transport, surface energy and interaction between different phases and interfaces and also the distribution of the same within the porous material, studies of their electrochemical responses and applications. Furthermore, understanding the life cycle of porous materials from beginning of life properties till end of life properties and its impact on durability of electrochemical devices is essential for commercial viability of these electrochemical technologies.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **John Staser**, University of South Carolina, email: staser.john@gmail.com; **V. Birss**, University of Calgary, email: birss@ucalgary.ca; **Jeff Gostick**, McGill University, email: jeff@gostick.ca; and **Jie Xiao**, Pacific Northwest National Laboratory, email: jie.xiao@pnnl.gov.

E3 Electrochemical Engineering for the 21st Century 4

Industrial Electrochemistry and Electrochemical Engineering Division / Battery Division / Electrodeposition Division / Energy Technology Division

Future trends in electrochemical engineering will be influenced by the need to control processes and insure quality at the molecular scale. Transfer of molecular-scale understanding and discoveries into new and improved products and processes requires integration of system behavior across a range of length and time-scales. New engineering approaches are needed that couple traditional current- and potential-distribution approaches to molecular-scale events in order to accurately describe and design systems to meet the needs of the next century. For example, such an approach will open the way to exploiting self-assembly during processing. This symposium focuses on the role of molecularly coupled electrochemical engineering in addressing future technology challenges of the 21st century. Topics include: (1.) experimental and theoretical methods for understanding and describing behavior in electrochemical systems at the molecular level; (2.) new engineering methods and simulation algorithms with improved computational efficiency and quantification of uncertainty that enable coupling to molecular-scale processes for the design, control and optimization of entire, realistic systems, including those where stochastic events influence quality; and (3.) use of molecular understanding, design and/or control to address 21st century electrochemical engineering applications such as NEMS, MEMS, and electronic device fabrication; systems and materials for stationary power (from photovoltaic systems and fuel cells to energy storage devices and hydrogen generation); power systems for transportation; electrochemically enabled devices, systems, and products for medical technology; and corrosion systems, among many others. Both fundamental and applied papers that address the symposium topics are encouraged. The symposium may also include a few invited speakers who will give historical and future perspectives of the underlying science in various fields and its anticipated implementation in technology.

For this meeting, the multi-scale modeling symposium offered in Spring meetings has been merged with this symposium. Papers related to multi-scale modeling should therefore be submitted under this symposium.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **James M. Fenton**, University of Central Florida, email: jfenton@fsec.ucf.edu; **Jeremy Meyers**, EnerVault, email: jmeyers@enervault.com; **Chengdu Liang**, Oak Ridge National Laboratory, email: liangcn@ornl.gov; **Richard Alkire**, University of Illinois, email: r-alkire@illinois.edu; **Venkat Subramanian**, Washington University in St. Louis, email: vsubramanian@seas.wustl.edu; **H. Deligianni**, IBM, email: lili@us.ibm.com; and **John Harb**, Brigham Young University, email: john_harb@byu.edu.

E4 Electrolysis and Electrochemical Processes

Industrial Electrochemistry and Electrochemical Engineering Division / Energy Technology Division

Electrolysis and Electrochemical Processes provide an alternate path for traditional chemical and biological processes. Electrochemical processes offer many advantages when compared to traditional chemical processes, including: easy of scalability, low temperature operation, high selectivity of the reaction, easy to control, and compatibility with renewable energy sources. Recent advances in materials and nanotechnology provide a new vista to revisit applications of electrolysis and electrochemical processes in the chemical, petrochemical, and biological industry, e.g., recycling and waste management, ammonia synthesis, natural gas utilization, remediation, synthesis of pharmaceuticals, among others.

This symposium will provide an international forum for the presentation and discussion of the most recent developments on the application of electrolysis and electrochemical processes in traditional chemical processes. Topics of interest include, but are not limited to: (1) electrocatalysts and fundamental mechanistic aspects of redox processes; (3) advanced electrode materials and structures; (4) cell and system design, including reactant and product flow, heat transfer, and stack level materials corrosion; (5) electrochemical performance and cell characterization; (6) modeling and simulation of electrochemical phenomena and processes; and (7) applications and economic analysis.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Gerri Botte**, Ohio University, email: botte@ohio.edu; **John Weidner**, University of South Carolina, email: weidner@cec.sc.edu; and **Kathy Ayers**, Proton OnSite, email: kayers@protononsite.com.

E5 Materials for Low Temperature Electrochemical Systems

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

Materials development is critical to the commercialization of electrochemical technologies including batteries, alkaline and proton exchange membrane fuel cells, electrolyzers, and other electrochemical applications/devices. This symposium will focus on both the fundamental and applied aspects of the materials for low temperature electrochemical technologies. Topics of interest include, but are not restricted to: 1. New polymer electrolyte membranes/ionomers and morphologies; 2. Experimental methods for membrane/ionomer design, synthesis, characterization and evaluation; 3. Stability issues related to device applications, including degradation processes/products and mechanisms at the electrolyte/electrode interface; 4. Methods of fabricating polymer electrolyte based membrane/ionomer-electrode components; 5. Modeling for guiding membrane materials development and for the prediction of membrane material properties; 6. catalyst design, synthesis, characterization and performance/durability evaluation; 7. electrocatalysis fundamentals; 8. advanced catalyst supports; 9. advanced bipolar plates.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Peter Pintauro**, Vanderbilt University, email: pn.pintauro@Vanderbilt.Edu; **Minhua Shao**, Ford Motor Company, email: Minhua@gmail.com; **Richard Wycisk**, Vanderbilt University, email: wycisk@vanderbilt.edu; **Plamen Atanassov**, University of New Mexico, email: plamen@unm.edu; **Kunal Karan**, University of Calgary, email: kkaran@ucalgary.ca; and **Brett Lucht**, University of Long Island, email: blucht@chm.uri.edu.

F—Fuel Cells, Electrolyzers, and Energy Conversion

F1 Characterization of Interfaces and Interphases

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

Interfaces and interphases play very important roles in electrochemical systems. They affect the rate of electrochemical reaction and transport of reactive species and provide stability to many low temperature battery and fuel cell systems. Consequently, better understanding of the interfaces and interphases is crucial to the development of better and safe electrochemical devices. Areas of interest include: 1) computer modeling ranging from molecular to continuum levels, 2) *In-situ* measurements of solid-electrolyte interfaces (SEI) and interphases as a function of potential, cycle number, temperature and other relevant parameters, and 3) fundamental understanding of the influence of impurities on the nature and properties of the SEI and interphases.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Trung Nguyen**, Univiversity of Kansas, email: cptvn@ku.edu; **Plamen Atanassov**, University of New Mexico, email: plamen@unm.edu; and **Robert Kostecki**, Lawrence Berkeley National Laboratory, email: r_kostecki@lbl.gov.

F2 Computational Studies on Battery and Fuel Cell Materials

Energy Technology Division / Battery Division / High Temperature Materials Division / Physical and Analytical Electrochemistry Division

This symposium aims to bring together people who are interested in advancing the frontiers of simulation of electrochemical energy conversion processes, particularly those related to batteries and fuel cells, using high quality quantum chemical approaches. The specific types of topics could include the following: (1) understanding of existing lithium positive or negative electrodes, (2) understanding of other important battery systems, (3) use of quantum chemical results to predict and develop new battery materials and reactions, (4) understanding of the hydrogen oxidation reaction (HOR) on existing electrocatalysts, (5) prediction of new HOR electrocatalysts, (6) understanding of the oxygen reduction reaction (ORR) on existing electrocatalysts, (7) prediction of new ORR electrocatalysts, (8) understanding of existing electrocatalysts for alcohol oxidation, and (9) prediction of new electrocatalysts for alcohol oxidation. We encourage efforts to carefully examine the agreement between experimental results and computational results, and to examine the benefits of increasingly realistic models, in which solvent and potential effects are included.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Deryn Chu** , US Army, email: deryn.d.chu.civ@mail.mil; **Sri R Narayan**, University of Southern California, email: srnaraya@dornsife.usc.edu; **Emily M Ryan**, Boston University, email: ryanem@bu.edu; and **Shirley Meng**, University of California, San Diego, email: shirleymeng@ucsd.edu.

F3 Electrochemical Utilization of Solid Fuels 2

High Temperature Materials Division / Energy Technology Division

Our increasingly carbon-constrained world makes it imperative to devise new ways to utilize solid fuels, particularly coal, in an environmentally responsible manner with reduced CO_2 emissions.

This symposium series focuses on efficient conversion and utilization of solid fuels in electrochemical systems such as fuel cells with or without gasification. All forms of solid fuels including coal, carbon, biomass, and waste utilized or converted in all forms of fuel cells including solid oxide, molten carbonate, molten alkali, molten metal anode, alkaline, and others are of interest. The symposium also covers other forms of solid fuel utilization or conversion processes, for example, electrochemical production of hydrogen including chemically assisted electrolysis, and other gaseous or liquid fuels from solid fuels for energy storage.

All aspects of materials issues, including catalytic electrodes, materials tolerant to contaminants in solid fuels, electrolyte materials, catalysts for gasification, and materials for capture and removal of contaminants; electrode kinetics and catalysis; solid fuel pretreatment for utilization in fuel cells; characterization and testing of cell performance; and stack and systems issues including modeling and economics are of interest for this symposium.

Electrochemical conversion and utilization of solid fuels hold the potential to change the playing field for electrical power generation, CO_2 capture and mitigation, and also for large-scale energy storage.

This symposium series offers an interdisciplinary and international platform, and aims to contribute towards advancing the fundamental understanding of these challenges and issues, and solicit original contributions from researchers in this critically important area.

A hard-cover issue of *ECS Transactions* is planned to be available "AT" the meeting. All authors accepted for presentation are obligated to submit their full text manuscript for the issue no later than February 7, 2014. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Turgut Gur**, Stanford University, email: turgut.gur@stanford.edu; **Srikanth Gopalan**, Boston University, email: sgopalan@engc.bu.edu; and **Sri R Narayan**, University of Southern California, email: srnaraya@dornsife.usc.edu.

F4 Ionic and Mixed Conducting Ceramics 9

High Temperature Materials Division / Energy Technology Division

Ceramic materials that exhibit fast ionic transport or significant levels of concurrent ionic and electronic conduction continue to be of great interest among researchers worldwide for wide ranging uses including fuel cell components, battery components, sensors, membranes, electrochemical reactors and electrosynthesis. This symposium will provide a forum to share both experimental data and theoretical and simulation studies, and discuss research activities and needs in this exciting field. Both fundamental and applied aspects of ionic transport and mixed conduction will be included.

Some of the topics that will be covered in this symposium are: Ionic Transport in Solid Electrolytes, Advances in Protonic Conductors, Electrolysers for electrochemical fuel synthesis, Fuel Cells and Batteries, Mechanisms of Mixed Conduction in Ceramics, Role of Microstructure in Conduction, Dense Ceramic Membranes for Gas Separation and Production of Chemicals, Electrocatalytic Phenomena, Ceramic Sensors, Electrochemistry of Nanoceramics and Transport in Corrosion-resistant Ceramic Films.

A hard-cover issue of *ECS Transactions* is planned to be available "AT" the meeting. All authors accepted for presentation are obligated to submit their full text manuscript for the issue no later than February 7, 2014. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **M. Mogensen**, Department of Energy Conversion and Storage, Technical University of Denmark (DTU), email: momo@risoe.dtu.dk; **T. Kawada**, Tohoku University, email: kawada@ee.mech.tohoku.ac.jp; **T. Armstrong**, Carpenter Alloys, email: TArmstrong@cartech.com; **T. Gur**, Stanford University, email: turgut@stanford.edu; **X.-D. Zhou**, University of South Carolina, email: xiao-dong.zhou@sc.edu; and **Mani Manivannan**, NETL, email: manivana@netl.doe.gov.

Please see A3 for Mechanical-Electrochemical Coupling in Energy Related Materials and Devices.

F5 Solar Fuels and Photocatalysts 3

Energy Technology Division / Industrial Electrochemistry and Electrochemical Engineering Division / Physical and Analytical Electrochemistry Division

This symposium will provide an international and interdisciplinary forum to present the latest research on production of fuels (e.g., hydrogen), conversion CO_2 and environmental disinfection by utilizing solar energy. Topics of interest include but not limited to: (1) exploring novel methods for production of fuels such as hydrogen, ethanol and other fuels; (2) conversion of renewable energy resources such as biomass to fuels; (3) capture or conversion of CO_2 to fuels; (4) photocatalytic disinfection and environmental remediation; (5) synthesis and characterization of photocatalysts; (6) exploring new solar energy materials; (7) development of photoelectrochemical cells (PECs); (8) construction of solar thermal panels and solar reactors; (9) simulation and modeling of materials, devices and systems for solar energy applications; and (10) corrosion and durability of solar energy materials.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Nianqiang (Nick) Wu**, West Virginia University, email: nick.wu@mail.wvu.edu; **Ravi Subramanian**, University of Nevada - Reno, email: ravisv@unr.edu; **A. Manivannan** , Department of Energy, email: amanivana@netl.doe.gov; **Heli Wang**, National Renewable Energy Laboratory, email: Heli.Wang@nrel.gov; **Pawel J. Kulesza**, University of Warsaw, email: pkulesza@chem.uw.edu.pl; **Deryn Chu**, US Army Research Laboratory, email: deryn.chu@us.army.mil; **Huyen Dinh**, National Renewable Energy Laboratory, email: huyen_dinh@nrel.gov; and **Jim Fenton**, Florida Solar Energy Center, email: jfenton@fsec.ucf.edu.

F6 State-of-the-Art Tutorial on Durability in Low Temperature Fuel Cells

Energy Technology Division / Industrial Electrochemistry and Electrochemical Engineering Division / Physical and Analytical Electrochemistry Division

This symposium will feature invited talks on a variety of issues related to the processes limiting the lifetime of fuel cell components, stacks and systems. Topics of interest include (1) elucidation of degradation mechanisms in PEFCs; (2) evolution of electrocatalysts in PEFCs; (3) degradation of membranes; (4) failure modes associated with system aspects; (5) computational chemistry and modeling of transport processes; and (6) new characterization methods.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Adam Weber**, LBNL, email: azweber@lbl.gov; **Thomas Zawodzinski**, University of Tennessee Knoxville, email: tzawodzi@utk.edu; **Thomas Schmidt**, Paul Scherrer Institute, email: ThomasJustus.Schmidt@psi.ch; **Jim Fenton**, Florida Solar Energy Center, email: jfenton@fsec.ucf.edu; and **Rod Borup**, Los Alamos National Laboratory, email: borup@lanl.gov.

G—Organic and Bioelectrochemistry

G1 Students in Bioelectrochemistry
Organic and Biological Electrochemistry Division / Physical and Analytical Electrochemistry Division / Sensor Division

Contributions are sought from students working in the broad, general area of Bioelectrochemistry. Sensing and fundamental electrochemical studies centered on organic molecules of physiological relevance or origin that are early in development or at the application stage are encouraged. Work focusing on a particular facet of a long-term goal is of interest.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Jim Burgess**, Organic and Biological Electrochemistry , email: jdb22@case.edu; **Mike Carter**, KWJ Engineering , email: mtcarter62@comcast.net; and **Shelley Minteer**, University of Utah, email: minteer@chem.utah.edu.

G2 Manuel Baizer Memorial Award Symposium in Organic Electrochemistry 11
Organic and Biological Electrochemistry Division

This is the premier international symposium in the area of organic electrochemistry. The symposium honors the 2013 winner of the Manuel Baizer Award in Organic Electrochemistry. Submissions are invited in all areas of synthetic and mechanistic organic electrochemistry.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Professor Kazuhiro Chiba**, Tokyo University of Agriculture and Technology, email: chiba@cc.tuat.ac.jp; **Professor Shigeru Nishiyama**, Keio University, email: nisiyama@chem.keio.ac.jp; and **Dennis Peters**, Indiana University, email: peters@indiana.edu.

G3 Timely Challenges in Bioelectrochemistry: Unprecedented Analysis
Organic and Biological Electrochemistry Division / Energy Technology Division / Physical and Analytical Electrochemistry Division / Sensor Division

Contributions are sought that address barriers in achieving superior clinical electro-analysis. Work that couples analysis and diagnostics with biological control and disease state management is of particular interest. Fundamental studies characterizing electrode-supported structures and their function, ultimately aimed at biological analysis are welcomed. In vivo and in vitro applications of diagnostic platforms are also encouraged.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Mekki Bayachou**, Organic and Biological Electrochemistry, email: m.bayachou@csuohio.edu; **Zoraida Aguilar**, Ocean Nanotech, email: zapaguilar@yahoo.com; **Scott Calabrese Barton**, Michigan State University, email: scb@msu.edu; and **Shelley Minteer**, University of Utah, email: minteer@chem.utah.edu.

H—Physical and Analytical Electrochemistry, Electrocatalysis, and Photoelectrochemistry

H1 Physical and Analytical Electrochemistry General Session
Physical and Analytical Electrochemistry Division

Papers concerning any aspect of physical electrochemistry not covered by topic areas of other specialized symposia at this meeting are welcome. Contributed papers will be programmed in some related order, depending on the titles and contents of the submitted abstracts.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizer: **Pawel J. Kulesza**, University of Warsaw, email: pkulesza@chem.uw.edu.pl.

H2 Symposium in Honor of Andrzej Wieckowski
Physical and Analytical Electrochemistry Division

This symposium honors Professor Andrzej Wieckowski on the occasion of his retirement from the University of Illinois at Urbana-Champaign after twenty-seven years of research, teaching, advising and collaborating with more than 150 Ph.D. and Master's students, postdoctoral fellows and visitors to his laboratory from all over the world. This symposium will focus on the research topics to which Andrzej devoted his entire career: (1) electrochemical surface science using advanced *in-situ* and *ex-situ* characterization techniques such as ultra-high vacuum (UHV) methods, nuclear magnetic resonance (NMR), sum frequency generation (SFG), radioactive labeling of adsorbates, and other spectroscopy and microscopy techniques; (2) modeling of electrocatalytic systems; (3) theory vs. experiment in electrocatalysis; (4) well-defined vs. real-life catalytic systems; (5) electrocatalysis of fuel cells reactions (fuel oxidation and oxygen reduction); and (6) applied aspects of electrocatalysis.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **P. Zelenay**, Los Alamos National Laboratory, email: zelenay@lanl.gov; **D. J. Myers**, Argonne National Laboratory, email: dmyers@anl.gov; **P. J. Kulesza**, University of Warsaw, email:

pkulesza@chem.uw.edu.pl; **R. R. Adzic**, Brookhaven National Laboratory, email: adzic@bnl.gov; **S. Gottesfeld**, CellEra Inc., email: shimshon@cellera.biz; **P. Atanassov**, University of New Mexico, email: plamen@unm.edu; **S. Mukerjee**, Northeastern University, email: s.mukerjee@neu.edu; **J. Inukai**, University of Yamanashi, email: jinukai@yamamashi.ac.jp; **N. M. Markovic**, Argonne National Laboratory, email: nmmarkovic@anl.gov; **M. Neurock**, University of Virginia, email: mn4n@cms.mail.virginia.edu; and **A. Lewenstam**, Abo Akademi University, email: alewenst@abo.fi.

H3 Biofuel Cells 6

Physical and Analytical Electrochemistry Division / Energy Technology Division / Organic and Biological Electrochemistry Division

The ability of biological species to facilitate the conversion of chemical and photochemical energy to electricity has inspired a growing field of bioelectrochemical energy research. This symposium will focus on fundamental and applied aspects of fuel cell and battery technology that incorporate enzymes, microbes, or other biological species as catalysts, fuel sources, transport agents,or other such roles. Of interest are fundamental studies focusing on heterogeneous electron transfer coupled with oxidation or reduction reactions, including direct or mediated electron transfer between electrodes and enzymes, organelles, or microbes; catalysis at electrode supported membranes, electrode modification chemistries for immobilization or stabilization of electrochemically addressable catalytic moieties, and engineered electrode systems facilitating mass transfer of fuels and wastes. Papers addressing practical issues of electrode reaction rate, operating potential, and electrode stability are welcome, as is work toward developing mechanistic and system-level models that elucidate aspects of biological fuel cells. Strategies aimed at utilization of biological materials in fuel cells for portable power, waste elimination, ambient power, or other novel applications are appropriate for this symposium. The goal is to bring together a multidisciplinary representation of research in this broad area to redefine the existing state-of-the-art, and address remaining challenges for practical implementation of these technologies.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Plamen Atanassov**, University of New Mexico, email: plamen@unm.edu; **Scott Calabrese Barton**, Michigan State University, email: scb@msu.edu; **N. Mano** , Le Centre de Recherche Paul-Pascal, email: mano@crpp-bordeaux.cnrs.fr; and **Shelley Minteer**, University of Utah, email: minteer@chem.utah.edu.

H4 Charge Transfer: Electrons, Protons, and Other Ions 2

Physical and Analytical Electrochemistry Division / High Temperature Materials Division

Charge transfer is important to both the frontier of fundamental science and in the long term solutions for energy generation, conversion, and storage. Applications are diverse and include: hybrid inorganic-polymer composite photovoltaic solar cells, polymer electrolyte membrane fuel cells, and lithium ion and redox flow batteries, to name but a few. Although the charge carrier may be different in these devices there are common features in all charge transfer events or reactions. This symposium will provide a forum to present recent progress in understanding how local and larger aspects determines the nature and energetics of charge transfer and transport in various systems and devices. Current interest ranges from: (a.) utilization of single or small groups of organic molecules or polymers as components in electronic devices; to (b.) exploitation of semiconductor and metal or metal oxide nanoparticles because of their high surface areas and other size-dependent properties; to (c.) the effects of the density and distribution of fixed and/or mobile ions in electrodes and electrolytes. Papers of interest include both experimental and theoretical studies that may be either applied or fundamental in focus.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Stephen Paddison**, University of Tennessee, Knoxville, email: spaddiso@utk.edu; and **Vito di Noto**, University of Padova, email: vito.dinoto@unipd.it.

H5 Physical Chemistry of Electrolytes

Physical and Analytical Electrochemistry Division / Battery Division

Electrolytes play a pivotal role in electrochemical systems. This symposium will focus on: (1) determination of physical properties, (2) thermodynamics and mechanisms of ion conduction, (3) computational or theoretical characterization of ion conduction processes, (4) understaning of structure-property relationships, (5) and electrode interfacial phenomenon.

An issue of *ECS Transactions* is planned to be published "AFTER" the meeting. All authors accepted for presentation are encouraged to submit their full text manuscript for the issue no later than June 20, 2014. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Paul Trulove**, United States Naval Academy, email: trulove@usna.edu; **Pawel J. Kulesza**, University of Warsaw, email: pkulesza@chem.uw.edu.pl; **Petr Vanysek**, Northern Illinois University, email: pvanysek@gmail.com; and **Kevin Gering**, Idaho National Laboratory, email: Kevin.gering@inl.gov.

H6 Rare-Earth and Actinide Electrochemistry

Physical and Analytical Electrochemistry Division

The goal of this symposium is to highlight electrochemistry of rare-earths and actinides across various solvent systems, such as aqueous, room temperature ionic liquids, and molten salts. The symposium seeks to bring together scientists and engineers from different perspectives to share their research and discuss relevant topics toward analytical and process methods. Topics of interest include materials characterization, process applications, electroanalytical methods, and fundamental physical electrochemistry of these materials.

An issue of *ECS Transactions* is planned to be published "AFTER" the meeting. All authors accepted for presentation are encouraged to submit their full text manuscript for the issue no later than June 20, 2014. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizer: **P. Motsegood**, Argonne National Laboratory, email: motsegood@anl.gov.

H7 Scanning Probe Microscopy 2
Physical and Analytical Electrochemistry Division

Over the past several decades, scanning probe microscopy methods, such as scanning tunneling (STM), atomic force (AFM), and scanning electrochemical microscopy (SECM) have proven to be unique tools for characterizing solid/ liquid interfaces from the micro to cellular to nano scale. These techniques as well as combinations and spectroscopy based on these local probes have guided fundamental advances in many areas of electrochemistry, including self-assembly, electrodeposition, corrosion, or adsorption of ionic and molecular species by providing invaluable structural, morphological, and electronic information. The contribution of scanning probe microscopy to electrochemistry is continuing and has expanded to more complex systems, to include living systems, while refinement to the hardware and software allows for improvements in spatial and temporal resolution on a quasi-routine basis. This symposium will focus on: (1.) applications of *in situ* scanning tunneling microscopy and spectroscopy to gain new insights into the molecular scale structure of the electrochemical double layer and adsorbed layers; (2.) microscopic studies of the atomic or molecular dynamics at interfaces under equilibrium conditions and during electrochemical reactions; (3.) novel experimental developments in *in situ* scanning probe microscopy and spectroscopy including improvements in instrumentation and application to living systems; and (4.) theoretical and computational approaches to further the understanding of *in situ* imaging and spectroscopy.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **David Cliffel**, Vanderbilt University, email: d.cliffel@vanderbilt.edu; **Robert Calhoun**, United States Naval Academy, email: calhoun@usna.edu; and **Mark Anderson**, Kennesaw State University, email: mark_anderson@kennesaw.edu.

H8 Spectroelectrochemistry 2
Physical and Analytical Electrochemistry Division

Understanding charge transfer at an electrochemical interface under *in situ* and operando conditions has been an evolving field for some decades. Its success and continued advances in capabilities touches every aspect of electrochemical technology, encompassing new materials development, corrosion, and safety in field such as batteries, fuel cells, electrolyzer, sensors coating, polishing etc. Huge strides have been made in areas such as *in situ* capability, resolution in terms of sample size, space and time. This symposium aims at accelerating the pace of these developments by inviting presentations on the latest developments in this arena. This includes, latest advances in techniques involving vibrational, absorption, scattering, resonance etc., pushing the state of the art towards greater sensitivity and time and space resolution. Of particular interest would be those which not only enable close coordination with electrochemical interface but also provide for combination of diverse techniques to provide a more holistic picture. These also include tools and methods which allow capturing of both steady state and transient phenomenon with *in situ* (operando) and in some cases element specificity.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Sanjeev Mukerjee**, Northeastern University, email: s.mukerjee@neu.edu; and **Vito Di Noto**, University of Padova, email: vito.dinoto@unipd.it.

H9 Symposium in Honor of Richard Buck
Physical and Analytical Electrochemistry Division

This symposium is being organized to honor the memory of Professor Richard Pierson Buck (1929-2011), who made important contributions to many areas of physical and analytical electrochemistry, ranging from fundamental theoretical considerations to development of sensors in applied biomedical fields. Papers are solicited in topics spanning the areas to which Prof. Buck contributed, including membrane electrochemistry, charge transport kinetics and thermodynamics, electrified interfaces, methods of electroanalysis, impedance studies, ion-selective electrodes and sensors. Contributions are welcome from past pupils, collaborators and associates as well from new researchers blazing the paths once explored by Prof. Buck.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Petr Vanysek**, Northern Illinois University, email: pvanysek@niu.edu; and **A. Lewenstam**, Abo Finland, email: alewenst@abo.fi.

M—Carbon Nanostructures and Devices

M1 Carbon Electronics: Interfaces to Metals, Dielectrics, and Electrolytes
Dielectric Science and Technology Division / Battery Division / Electronics and Photonics Division / Fullerenes, Nanotubes, and Carbon Nanostructures Division / Sensor Division

Carbon, in many respects, is starting to challenge Si as the most important technological material. Besides the prominence of fullerenes, graphite, graphene and carbon nano tubes, glassy carbon 3D MEMS and NEMS-like devices are now being made by lithographically patterning polymer precursors and carbonizing them. Other carbon allotropes like diamond, diamond–like carbon and amorphous carbon also are being studied intensively, allotrope by allotrope. We will look at carbon in a more holistic way in which different carbon allotropes manufactured by a particular method are combined with others in hybrid carbon functional devices. For example, depending on the polymer precursor processing more or less graphitic structures can be made, nanotubes or fullerenes can be integrated in a glassy carbon matrix, or graphene ribbons can be suspended between glassy carbon contact posts.

This symposium is bringing together a new community of carbon experts that does not see carbon-nanotubes or fullereres in isolation but considers the construction of 3D carbon devices integrating one, two or more carbon allotropes as the application might demand.

The interfaces of the new carbon materials have to be mastered to make the best electronic devices, so the list of topics would include: passivation, encapsulation, application of high-k dielectrics

for carbon-based MOS devices, fabrication, printable electronic processes, modelling, analysis, and high-speed switches, amplifiers, and sensors.

A hard-cover issue of *ECS Transactions* is planned to be available "AT" the meeting. All authors accepted for presentation are obligated to submit their full text manuscript for the issue no later than February 7, 2014. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **M. Madou**, U. of California, Irvine, email: mmadou@uci.edu; **Andrew Hoff**, U. of South Florida, email: hoff@usf.edu; **Michael Carter**, KWJ Engineering, email: mtcarter62@comcast.net; **D. Landheer**, National Research Council Canada, email: dolf.landheer@nrc.ca; **Richard Martel**, Univ. of Montreal, email: r.martel@umontreal.ca; **Robert Kostecki**, Lawrence Berkeley National Laboratory, email: r_kostecki@lbl.gov; and **C. Wang**, Florida International University, email: wangc@fiu.edu.

M2 Carbon Nanostructures for Energy Conversion

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

Papers are invited in the following areas related to energy conversion using nanocarbons: synthesis and characterization of relevant nanoparticles and nanostructures; functionalization with chromophores; inducing chemical reactions with strong photon-molecule coupling fields; size- and shape-dependent photocatalytic properties; photochemical solar cells; and photocatalysis and electron transfer studies relevant to energy conversion.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Jeff Blackburn**, NREL, email: jeffrey.blackburn@nrel.gov; **Michael Arnold**, Univ. of Wisconsin, email: msarnold@wisc.edu; **Krishnan Rajeshwar**, University of Texas, email: rajeshwar@uta.edu; **Robert Kostecki**, Lawrence Berkeley National Laboratory, email: r_kostecki@lbl.gov; and **Richard Martel**, Univ. of Montreal, email: r.martel@umontreal.ca.

M3 Carbon Nanostructures in Medicine and Biology

Fullerenes, Nanotubes, and Carbon Nanostructures Division / Sensor Division

Original papers are solicited on all aspects of biological, pharmaceutical, biotechnological, and medical applications of fullerenes, metallofullerenes, carbon nanotubes, graphene, and related nanocarbons.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Tatiana DaRos**, Univ. of Trieste, email: daros@units.it; **Lon Wilson**, Rice University, email: durango@rice.edu; **Raluca Van Staden**, Polytechnic University of Bucharest, email: iustinavanstaden@yahoo.com; and **Daniel Heller**, Memorial Sloan-Kettering Cancer Center, email: hellerd@mskcc.org.

M4 Carbon Nanotubes - From Fundamentals to Devices

Fullerenes, Nanotubes, and Carbon Nanostructures Division

Papers are solicited on experimental and theoretical studies related to the basic chemistry, physics, and materials science of carbon nanotubes, as well as on novel nanotube applications in areas such as electronic devices, sensors, and materials development.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Slava V. Rotkin**, Lehigh University, email: rotkin@lehigh.edu; **Ming Zheng**, NIST, email: ming.zheng@nist.gov; **Steven Doorn**, Los Alamos National Laboratory, email: skdoorn@lanl.gov; **Yury Gogotsi**, Drexel University, email: yg36@drexel.edu; and **R. Bruce Weisman**, Rice University, email: weisman@rice.edu.

M5 Endofullerenes and Carbon Nanocapsules

Fullerenes, Nanotubes, and Carbon Nanostructures Division

Original papers are solicited on all aspects of endofullerenes, including endohedral metallofullerenes, endohedral rare-gas fullerenes, and related species. Papers on carbon nanocapsules and metal encapsulates are also welcome. Topics include the synthesis, characterization, properties, and applications of various endo-nanocarbons.

An issue of *ECS Transactions* is planned to be published "AFTER" the meeting. All authors accepted for presentation are encouraged to submit their full text manuscript for the issue no later than June 20, 2014. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **T. Akasaka**, Univ. of Tsukuba, email: akasaka@tara.tsukuba.ac.jp; **Luis Echegoyen**, Univ. of Texas, El Paso, email: echegoyen@utep.edu; and **Shangfeng Yang**, Univ. of Science and Technology of China, email: sfyang@ustc.edu.cn.

M6 Fullerenes - Chemical Functionalization, Electron Transfer, and Theory

Fullerenes, Nanotubes, and Carbon Nanostructures Division / Physical and Analytical Electrochemistry Division

Papers are invited in the following areas of fullerene science: chemical functionalization, electrochemistry, photochemistry, photophysics, electron transfer chemistry, photoelectrochemistry, photovoltaic applications, catalysis, sensor studies, and theoretical studies.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **F. D'Souza**, Univ. of North Texas, email: Francis.DSouza@UNT.edu; **Dirk Guldi**, Univ. of Erlangen, email: guldi@chemie.uni-erlangen.de; and **Shunichi Fukuzumi**, Osaka University, email: fukuzumi@chem.eng.osaka-u.ac.jp.

M7 Graphene and Related Structures

Fullerenes, Nanotubes, and Carbon Nanostructures Division

This symposium focuses on the synthesis, funtionalization, characterization, and chemical and physical properties of graphene and graphene-based two-dimensional nanostructures. Papers dealing with optical, electrical, and electrochemical properties of such carbon nanostructures and their composites are welcomed.

An issue of *ECS Transactions* is planned to be published "AFTER" the meeting. All authors accepted for presentation are encouraged to submit their full text manuscript for the issue no later than June 20, 2014. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **H. Grebel**, New Jersy Inst. of Technology, email: grebel@njit.edu; **Slava V. Rotkin**, Lehigh University, email: rotkin@lehigh.edu; and **L. Huang**, Notre Dame Radiation Lab, email: lhuang2@nd.edu.

M8 Nanostructures for Energy Conversion

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

Metal and semiconductor nanoparticles play important roles in fuel cells, solar energy conversion, catalysis and hydrogen production. Recent advances in the area of nanostructured materials have led to new understanding of the catalytic and photoelectrochemical properties of these nanostructures. Optically functional nanostructures, which can collect and localize photon energy into an ultra-small space, can efficiently excite molecules using an extremely low number of photons. Papers are invited in the following areas: synthesis and characterization of metal nanoparticles and nanostructures; functionalization with chromophores, strong photon-molecule coupling fields for chemical reactions, bimetallic particle and semiconductor metal composites; size-dependent catalytic properties; hydrogen evolution reactions; photochemical solar cells; and photocatalysis and electron transfer processes that are relevant to energy conversions.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **H. Imahori**, Kyoto University, email: imahori@kyoto-u.ac.jp; **Prashant Kamat**, Notre Dame University, email: pkamat@nd.edu; **Kei Murakoshi**, Hokkaido University, email: kei@sci.kokudai.ac.jp; **Ravi Subramanian**, University of Nevada Reno, email: ravis@unr.edu; and **Jie Xiao**, Pacific Northwest National Laboratory, email: jie.xiao@pnnl.gov.

M9 Porphyrins, Phthalocyanines and Supramolecular Assemblies

Fullerenes, Nanotubes, and Carbon Nanostructures Division / Physical and Analytical Electrochemistry Division

This symposium will highlight recent advances in porphyrin chemistry. A wide range of topics will be covered in order to generate interdisciplinary discussions between particpants and encourage the exchange of new ideas. We therefore solicit high quality contributions in areas ranging from the synthesis of challenging porphyrinic devices to the characterization of electrochemical and physicochemical behavior of new porphyrinic materials. Submissions are encouraged on the following topics: (1) new challenging multi-porphyrinic devices; (2) electronic properties of porphyrinic arrays; (3) photoinduced processes in molecular and supramolecular porphyrinic assemblies; and (4) novel porphyrin-modified electrodes.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **K. Kadish**, University of Houston, email: kkadish@uh.edu; **Roberto Paolesse**, Univ. of Rome, email: Roberto.paolesse@uniroma2.it; **Nathalie Solladie**, LCC-CNRS, email: solladie@lcc-toulouse.fr; and **Tomas Torres**, Univ. Autonoma Madrid, email: tomas.torres@uam.es.

N—Dielectric Science and Materials

N1 Dielectrics for Interconnect, Interposers, and Packaging

Dielectric Science and Technology Division

Low dielectric constant materials have been critical to reducing the RC time constant for interconnect on-chip, on-interposers, and in electronic packages and boards. The ITRS calls for dramatic improvements in dielectric constant (both permittivity and loss) and other physical properties, such as thermal expansion, thermal conductivity and modulus, at all levels of interconnect including chips, interposers, packages and substrates. This symposium will focus on advances in dielectric materials, processing, characterization, and reliability for interconnect dielectrics. The application areas include (1.) on-chip; (2.) organic, silicon, and glass interposers, (3.) package substrates; (4.) printed circuit boards; and (5.) other interconnect media. The topics include new dielectric materials, patterning methods for dielectric materials, chemical/mechanical/electrical properties and their characterization, applications of dielectric materials in microelectronic devices, and reliability of dielectric materials.

A hard-cover issue of *ECS Transactions* is planned to be available "AT" the meeting. All authors accepted for presentation are obligated to submit their full text manuscript for the issue no later than February 7, 2014. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **P. Kohl**, Georgia Tech, email: paul.kohl@chbe.gatech.edu; **O. D. Leonte**, Berkeley Polymer Technology, email: odleonte@comcast.net; **Kalpathy Sundaram** , University of Central Florida, email: kalpathy.sundaram@ucf.edu; and **Charles Arvin** , IBM, email: Charlesa@us.ibm.com.

N2 Dielectrics for Nanosystems 6: Materials Science, Processing, Reliability and Manufacturing

Dielectric Science and Technology Division / Electronics and Photonics Division

Advanced semiconductor products that are true representatives of nanoelectronics have reached below 100 nm. Depending on the application, the nanosystem may consist of one or more of the following types of functional components: electronic, optical, magnetic, mechanical, biological, chemical, energy sources, and various types of sensing devices. As long as one or more of these functional devices is in 1-100 nm dimensions, the resultant system can be defined as nanosystem. Papers are solicited in all areas of dielectric issues in nanosystems including gate dielectric materials for Si, SiC, SiGe, Ge, and III-V semiconductor devices, dielectric materials for devices based on nanowires, nanotubes, and grapheme, dielectric materials for high temperature and energy savings applications, and dielectric materials for sensing devices. In addition to traditional areas of semiconductor processing, novel topological insulators are of interest, which may lead to new applications of nanosystems.

A hard-cover issue of *ECS Transactions* is planned to be available "AT" the meeting. All authors accepted for presentation are obligated to submit their full text manuscript for the issue no later than February 07, 2014. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **D. Misra**, NJIT, email: dmisra@adm.njit.edu; **Y. Obeng**, NIST, email: yaw.obeng@nist.gov; **T. Chikyow**, Advanced Electronic Materials Center, NIMS, email: chikyo.toyohiro@nims.go.jp; **H. Iwai**, Tokyo Institute of Technology, email: iwai@ep.titech.ac.jp; **Z. Chen**, University of Kentucky, email: zhichen@engr.uky.edu; and **D. Bauza**, Institut de Microélectronique, email: bauza@minatec.grenoble-inp.fr.

N3 More than Moore

Dielectric Science and Technology Division / Electronics and Photonics Division / Sensor Division / New Technology Subcommittee

The semiconductor industry is rapidly adopting the functional diversification approaches to adding value to integrated circuits. Dubbed "More than Moore", this strategy enhances value to devices by incorporating functionalities that do not necessarily scale according to "Moore's Law". It often leverages the scaling capabilities derived from the "More Moore" developments to incorporate digital and non-digital functionality into compact systems. The "More than Moore" approach particularly allows for the non-digital functionalities (e.g., RF communication, power control, passive components, sensors, actuators) to migrate from the system board level into package-level (SiP) or chip-level (SoC) implementation. The pervasion of "More than Moore" technologies will impact the development of integration platforms, of innovative technologies (e.g. for 3D integration of multiple chips), manufacturing techniques and design & modeling tools capable of handling multifunctional heterogeneous subsystems. From technology perspectives, More than Moore includes all technologies based upon or derived from silicon processing that will eventually be packaged or monolithically integrated in a semiconductor product, including functionalities that do not scale with Moore's Law. Examples of such functionalities may include, not necessarily restricted to, sensing, communicating, energy harvesting and analog signal processing, while the application areas includes but not restricted to health care, transport, security, energy, communication and infotainment. This symposium is aimed at providing a forum for discussing all aspects of this emerging technology trend. Thus papers will be solicited in all aspects of More than Moore, including but not limited to, materials, integration, performance, reliability and applications.

A hard-cover issue of *ECS Transactions* is planned to be available "AT" the meeting. All authors accepted for presentation are obligated to submit their full text manuscript for the issue no later than February 7, 2014. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Y. Obeng**, NIST, email: yaw.obeng@nist.gov; **G. Banerjee**, Air Products and Chemicals, email: gbanerje@hotmail.com; **S. Datta**, Pennsylvania State University, email: sdatta@engr.psu.edu; **P. Hesketh**, Georgia Tech, email: peter.hesketh@me.gatech.edu; **T. Hiramoto**, University of Tokyo, email: hiramoto@nano.iis.u-tokyo.ac.jp; **P. Srinivasan**, GlobalFoundries-IBM, NY, email: purushothaman.s@gmail.com; and **A. Hoff**, University of South Florida, email: hoff@usf.edu.

P—Electronic Materials and Processing

P1 Chemical Mechanical Polishing 13

Dielectric Science and Technology Division

This symposium will address fundamentals and applications of chemical mechanical planarization (CMP) in a wide range of materials (metals, dielectrics, semiconductor substrates, and more). The symposium will also discuss post CMP cleaning, advances in consumables, new materials, process integration, and other relevant issues of this technology. Papers are being solicited in the following areas: (1.) CMP fundamental science and technology; (2.) surface and electrochemical aspects of CMP; (3.) CMP of metals and composites; (4.) CMP of dielectrics and semiconductors; (5.) CMP process integration and control; (6.) advances in CMP consumables; (7.) operational and environmental aspects of CMP; (8.) CMP for 3D integration and packaging; and (9.) CMP for emerging materials.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **R. Rhoades**, Entrepix Inc., email: rrhoades@entrepix.com; **I. Ali**, Sematech, email: iqbal.ali@sematech.org; **G. Banerjee**, Air Products and Chemicals, email: BANERJG@airproducts.com; **L. Economikos**, IBM, email: econol@us.ibm.com; **D. Huang**, Praxair, email: david_huang@praxair.com; **Y. Obeng**, NIST, email: yaw.obeng@nist.gov; and **B. Basim**, Ozyegin University, Turkey, email: bahar.basim@ozyegin.edu.tr.

P2 Silicon Compatible Materials, Processes and Technologies for Advanced Integrated Circuits and Emerging Applications 4

Electronics and Photonics Division / Dielectric Science and Technology Division

This symposium will focus on emerging materials, processes and technologies that can be applied to large area silicon wafers either to enhance the performance of analog and digital integrated circuits or to enable revolutionary device structures with entirely new functionalities.

Topics of particular interest include:

1) Materials and processes needed to realize advanced transistor structures with high mobility channels based on either strain engineering or emerging high-mobility channel materials such as strained Si, compound semiconductors and graphene that can be synthesized on large area silicon wafers by epitaxial or other innovative methods. Papers focusing on synthesis of the new channel materials as well as processes that are essential for the realization of successful device structures are of particular interest. Examples include high performance gate stacks and low-resistivity junctions and contacts formed on new, silicon compatible materials.
The symposium also invites abstracts on new materials and processes for 3-D (TSV) integration.

2) Synthesis of nano-structures including wires, pores and membranes of silicon compatible materials as well as novel MEMS/NEMS structures and their integration with the mainstream silicon integrated circuit technology. Abstracts on applications of these new devices in all relevant fields including electronics, optics and biology are welcome.

3) New technologies and equipment for synthesis and characterization of the materials and processes listed above.

A hard-cover issue of *ECS Transactions* is planned to be available "AT" the meeting. All authors accepted for presentation are obligated to submit their full text manuscript for the issue no later than February 7, 2014. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **F. Roozeboom**, Eindhoven University of Technology, email: f.roozeboom@tue.nl; **E.P. Gusev**, Qualcomm MEMS Technologies, email: gusev@qualcomm.com; **H. Iwai**, Frontier Collaborative Research Center, Tokyo Institute of Technology, email: iwai@ae.titech.ac.jp; **K. Kakushima**, Frontier Collaborative Research Center, Tokyo Institute of Technology, email: kakushima@ep.titech.ac.jp; **D.-L. Kwong**, Institute of Microelectronics, email: kwongdl@ime.a-star.edu.sg; **V. Narayanan**, IBM T. J Watson Research Center, email: vijayna@us.ibm.com; and **P.J. Timans**, Mattson Technology Inc., email: Paul.Timans@mattson.com.

Q—Electronic and Photonic Devices and Systems

Q1 Integrated Optoelectronics 7

Electronics and Photonics Division / Dielectric Science and Technology Division

This seventh international symposium will address issues on integrated optoelectronics and its applications to emerging areas such as biophotonics, biomedical engineering, silicon photonics and nanophotonics. Original contributions are solicited on all topics related to integrated optoelectronics - technology and fabrication, components and systems manufacturing, testing, performance, reliability, biophotonics, health sciences, and other related topics. Contributions that span fundamental as well as applied aspects of integrated optoelectronics are welcome.

Examples of topics in integrated optoelectronics of interest are: (1.) advanced growth and device processing technologies; (2.) applications to diagnostic and screening devices for health care applications; (3.) applications to environmental sciences; (4.) biophotonics, bioimaging systems and related areas; (5.) CMOS imagers, integration issues and applications; (6.) current, emerging, and novel materials and devices in optoelectronics; (7.) detectors, detector arrays and transmitters; (8.) integration of silicon optoelectronics and electronics circuitry and compound semiconductor components — fabrication issues, reliability and performance; (9.) integrated lasers/modulators or multi-wavelength laser arrays; (10.) integrated optoelectronic active and passive components; (11.) integration technologies based on quantum well and quantum dot structures; (12.) micro-opto-electro-mechanical systems (MOEMS); integration issues related to improving the performance of high speed and high-sensitivity systems; (13.) planar lightwave integrated devices and circuits; (14.) optoelectronic components based on nanocrystalline materials; (15.) optoelectronic integrated circuit (OEIC) receivers and imaging arrays; and (16.) transceivers systems and integration issues. The symposium will consist of invited as well as contributed papers.
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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **M. J. Deen**, McMaster University, email: jamal@mcmaster.ca; **Q. Fang**, McMaster University, email: qfang@mcmaster.ca; **C. Jagadish**, The Australian National University, email: c.jagadish@ieee.org; **L. Marsal**, University Rovari i Virgili, email: lluis.marsal@urv.cat; and **K. Ohashi**, NEC Corporation, email: k-ohashi@cb.jp.nec.com.

Q2 Wide Bandgap Semiconductor Materials and Devices 15

Electronics and Photonics Division / Sensor Division

This symposium will focus on issues pertinent to the development of wide-bandgap semiconductor materials and devices. All wide-bandgap semiconductor materials are of interest, including III-nitrides, II-oxides, SiC, diamond, II-VI, and emerging materials. The following technical areas are of particular interest: (1) emitters: light emitting diodes, light emitting transistors, laser diodes, displays, and devices for solid state lighting; (2) detectors: including solar cells and avalanche photodiodes; (3) high temperature, high power, and high frequency electronics; (4) sensor applications; (5) substrates for wide bandgap material epitaxy; (6) material characterization: synthesis, defect structure and luminescence; (7) nanoscale wide band gap materials; (8) transparent conducting oxide films and devices, including ZnO and IGZO thin film transistors. The goal of this symposium is to bring together the wide-bandgap crystal growth, material processing, circuit design, and device application communities to review current issues and present state of the art developments in wide-bandgap semiconductor technology. This symposium will consist of invited and contributed papers and posters.

A hard-cover issue of *ECS Transactions* is planned to be available "AT" the meeting. All authors accepted for presentation are obligated to submit their full text manuscript for the issue no later than February 7, 2014. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Fan Ren**, University of Florida, email: ren@che.ufl.edu; **D. Senesky**, Stanford University, email: dsenesky@stanford.edu; **Y.-L. Wang**, National Tsing-Hua University, email: ylwang@mx.nthu.edu.tw; **S.J. Pearton**, University of Florida, email: spear@mse.ufl.edu; **E.B. Stokes**, University of North Carolina at Charlotte, email: ebstokes@uncc.edu; and **Gary Hunter**, NASA Glenn, email: gary.w.hunter@nasa.gov.

R—Luminescence and Display Materials, Devices, and Processing

R1 Nanoscale Luminescent Materials 3
Dielectric Science and Technology Division / Luminescence and Display Materials Division

This symposium will focus on those characteristics of nanoscale materials that relate to their luminescence properties. Relevant topics include: effects of quantum confinement, the role of surface states, loss mechanisms, methods to improve luminescence efficiency, bulk vs. nanoparticle luminescence, and the role of phonons in nanomaterials. Presentations at this meeting will cover: (1.) basic physical properties of luminescent nano-materials including insulators, semiconductors, organics, and polymers; (2.) nanophosphors for biophotonics and biomarkers; (3.) nanoparticles for light emitting diodes and next generation lighting applications; (4.) luminescent properties of fabricated nano-structures (nanowires, nanorods, nanodots, etc.); and (5.) nanophosphors for traditional phosphor applications such as X-ray and scintillator phosphors, phosphors for VUV excitation, and persistent phosphors.

Presentations should involve the physics, chemistry, and/or engineering of these materials. Selected abstracts will be also chosen by the organizers for longer invited talks.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **P. Mascher**, Mcmaster University, email: mascher@mcmaster.ca; and **David Lockwood**, National Research Council Canada, email: david.lockwood@nrc.ca.

S—Physical Sensors

S1 Sensors, Actuators and Microsystems General Session (Physical Sensors)
Sensor Division

This symposium will address all aspects of physical sensors, actuators and microsystems. A companion symposium concerning the corresponding aspects of chemical and biological sensors and actuators may be found under Topic B. Physical sensors find extensive application in environmental monitoring, health care, food security and industrial quality assurance, safety and process control. Sensors and actuators are often integrated into "smart" microsystems: microfabricated sensors and/or actuators combined with electronics which enable, for example, signal conditioning and data processing. The need for multifunctional, smart technologies, which depend on sensors, actuators and electronics, is expected to increase in coming years as further demands and expectations are placed on systems and devices. This general session welcomes papers on all aspects of physical sensors, actuators and microsystems not covered in other sessions. This symposium intends to bring together a range of interdisciplinary topics and covers all materials aspects of sensors, actuators and microsystems. Primary emphasis will be placed upon applied aspects of the materials, synthesis, evaluation and development strategies of novel materials/device configurations for sensing and actuating functions as well as integrated microsystems. Papers are solicited in, but not limited to, the following areas: (1.) physics and chemistry of sensor and actuator materials, fabrication, and characterization of novel compositions; (2.) novel sensor and actuator concepts, design, modeling, and verification, system integration and actuating functions; (3.) sensing systems that include sampling systems and actuators, like sensor arrays, and electronic noses/tongues; (4.) physical sensors and actuators based on various transduction mechanisms including electrochemical, resistive, optical, , fiber optics, radio frequency, microwave and surface acoustics; (5.) emerging technologies and applications including physical sensors based on nanotechnology, (6.) wireless integrations; and (7.) novel techniques to expand and ensure sensor stability and reliability.

An issue of *ECS Transactions* is planned to be published "AFTER" the meeting. All authors accepted for presentation are encouraged to submit their full text manuscript for the issue no later than June 20, 2014. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Nick Wu**, West Virginia University, email: Nick.Wu@mail.wvu.edu; **Gary Hunter**, NASA, email: gary.w.hunter@nasa.gov; **Ajit Khosla**, Simon Fraser University, email: ajit_khosla@sfu.ca; **Larry Nagahara**, NIH, email: nagaharal@mail.nih.gov; and **Zoraida Aguilar**, Ocean Nanotech, email: zapaguilar@yahoo.com.

Z—General

Z1 General Student Poster Session
All Divisions

This poster session provides a forum for graduate and undergraduate students to present research results of general interest to ECS. The purpose of this session is to foster and promote work in both electrochemical and solid-state science and technology, and to stimulate active student interest and participation in ECS. A competition for the two best posters will be part of the session. Cash prizes will be given to the presenting student author on each winning paper; the amounts are awarded at the discretion of the organizers and judges. The awards will be made without regard to gender, citizenship, race, or financial need.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **V. Subramanian**, Washington University in Saint Louis, email: vsubramanian@seas.wustl.edu; **V. Chaitanya**, New Mexico State University, email: vimalc@nmsu.edu; **Jean St-Pierre**, HNEI, email: jsp7@hawaii.edu; **Christopher Johnson**, Argonne National Laboratory, email: cjohnson@anl.gov; **M. P. Foley**, United States Naval Academy, email: foley@usna.edu; and **K. B. Sundaram**, University of Central Florida, email: sundaram@mail.ucf.edu.

Z2 Nanotechnology General Session
All Divisions / New Technology Subcommittee

The emergence of nanotechnology as a major field of research has touched almost every scientific discipline. The number of applications for materials that are prepared on a nanometer scale has been expanding rapidly. The advancement of these applications is made possible by the new methods of preparation and characterization of materials and composites on a nanometer scale. Examples include catalysts for fuel cell, battery and supercapacitor applications, semiconductors for photovoltaic and photoelectrochemical solar energy conversion, and chemical and biological sensors.

This symposium will focus on critical issues and state-of-theart developments in the science and technology of nanostructured materials for a broad spectrum of applications. Papers are solicited in all areas related to materials including metals, ceramics, semiconductors, composites, molecular electronics, and organic compounds and polymers, and to devices including fuel cells, batteries, photovoltaic cells, supercapacitors, molecular/nanoelectronics, chemical and biological sensors, actuators, etc.

Areas of interest include: heterogeneous functional materials for energy systems; semiconductor and metal nanoparticles and metal/semiconductor nanocomposites; size quantization effects in semiconductor nanoparticles; fundamentals of nucleation and growth of nanoparticles/nanowires/nanotubes; novel synthesis methods of nanostructured materials; processing of nanostructured materials; advanced characterization techniques for nanostructured materials; modeling and tailoring of nanostructured materials; nanocomposites and interfacial phenomena; photo-induced charge separation and interfacial charge transfer; photoelectrochemistry of nanostructured films; photo-catalysis and environmental applications; nano-ionics; nanostructured catalysts for fuel cells, electrolyzers, batteries and supercapacitors; nanostructured sensor surfaces; and biological applications of nanomaterials.

An issue of *ECS Transactions* is planned to be published "AFTER" the meeting. All authors accepted for presentation are obligated to submit their full text manuscript for the issue no later than June 20, 2014. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **William Mustain**, University of Conneticut, email: mustain@engr.uconn.edu; and **Oana Leonte**, Berkeley Polymer Technology, email: odleonte@comcast.net.

Z3 Solid State Topics General Session
Dielectric Science and Technology Division / Dielectric Science and Technology Division / Electronics and Photonics Division / Energy Technology Division / Fullerenes, Nanotubes, and Carbon Nanostructures Division / Luminescence and Display Materials Division / Organic and Biological Electrochemistry Division / Sensor Division

Original papers are solicited on all aspects of electronic materials, devices, and processing technologies not covered by specialized topical symposia at this meeting.

An issue of *ECS Transactions* is planned to be published "AFTER" the meeting. All authors accepted for presentation are obligated to submit their full text manuscript for the issue no later than June 20, 2014. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Kalpathy Sundaram**, University of Central Florida, School of Electrical Engineering and Computer Science, email: sundaram@mail.ucf.edu; **Oana Leonte**, Berkeley Polymer Technology, email: odleonte@comcast.net; **K. Shimamura** , Waseda University , email: shimamura.kiyoshi@nims.go.jp; and **H. Iwai**, Tokyo Institute of Technology, email: iwai@ep.titech.ac.jp.

Questions?
ASK . . .

For **registration**, please contact customerservice@electrochem.org or call 1.609.737.1902.

For ***ECS Transactions***, please contact ecst@electrochem.org or call 1.609.737.1902, ext. 120.

For **sponsorship and exhibits**, please contact dan.fatton@electrochem.org or call 1.609.737.1902, ext. 115.

IMPORTANT DEADLINES

- ***Abstracts*** are due no later than **November 15, 2013**—some may be due earlier so carefully review symposium deadlines.
- ***Travel Grant Application*—January 1, 2014**
- ***Sponsorship and Exhibits*—January 31, 2014**
- ***Early-Bird Meeting Registration*—April 11, 2014**
- ***Hotel Reservations*—April 11, 2014** or until the block sells out!

Young Faculty Early Career Travel Grant Application Orlando, FL

The Society's Battery, High Temperature Materials (HTM), and Physical and Analytical Electrochemistry Divisions offer travel grants to post-doctoral associates, junior faculty, and other young investigators presenting papers at the Society's meeting in Orlando, FL, May 11-16, 2014. To apply, complete this application and send it along with a copy of your CV and a letter of recommendation from an established researcher attesting both to the quality of the applicant's work and financial needs, and a copy of the applicant's meeting abstract. For additional information please send an email to travelgrant@electrochem.org. Please note the specific division in your inquiry, as requirements might differ between Divisions.

Meeting Site:_____

Name:_____

Organization:_____

Address: _____

_____

_____

Email:_____Phone #: _____

Symposium Title (#):_____

_____

_____

Title of paper to be presented at the meeting:_____

_____

_____

Estimated meeting expenditures: $_____

Signature:_____Date: _____

Check only one Division. (*Applications made to multiple Divisions will be rejected.*)

- ❑ Battery
- ❑ High Temperature Materials
- ❑ Physical and Analytical Electrochemistry

Please send materials to: Attn: (*Division Name*) Young Faculty/Early Career Travel Grant, c/o The Electrochemical Society, 65 S. Main Street, Building D, Pennington, NJ 08534; Phone: 609-737-1902; Fax: 609-737-2743; e-mail: travelgrant@electrochem.org. Electronic submission of nomination packets is preferred.

Applications for Travel Grants for the Orlando, FL, meeting must be received no later than January 1, 2014.

www.electrochem.org/sponsorship/travel_grants.htm

Student Travel Grant Application ECS Orlando, FL

The Society's, Battery, Corrosion, Dielectric Science & Technology, Electrodesposition, Electronics and Photonics, Energy Technology, High Temperature Materials (HTM), Fullerenes, Nanotubes and Carbon Nanostructures (FNCN), Industrial Electrochemistry & Electrochemical Engineering (IE&EE), Luminescence and Display Materials (LDM), Organic and Biological Electrochemistry (O&BE), Physical and Analytical Electrochemistry, and Sensor Divisions offer travel grants to students presenting papers at the Society's next meeting in Orlando, FL, May 11-16, 2014. **To apply, complete this application and send it along with a copy of your transcript and a letter from an involved faculty member attesting both to the quality of the student's work and financial needs, and a copy of the student's meeting abstract.** For additional information please send an email to travelgrant@electrochem.org. Please note the specific division in your inquiry, as requirements might differ between Divisions.

Meeting Site:_____

Name:_____

School Address: _____

_____

Email:_____Phone #: _____

Undergraduate Year (U) or Graduate Year (G) - circle one: U3 U4 G1 G2 G3 G4 G5

Major Subject:_____Grade point average: _____out of possible: _____

(please provide a letter of recommendation from your faculty advisor and a copy of your transcript)

Symposium Title (#):_____

_____

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Title of paper to be presented at the meeting:_____

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_____

Are you an ECS Student Member of the Society? ❑ yes ❑ no

(if not, please additionally submit the Awarded Student Membership application)

Estimated meeting expenditures: $_____

Signature:_____Date: _____

Check only one Division. *(Applications made to multiple Divisions will be rejected.)*

- ❑ Battery
- ❑ Corrosion
- ❑ Dielectric Science & Technology
- ❑ Electrodeposition
- ❑ Electronics & Photonics
- ❑ Energy Technology
- ❑ Fullerenes, Nanotubes and Carbon Nanostructures
- ❑ High Temperature Materials
- ❑ Industrial Electrochemistry and Electrochemical Engineering
- ❑ Luminescence and Display Materials
- ❑ Organic and Biological Electrochemistry
- ❑ Physical and Analytical Electrochemistry
- ❑ Sensor

Please send materials to: Attn: (*Division Name*) Student Travel Grant, c/o The Electrochemical Society, 65 S. Main Street, Building D, Pennington, NJ 08534; Phone: 609-737-1902; Fax: 609-737-2743; e-mail: travelgrant@electrochem.org. Electronic submission of nomination packets is preferred.

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www.electrochem.org/sponsorship/travel_grants.htm