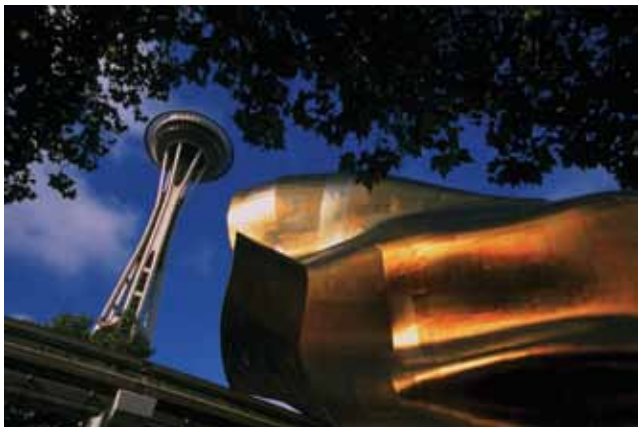
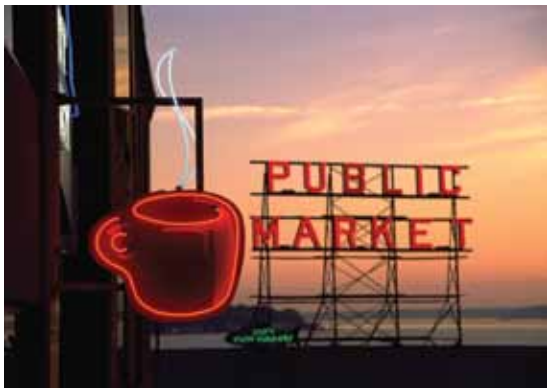
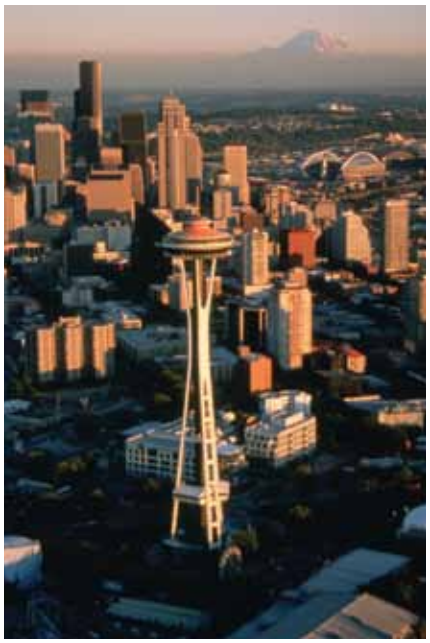
CALL FOR PAPERS







221st ECS Meeting

Seattle, WA

May 6-11, 2012

Seattle Convention Center and the Sheraton Seattle

221st ECS Meeting—Call for Papers—May 6-11, 2012

General Information

The 221th ECS Meeting will be held from May 6-11, 2012. 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 21, 2011.

Note: Some abstracts may be due earlier than November 21, 2011. Please carefully check the symposium listings for any alternate abstract submission deadlines. For complete details on abstract submission and symposia topics, please see www.electrochem.org.

Submit one original meeting abstract electronically via www.electrochem.org, no later than **November 21, 2011**. Faxed abstracts, late abstracts, and abstracts more than one page in length will not be accepted. In January 2012, 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 December 2011, 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 2012. Oral presentations must be in English. Both LCD projectors and Laptops will now 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 their own laptop for presentation, we strongly suggest that authors verify laptop/projector compatibility at the tech table prior to their presentation at the meeting. 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

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

ECS Transactions — All full papers presented at ECS meetings are eligible for submission to the online 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; some of these issues will also be available in a hard-cover edition. 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. Even if an individual symposium listing does not specify publication of an ECST issue, all authors are still 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.

Papers presented at the meeting, and papers submitted to ECST, may also be submitted to the Society's technical journals: the *Journal of The Electrochemical Society* or *Electrochemical and Solid-State Letters*. Full manuscripts must be submitted within six months of the symposium date. "Instructions to Authors" are available from the ECS headquarters office, the journals, or the ECS website.

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.

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 seeking financial assistance should consider awarded travel grants (see pages 110 and 111).

Hotel Reservations

The 221st ECS Meeting will be held at the Sheraton Seattle Hotel located at 1400 Sixth Avenue, Seattle, WA, USA and the Washington State Convention Center. Please refer to the 221st ECS Meeting site for the most up to date information on hotel availability and a block of rooms where special discounted rates have been reserved for participants attending the 221st ECS Meeting. **The hotel reservation deadline is April 6, 2012.** Please refer to ECS website for rates and reservations.

Meeting Registration

All participants, including authors and invited speakers of the 221st ECS Meeting, are required to pay the appropriate registration fees. Hotel and meeting registration materials will be made available in June 2011 on the ECS website (www.electrochem.org). **The deadline for early bird registration is April 6, 2012.**

Short Courses

A number of short courses will be offered on Sunday, May 6, 2012 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 planned for the meeting: Enantioselective Electrochemical Sensors: Design, Response Characteristics, and Applications; Basic Impedance Spectroscopy; Scientific Writing for Scientists and Engineers; Electronic Microscopy for Electrochemical Systems; MEMS Packaging and Reliability; and Introduction to Renewable Energy: Opportunities for Electrochemistry. Please check the ECS website for the final list of offerings.

Technical Exhibit

The 221st ECS Meeting will also include a Technical Exhibit, featuring presentations and displays by over 30 manufacturers of instruments, materials, systems, publications, and software of interest to meeting attendees. Full exhibit booths manned by company representatives cost $2,000 and include one free meeting registration. Literature display tables (unmanned by company representatives; no meeting registration included) will also be available for $1,000. Parties interested in exhibiting should contact Tim Fest (sponsorship@electrochem.org) at the ECS headquarters office for more information. Coffee breaks are scheduled each day in the exhibit hall along with evening poster sessions to increase traffic.

Sponsorship Opportunities

ECS biannual meetings are wonderful chances to market your company through sponsorship. Sponsors will be recognized by level in *Interface*, the Meeting Program, meeting signage, and on the ECS website. The Levels are: Platinum: $5,000+, Gold: $2,500+, Silver: $1,000+, and Bronze: $500.

In addition, sponsorships are available for the plenary talks and other special events. These opportunities include the recognition stated above along with additional personalized packages. Special event sponsorships will be assigned by the Society on a first-come, first served basis.

Advertising opportunities—in the meeting program as well as in *Interface*—are available. For more information on any sponsorship opportunity, contact Tim Fest at sponsorship@electrochem.org.

Contact Information

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

SYMPOSIUM TOPICS

A General Topics

A1 — General Student Poster Session

A2 — Tutorials in Nanotechnology: More than Moore – Beyond CMOS Emerging Materials and Devices

A3 — Clean Water Technologies

A4 — Nanotechnology General Session

B Batteries, Fuel Cells, and Energy Conversion

B1 — Batteries and Energy Technology Joint General Session

B2 — Large Scale Electrical Energy Storage 1

B3 — High Temperature Batteries

B4 — Ionic and Mixed Conducting Ceramics 8

B5 — Special Topics in Battery Science and Technology

B6 — Tutorials on Electrocatalysis in Low Temperature Fuel Cells

B7 — Next Generation Portable Power

C Biomedical Applications and Organic Electrochemistry

C1 — Organic and Biological Electrochemistry General Poster Session

C2 — 10th Manual M. Baizer Memorial Symposium on Organic Electrochemistry

C3 — Progress in Fundamental and Applied Bioelectrochemistry

D Corrosion, Passivation, and Anodic Films

D1 — Corrosion General Session

E Dielectric and Semiconductor Materials, Devices, and Processing

E1 — Dielectrics for Nanosystems 5: Materials Science, Processing, Reliability, and Manufacturing

E2 — Graphene, Ge/III-V, Nanowires, and Emerging Materials for Post-CMOS Applications 4

E3 — Integrated Optoelectronics 6

E4 — Nanoscale Luminescent Materials

E5 — Silicon Compatible Materials, Processes, and Technologies for Advanced Integrated Circuts and Emerging Applications 2

E6 — Thermal and Plasma CVD of Nanostructures and Their Applications

E7 — Wide-Bandgap Semiconductor Materials and Devices 13

F Electrochemical / Chemical Deposition and Etching

F1 — Stress-Related Phenomena in Electrochemical Systems 2

F2 — Surface Treatments for Biomedical Applications 3

G Electrochemical Synthesis and Engineering

G1 — Industrial Electrochemistry and Electrochemical Engineering General Session

G2 — Multiscale Modeling of Electrochemical Systems 5

G3 — Characterization of Porous Materials 5

G4 — Electrochemical Engineering for the 21st Century 2

G5 — Fuel Cell Membranes, Electrode Binders, and MEA Performance

H Fullerenes, Nanotubes, and Carbon Nanostructures

H1 — Electron Transfer and Energy Applications of Fullerenes and Nanostructured Materials

H2 — Chemistry of Fullerenes and Carbon Nanotubes

H3 — Carbon Nanotubes and Nanostructures: Fundamental Properties and Processes

H4 — Carbon Nanotubes and Nanostructures: Applications and Devices

H5 — Endofullerenes and Carbon Nanocapsules

H6 — Carbon Nanotubes and Nanostrucutes: Medince and Biology

H7 — Porphyrins and Supramolecular Assemblies

H8 — Nanostructures for Energy Conversion

H9 — Chemistry and Physics of Graphene and 2D Nanostructures

I Physical and Analytical Electrochemistry

I1 — Physical and Analytical Electrochemistry General Session

I2 — Biological Fuel Cells 5

I3 — Electroanalytical Chemistry Applied to Biomedical Applications

I4 — Electrocatalysis Applied to Fuel Cells and Electrolyzers

I5 — Exploiting Magnets in Electrochemistry

I6 — Fundamental Aspects of the Electrochemical and Interfacial Properties of Carbon Nanostructures

I7 — Recent Advances in Spectro-Electrochemistry

I8 — Electrochemical Impedance Spectroscopy: Modeling and Interpretation

J Sensors and Displays: Principles, Materials, and Processing

J1 — Sensors, Actuators, and Microsystems General Session

J2 — Nano/Bio Sensors

J3 — Sensors for Safety and Security

A — General Topics

A1 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.

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 15, 2012. 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: **V. R. Subramanian**, Washington University, e-mail: vsubramanian@seas.wustl.edu; **V. Chaitanya**, New Mexico State University, e-mail: vimalc@nmsu.edu; **M. P. Foley**, U. S. Naval Academy, foley@usna.edu; and **K. Sundaram**, Univ. of Central Florida, e-mail: sundaram@mail.ucf.edu.

A2 Tutorials in Nanotechnology: More than Moore – Beyond CMOS Emerging Materials and Devices
(Electronics and Photonics / Sensor / New Technology Subcommittee)

This symposium will feature invited talks on nanodevices and nanosystems with an emphasis on emerging devices with added functionality that may not necessarily scale. Presentations at this meeting will cover: (1.) Nanotechnology applications in information technology, biotechnology and renewable energy; (2.) Beyond CMOS device structures and properties of semiconductor nanoelectronics; (3.) Nanocomponent fabrication and Nanosystem integration with new technologies; (4.) Advanced nanostructures in chemical and biological sensing system for healthcare, defense and security, environmental monitoring, industrial processing, and space missions; (5.) Test and evaluation of nanodevices and nanosystems; and (6.) Nanosystem modeling and data (signal) processing.

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 3, 2012. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to ECS headquarters no later than November 21, 2011, and questions and inquiries should be sent to the symposium organizers: **D. Misra**, New Jersey Institute of Technology, dmisra@njit.edu; **S. Datta**, Pennsylvania State University, sdatta@engr.psu.edu; and **J. Li**, NASA Ames Research Center, e-mail: Jing.Li-1@nasa.gov.

A3 Clean Water Technologies
(Sensor / Corrosion / Industrial Electrochemistry and Electrochemical Engineering / New Technology Subcommittee)

Water has been called "the oil of the 21st century": 41% of the Earth's population (2.3 billion) live in water-stressed areas, and that number is expected to grow to 3.5 billion by 2025. According to the World Health Organization, one billion people live without clean, piped water and 3.5 million deaths occur annually due to water-related illnesses. And this is not just a problem in developing countries, in the United States, for example, 46 states will face water shortages in the next 10 years. In many nations, water treatment, distribution, and quality control are based on 100 year-old infrastructure, and decades-old regulations. For this vital natural resource to be available through the 21st century, new paradigms are needed for management, remediation, and valuation. With the emergence of novel sensing modalities and processing technologies, ECS has a unique opportunity to provide a forum for the presentation of original research and innovation that can impact the future direction of Clean Water Technologies and provide viable solutions for the current and future needs.

This symposium will focus on critical issues related to both water treatment and sensing with an emphasis on those that significantly impact either the assessment of water quality or the ability to treat, disinfect, desalinate, or otherwise improve its quality or properties for a given application. Papers are solicited in all areas related to materials, devices, methodologies, and systems for water treatment and toxin detection.

Areas of interest include: reactor or treatment systems, treatment reactor design and modelling, electrode materials and design, membrane technology, desalinization, catalysts, disinfection, technologies related to industrial inorganic and organic waste, corrosion, metal removal, sewage treatment, integrated or remote sensing and biosensing, solid-state or organic sensors for water quality, and pre-concentrators for ultra-low concentrations.

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 15, 2012. 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: **B. R. Stoner**, Research Triangle Institute, Inc., e-mail: stoner@rti.org; **Z. Aguilar**, Ocean Nano Tech., LLC, e-mail: zapaguilar@yahoo.com; **E. Greenbaum**, Oak Ridge National Laboratory, e-mail: greenbaum@ornl.gov; **P. M. Natishan**, Naval Research Laboratory, e-mail: natishan@nrl.navy.mil; **E. J. Taylor**, Faraday Technology Inc., e-mail: JenningsTaylor@FaradayTechnology.com; and **J. Weidner**, University of South Carolina, email: weidner@engr.sc.edu.

A4 Nanotechnology General Session
(All Divisions)

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 is 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-the-art developments in the science and technology of nanostructured materials for electrochemical and catalytic 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, supercapacitors, molecular/nano electronics, chemical and biological sensors, and actuators.

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; modelling and tailoring of nanostructured materials; nanocomposites and interfacial phenomena; photoinduced charge separation and interfacial charge transfer; photoelectrochemistry of nanostructured films; photocatalysis 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 encouraged to submit their full text manuscript for the issue no later than June 15, 2012. 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. Chen**, University of South Carolina, e-mail: chenfa@cec.sc.edu; **O. M. Leonte**, Berkeley Polymer Technologies, Inc., e-mail: odleonte@comcast.net; and **W. Mustain**, University of Connecticut, e-mail: mustain@engr.uconn.edu.

B — Batteries, Fuel Cells, and Energy Conversion

B1 Batteries and Energy Technology Joint General Session
(Energy Technology / Battery)

Papers are solicited on the fundamental and applied aspects of energy storage and energy conversion not covered by other symposia at this meeting. Of particular interest are new materials and designs, performance studies, and modeling of all types of batteries and fuel cells including aqueous, non-aqueous, polymer electrolyte, ionic liquids, and solid electrolyte systems.

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 15, 2012. 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: **A. Manthiram**, University of Texas at Austin, rmanth@mail.utexas.edu; **A. Manivannan**, NETL, e-mail: manivana@netl.doe.gov; and **S. R. Narayan**, University of Southern California, e-mail: srnaraya@usc.edu.

B2 Large Scale Electrical Energy Storage 1
(Energy Technology / Battery / Industrial Electrochemistry and Electrochemical Engineering)

The incorporation of non-dispatchable renewable resources is critical to environmental and energy security, but puts considerable strain on the operabilty of the electric grid. There is an imminent need to improve the overall performance and robustness of the electric grid through peak shaving and grid management, and to integrate energy from renewable sources into the overall electricity grid. The next-generation electricity grid will require large scale energy storage systems to smooth out variability, support ramp rates, and provide off-peak storage. Papers are sought in the area of energy conversion and storage technology that can support these grid-scale applications. The energy storage systems include rechargeable batteries of all types, fuel cells and electrolyzers, fuel production systems, heat to electricity, thermal storage, and hybrid storage systems.

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 15, 2012. 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-M. Chiang**, Massachusetts Institute of Technology, e-mail: ychiang@mit.edu; **W. Craig Carter**, MIT, e-mail: ccarter@mit.edu; **B. Y. Liaw**, University of Hawaii, e-mail: bliaw@hawaii.edu; **J. Meyers**, University of Texas at Austin, e-mail: jeremypmeyers@mail.utexas.edu; **T. Nguyen**, The University of Kansas, e-mail: cptvn@ku.edu; and **C. Ponce de León Albarrán**, University of Southampton, e-mail: C.A.Ponce-de-Leon-Albarran@soton.ac.uk.

B3 High Temperature Batteries
(Battery / Energy Technology / High Temperature Materials)

High-temperature batteries are being considered for applications in transportation and stationary energy storage. The high operating temperature leads to advantages, such as high efficiency and low material costs, but creates challenges related to temperature-accelerated failure modes, such as corrosion, self discharge, impedance rise and mechanical failure. Recent developments include designs based on all-solid-state lithium cells and sodium metal-chloride (i.e. zebra) cells as well as improved electrolyte materials, such as molten salts, ceramics and glassy materials. Contributions for this symposium on technical advances and operational aspects of any high-temperature primary or secondary battery system are encouraged.

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 15, 2012. 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. Hall**, University of Western Ontario, e-mail: david.hall@uottawa.ca; **J. W. Fergus**, Auburn University, e-mail: jwfergus@eng.auburn.edu; and **D. Wheeler**, Brigham Young University, e-mail: dean_wheeler@byu.edu.

B4 Ionic and Mixed Conducting Ceramics 8
(High Temperature Materials)

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 3, 2012. 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**, Fuel Cells and Solid State Chemistry Division, Risoe National Laboratory for Sustainable Energy, Technical University of Denmark, e-mail: momo@risoe.dtu.dk; **T. Armstrong**, Carpenter Technology Corporation, e-mail: TArmstrong@cartech.com; **T. Gur**, Stanford University, e-mail: turgut@stanford.edu; **H. Yokokawa**, National Institute of Advanced Industrial Science and Technology, e-mail: h-yokokawa@aist.go.jp; and **X-D. Zhou**, University of South Carolina, e-mail: xiao-dong.zhou@sc.edu.

B5 Special Topics in Battery Science and Technology
(Battery / Energy Technology)

Batteries are critical for a variety of energy needs arranging from portable to transportation to stationary storage of renewable energy. Batteries have revolutionized the portable electronics market, and there is immense interest to develop batteries for transportation and stationary applications. This special topics symposium will focus on the science and technology of battery materials and systems. The topics include but not limited to: (1.) fundamentals of battery materials and systems; (2.) new battery chemistries including lithium-ion, sodium-ion, polyvalent-ion, redox-flow, and high-temperature batteries; (3.) new anode, cathode, and electrolyte materials; (4.) advanced in-situ and ex-situ characterization; (5.) computational modeling of battery materials and systems; and (6.) novel cell design and system integration.

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 15, 2012. 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: **A. Manthiram**, University of Texas, e-mail: rmanth@mail.utexas.edu; **B. Y. Liaw**, University of Hawaii, e-mail: bliaw@hawaii.edu; **A. Manivannan**, Department of Energy, e-mail: manivana@netl.doe.gov; and **K. Zaghib**, Hydro-Quebec, e-mail: Zaghib.Karim@ireq.ca.

B6 Tutorials on Electrocatalysis in Low Temperature Fuel Cells
(Physical and Analytical Electrochemistry / Energy Technology / Industrial Electrochemistry and Electrochemical Engineering)

This symposium will feature invited talks on elecrocatalysis in PEM and related fuel cells such as direct oxidation FCs and alkaline fuel cells. Presentations at this meeting will cover recent advances in materials and mechanistic understanding. Topics of interest include: (1.) alloy electrocatalysis; (2.) fuel cell catalysts without platinum-group metals (non-precious metal catalysts); (3.) catalyst support effects; (4.) nanostructured electrodes; (5.) new characterization methods; and (6.) computational chemistry and modeling of catalytic processes and electrodes.

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 3, 2012. 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. Zawodzinski**, University of Tennessee, e-mail: tzawodzi@utk.edu; **S. Mukerjee**, Northeastern University, e-mail: s.mukerjee@neu.edu; and **P. Strasser**, Technische Universitat Berlin, e-mail: pstrasser@tu-berlin.de.

B7 Next Generation Portable Power
(Energy Technology / Battery)

The symposium will provide a forum for the presentation of new and exciting research related to the areas of portable power. The need for constant improvements in portable power technology is manifest in the proliferation of increasingly multifaceted smart devices providing communication, computing, and entertainment. This symposium will cover topics related to novel materials, nano-structured interface, and device design. On materials issue, the topics include (and not limited to), advanced electrocatalysis of direct conversion of fuels, oxygen reduction (for Li-air and other metal air batteries) intercalation compounds for Li-ion batteries, membranes and electrode design. Interfacial design includes novel methods for catalyst deposition, improvements in transport in porous electrodes, self-assembly and 3D nano-constructs. The symposium will consist of invited talks and submitted research presentations. The intent is to highlight the most recent and perhaps controversial research topics and to promote discussion in these areas.

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 15, 2012. 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: **S. Mukerjee**, Northeastern University, Boston, e-mail: s.mukerjee@neu.edu; **A. Manthiram**, University of Texas, Austin, e-mail: rmanth@mail.utexas.edu; and **S. Narayan**, University of Southern California, e-mail: srnaraya@usc.edu.

C — Biomedical Applications and Organic Electrochemistry

C1 Organic and Biological Electrochemistry General Poster Session
(Organic and Biological Electrochemistry)

Submissions are solicited in all area of organic, organometallic, and biological electrochemistry. Areas of interest include synthetic and mechanistic electrochemistry with industrial and educational applications involving fuel cells, batteries, sensing, and fundamental studies.

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 15, 2012. 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: **J. Burgess**, Case Western Reserve University, e-mail: jdb22@case.edu.

C2 10th Manual M. Baizer Memorial Symposium on Organic Electrochemistry
(Organic and Biological Electrochemistry)

This is the premier international symposium in the area of organic electrochemistry. The symposium honors the 2012 winner of the Manuel Baizer Award in Organic Electrochemistry. Submissions are invited in all areas of synthetic and mechanistic organic electrochemistry.

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 15, 2012. 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: **A. Fry**, Wesleyan University, e-mail: afry@wesleyan.edu; and **G. Cheek**, United States Naval Academy, e-mail: cheek@unsa.edu.

C3 Progress in Fundamental and Applied Bioelectrochemistry
(Organic and Biological Electrochemistry / Physical and Analytical Electrochemistry)

This symposium is designed to be a forum for discussion of modern approaches to bioelectrochemistry, from fundamental studies to applied electrochemical devices and their fabrications. Contributed papers are solicited in any area related to these general areas, with specific topics including but not limited to fundamental studies of protein and enzyme electrochemistry, and applications to protein, cell, and DNA detection, A drug development and toxicity screening, and point-of-care and other biomedical measurement devices. The symposium aims to stress novel studies in these areas.

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 15, 2012. 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: **J. Rusling**, University of Connecticut, e-mail: James.Rusling@uconn.edu.

D — Corrosion, Passivation, and Anodic Films

D1 Corrosion General Session
(Corrosion)

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: **S. Fujimoto**, Osaka University, e-mail: fujimoto@mat.eng.osaka-u.ac.jp.

E — Dielectrics and Semiconductor Materials, Devices, and Processing

E1 Dielectrics for Nanosystems 5: Materials Science, Processing, Reliability, and Manufacturing
(Dielectric Science and Technology / IEEE Electron Devices Society)

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 high-k and higher-k materials for high temperature and energy savings applications. In addition to traditional areas of semiconductor processing and packaging of nanoelectronics, emphasis will be placed on areas where multifunctional device integration (through innovation in design, materials, and processing at the device and system levels) will 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 3, 2012. 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**, New Jersey Institute of Technology, e-mail: dmisra@njit.edu; **D. Bauza**, Institut de Microélectronique, e-mail: bauza@enserg.fr; **Z. Chen**, University of Kentucky, e-mail: zhichen@engr.uky.edu; **T. Chikyow**, Advanced Electronic Materials Center, NIMS, e-mail: chikyo.toyohiro@nims.go.jp: **H. Iwai**, Tokyo Institute of Technology, e-mail: iwai@ep.titech.ac.jp; and **Y. Obeng**, NIST, e-mail: yaw.obeng@nist.gov.

E2 Graphene, Ge/III-V, Nanowires, and Emerging Materials for Post-CMOS Applications 4

(Dielectric Science and Technology / Electronics and Photonics)

On its fourth year of highly successful conference, the symposium will focus on science, technologies and applications related to Graphene, Ge/III-V and Emerging Materials that can be applied to enhance the performance of CMOS, nano-structures or post-CMOS devices. This year, the symposium will also expand to all types of nano-wires for similar applications.

Special emphasis will be placed on Beyond CMOS integration schemes/technology development and on the impact of non-traditional materials such as Optical, Laser, RF and others non-conventional devices into nanoelectronics. Papers will be solicited in the following areas: (1.) graphene material properties, preparation, synthesis, and growth, including equipment, processes and mechanism of growth; (2.) metrology and characterization of graphene including defects and wrinkle characterization; (3.) graphene devices and integration to RF applications and novel device concept; (4.) graphene transport and mobility enhancement related to electronic, photonic and other transport mechanism in different devices; (5.) thermal behavior of graphene and graphene based devices including thermal transport, thermal conductivity and heat transfer management in devices and nano-structures; (6.) Ge and SiGe devices for PMOS mobility enhancement for next generation CMOS and other devices beyond strain engineering; (7.) InGaAs, GaAs, and other compound semiconductor devices for NMOS mobility enhancement for next generation CMOS and other devices beyond strain engineering; (8.) III-V heterostructures on Si substrates; (9.) processes, equipment, and characterization of Group IV and Group III-V films including defect characterization; (10.) nano-wires for next generation device performance enhancement and modeling; (11.) simulation of properties of all devices based on Ge, III-V, nano-wires and graphene; and (12.) introduction to a "More than Moore – Beyond CMOS" integration schemes/technology.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Y. Obeng**, NIST, e-mail: yaw.obeng@nist.gov; **C. Claeys**, IMEC, e-mail: claeys@imec.be; **S. De-Gendt**, IMEC, Stefan.Degendt@chem.kuleuven.be; **Z. Karim**, AIXTRON, email: z.karim@aixtron.com; **D. Misra**, New Jersey Institute of Technology, e-mail: dmisra@njit.edu; and **P. Srinivasan**, Texas Instruments, e-mail: psrinivasan@ti.com.

E3 Integrated Optoelectronics 6

(Electronics and Photonics / Dielectric Science and Technology)

This sixth 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 electronic 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, e-mail: jamal@mcmaster.ca; **Q. Fang**, McMaster University, e-mail: qfang@mcmaster.ca; **C. Jagadish**, The Australian National University, e-mail: c.jagadish@ieee.org; and **K. Ohashi**, NEC Corporation, e-mail: k-ohashi@cb.jp.nec.com.

E4 Nanoscale Luminescent Materials

(Luminescence and Display Materials / Dielectric Science and Technology)

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 the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **P. Mascher**, McMaster University, e-mail: mascher@mcmaster.ca; and **D. J. Lockwood**, National Research Council, Canada, email: david.lockwood@nrc-cnrc.gc.ca.

E5 Silicon Compatible Materials, Processes, and Technologies for Advanced Integrated Circuts and Emerging Applications 2

(Electronics and Photonics / Dielectric Science and Technology)

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.

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

E6 Thermal and Plasma CVD of Nanostructures and Their Applications

(Dielectric Science and Technology / Fullerenes, Nanotubes, and Carbon Nanostructures / Sensor)

CVD, plasma enhanced CVD, and various related deposition techniques have enjoyed success in microelectronics industry. Based on their success and experience, these techniques have recently found their way into preparation of nanostructured materials. Some examples include growth of inorganic nanowires such as silicon, germanium, various oxides (zinc, indium and tin oxides), nitrides (GaN), etc. Vapor-liquid-solid (VLS) and related techniques, template assisted techniques (CVD, electrodeposition), and planar deposition are some of the popular approaches in nanowire/ nanotube growth for applications into electronics, sensors, and thermoelectrics. Carbon nanotube preparation is now widely done using CVD and PECVD for patterned growth for applications in nanoelectronics, nanodevices, sensors, and field emission. A variety of other nanostructured materials such as nanopowders and nanocrystals are also prepared by these versatile techniques. The topics for this symposium include, but not limited to the above mentioned materials and applications. Papers focusing on growth mechanisms, modeling, process diagnostics, materials characterization, and advances in applications are strongly encouraged.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **M. Sunkara**, University of Louisville, e-mail: Mahendra@louisville.edu; **U. Cvelbar**, Jozef Stefan Inst., e-mail: uros.cvelbar@ijs.si; **J. Li**, NASA Ames Research Center, e-mail: Jing.Li-1@nasa.gov; **M. Meyyappan**, NASA Ames Research Center, e-mail: m.meyyappan@nasa.gov; and **M. Sankaran**, Case Western Reserve University, e-mail: mohan@case.edu.

E7 Wide-Bandgap Semiconductor Materials and Devices 13

(Electronics and Photonics / Dielectric Science and Technology / Sensor)

This symposium will focus on issues pertinent to development of wide-bandgap semiconductor materials and device applications. All wide-bandgap semiconductor materials are of interest, including III-nitrides, II-oxides, SiC, diamond, II-VI, and emerging materials, including hybrid organic-inorganic nanoscale materials. The following six technical areas are of particular interest: (1) emitters: light emitting diodes, laser diodes, and displays, (2) detectors: including solar cells and avalanche photodiodes, (3) high temperature, high power, and high frequency electronics, (4) sensor applications. (5) alternate substrates: including GaN, AlN, and ZnO, and (6) material characterization: synthesis, defect structure and luminescence 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 in wide-bandgap semiconductors. This symposium will consist of both invited and contributed papers and posters.

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Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **E. B. Stokes**, University of North Carolina, ebstokes@uncc.edu; **R-H. Horng**, National Cheng Kung University, e-mail: rhhorng@mail.ncku.edu.tw; **G. W. Hunter**, NASA Glenn Research Center, e-mail: ghunter@grc.nasa.gov; **Z. Karim**, Aixtron, e-mail: z.karim@aixtron.com; **Z. Mi**, McGill University, e-mail: zetian.mi@mcgill.ca; and **C. O'Dwyer**, University Of Limerick, e-mail: colm.odwyer@ul.ie.

F — Electrochemical/Chemical Deposition and Etching

F1 Stress-Related Phenomena in Electrochemical Systems 2
(Electrodeposition / Corrosion / Battery)

The symposium will provide a forum for the presentation of original research concerned with stress effects on electrochemical processes. Fundamental and applied papers are solicited on all aspects of stress effects on general electrochemical phenomena including but not limited to charge-induced surface stress, electrodeposition, corrosion, electrocatalysis, batteries and hydrogen storage materials. Topics of interest include: (1.) *in situ* and *ex situ* experimental methods, e.g., wafer curvature, X-ray diffraction; (2.) surface stress, e.g., electrocapillarity, adsorbate-induced surface stress, surface reconstruction; (3.) growth stress in thin films, e.g., epitaxial growth and misfit-induced stress, capillarity, nuclei coalescence, grain growth, role of defects and impurities; (4.) strain-induced nucleation and self-assembly, (5.) stresses and fracture resulting from electrochemical insertion, intercalation and point defect reactions, in the context of e.g., lithium ion battery electrodes, hydrogen absorption and corrosion processes; (6.) stress effects on charge transfer and electrocatalysis; (7.) stresses associated with anodic oxidation and formation of self-organized nanoporous materials; (8.) stress-strain effects on all forms of corrosion, such as selective de-alloying, as well as stress-induced transitions in corrosion phenomena, such as between pits and cracks; (9.) new approaches to help understand and control coupled mechanical/chemical degradation in electrochemical systems; and (10.) new characterization and modeling methods.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Y. T. Cheng**, University of Kentucky, e-mail: ycheng@engr.uky.edu; **K. R. Hebert**, Iowa State University, e-mail: krhebert@iastate.edu; and **G. R. Stafford**, National Institute of Standards and Technology, e-mail: gery.stafford@nist.gov.

F2 Surface Treatments for Biomedical Applications 3
(Electrodeposition / Corrosion / Sensor)

Understanding and manipulating the physical and chemical properties of various surfaces is very important for a variety of applications in the biomedical field. Applications may include various implants, dressings for wound healing and different skin diseases, surfaces for immunodiagnostic devices, patches for a continuous drug release and surfaces used for the prevention of biofilm formation or corrosion inhibition. The aim of this symposium is to bring together scientists, researchers and engineers with a multidisciplinary approach of the treatments of surfaces which may increase our knowledge related to various biomedical applications.

Treatments of interest include, but are not limited to: (1.) all methods of electrodeposition of thin films of various metals (Ag, Au, Cu, Pd, Pt etc.), oxides, polymers or salts which are used for implants and devices for wound healing applications, treatment of various skin diseases or the inhibition of corrosion processes; (2.) production of composite coatings (metallic, polymeric or oxide matrices containing biologically active ingredients) via electrodeposition, electroless deposition or other available methods (e.g. PVD or CVD) which may be useful in devices for a continuous drug release, implants, catheters immunodiagnostic devices or surfaces for biofilm or corrosion prevention; and (3.) production of thin films via electrochemical or chemical oxidation which may have unusual properties (antimicrobial, adsorption, high surface area to allow a continued release of desired chemicals or biologicals etc.) and as such may be useful in the production of various biomedical devices or surfaces for the prevention of biofilm formation or corrosion.

Substrates of interests may include metals, textile materials (natural or synthetic), foams, polymers, ceramics etc. Devices of interest(s) are wound dressings, catheters, implants and devices for the continuous drug release, surgical instruments, immunodiagnostic devices etc.

Papers dealing with the behavior both *in vitro* and *in vivo* are very much encouraged.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **S. Djokic**, Elchem Consulting, Ltd., e-mail: sdjokic@telus.net; and **D. C. Hansen**, University of Dayton Research Institute, e-mail: douglas.hansen@udri.udayton.edu; **L. Magagnin**, Politecnico di Milano, e-mail: luca.magagnin@polimi.it; **L. A. Nagahara**, National Cancer Institute, e-mail: Nagaharl@mail.nih.gov; and **Y. Yoon**, University of Dayton Research Institute, e-mail: Yuhchae.Yoon@udri.udayton.edu.

G — Electrochemical Synthesis and Engineering

G1 Industrial Electrochemistry and Electrochemical Engineering General Session
(Industrial Electrochemical and Electrochemical Engineering)

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 organizer: **J. Weidner**, University of South Carolina, e-mail: weidner@cec.sc.edu.

G2 Multiscale Modeling of Electrochemical Systems 5
(Industrial Electrochemical and Electrochemical Engineering / Battery / Energy Technology)

The behavior of electrochemical systems is frequently governed by concerted interactions between electrochemical phenomena that extend over many time and length scales. Numerical simulation of electrochemical systems thus requires solving equations simultaneously as well as efficiently in different length and time scales. It is not possible to accurately describe these systems using a single approach such as continuum modeling.

Papers describing innovative approaches to describe complex electrochemical systems are solicited. Papers of interest include but are not restricted to the following: nano-macro scale coupled simulation, micro-macro scale coupled simulation, stability issues during coupling of different scales, approximation methods, parallel computing, parameter estimation, efficient numerical solvers, novel numerical techniques, multiple steady states, comparison of numerical methods, moving boundary problems. Applications include, but not limited to electro/electroless deposition, solid electrolyte, interface, secondary batteries, fuel cells, electrochemical capacitors, and hybrid power sources.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **V. R. Subramanian**, Washington University, e-mail: vsubramanian@wustl.edu; and **V. Ramani**, Illinois Institute of Technology, e-mail: ramani@itt.edu.

G3 Characterization of Porous Materials 5
(Industrial Electrochemical and Electrochemical Engineering / Electrodeposition / Energy Technology)

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, 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: **R. Alkire**, University of Illinois, e-mail: r-alkire@illinois.edu; **L. Deligianni**, IBM, e-mail: lili@us.ibm.com; **J. M. Fenton**, University of Central Florida, e-mail: jfenton@fsec.ucf.edu; and **J. Gostick**, McGill University, e-mail: jeff.gostick@mcgill.ca.

G4 Electrochemical Engineering for the 21st Century 2
(Industrial Electrochemical and Electrochemical Engineering / Electrodeposition / Energy Technology)

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.

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G5 Fuel Cell Membranes, Electrode Binders, and MEA Performance
(Industrial Electrochemical and Electrochemical Engineering / Energy Technology)

Novel membranes, membrane-electrode-assemblies (MEAs), and binders are critical components/concerns for the efficient deployment of polymer electrolyte fuel cells. Membranes have been the subject of considerable research for direct methanol fuel cells, high temperature/low relative humidity hydrogen/air fuel cells, and anion exchange membrane fuel cells. Much less emphasis has been placed on the ionomeric materials used in the electrodes that are responsible for both ion conduction and the mechanical integrity of the electrodes. Often, the performance of a new membrane in a PEM fuel cell is masked by under-performing and non-optimized electrodes. Studies that explore novel ionomer binders, the interaction of these ionomers with solvent and catalyst in electrode inks, ionomer-catalyst interactions within MEA electrodes, the attachment of electrodes to membranes, electrode structure, and the effect of electrode composition and processing on fuel cell performance are sorely needed.

This symposium covers all aspects of novel fuel cell electrolyte membrane and MEA synthesis and applications. Topics of interest include, but are not limited to: (1.) novel electrolyte synthesis and characterization; (2.) ionomeric solutions used in electrodes and their interactions with catalyst particles; and (3.) electrode characterization and the impact of electrode structure/composition on performance.

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H — Fullerenes, Nanotubes, and Carbon Nanotubes

H1 Electron Transfer and Energy Applications of Fullerenes and Nanostructured Materials
(Fullerenes, Nanotubes, and Carbon Nanostructures / Energy Technology)

Papers are invited in the following areas of fullerenes and carbon nanotubes: electrochemistry, photochemistry, electron transfer chemistry, photoelectrochemistry, photovoltaic applications, catalysis, sensor studies, and applications of fullerenes and related compounds (carbon nanotubes, organofullerenes, electroactive fullerenes, supramolecular fullerenes, organometallic fullerenes, endohedral fullerenes, fullerene films, and composites).

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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**, Wichita State University, e-mail: Francis.DSouza@wichita.edu; **S. Fukuzumi**, Osaka University, e-mail: fukuzumi@chem.eng.osaka-u.ac.jp; **D. M. Guldi**, Friedrich-Alexander-Universität, Erlangen-Nürnberg, e-mail: dirk.guldi@chemie.uni-erlangen.de; and **V. R. Subramanian**, Washington University, e-mail: vsubramanian@seas.wustl.edu.

H2 Chemistry of Fullerenes and Carbon Nanotubes
(Fullerenes, Nanotubes, and Carbon Nanostructures)

The purpose of this symposium is to provide a forum for the presentation of original research concerned with all aspects of chemical functionalization of fullerenes and carbon nanotubes. This rapidly growing area includes nucleophilic and radical additions, cyclo-additions, hydrogenations, transition metal complex formation, oxidations, and reactions with electrophiles. Also included are contributions on multiple additions to fullerenes, ring opening reactions, synthesis of heterofullerenes, as well as studies toward the total synthesis of fullerenes. The mentioned topics may be considered as representative examples and should not be regarded as restrictive.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **N. Martin**, Complutense University, e-mail: nazmar@quim.ucm.es; and **J. F. Nierengarten**, CNRS, ECPM, Lab de Chimie des mat Molecu, e-mail: jfnierengarten@lcc-toulouse.fr.

H3 Carbon Nanotubes and Nanostructures: Fundamental Properties and Processes
(Fullerenes, Nanotubes, and Carbon Nanostructures)

This is one of two related symposia on carbon nanotubes and related materials. This symposium will be focused on fundamental properties and processes in physics, chemistry, and materials science. Topics may include methods for sample preparation and characterization; mechanical, thermal, optical, and electronic properties; chemical and electrochemical behavior; 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: **R. B. Weisman**, Rice University, e-mail: weisman@rice.edu; **S. Doorn**, Los Alamos National Lab, e-mail: skdoom@lanl.gov; and **M. Zheng**, DuPont, e-mail: ming.zheng@usa.dupont.com.

H4 Carbon Nanotubes and Nanostructures: Applications and Devices
(Fullerenes, Nanotubes, and Carbon Nanostructures)

This is the second of two related symposia on carbon nanotubes and related materials. The theme of this symposium is applications of carbon nanomaterials. Topics may include novel applications in the areas of electronic devices, sensors, materials development, solar energy harvesting, catalysis, nano-mechanical devices, biomedicine, environmental remediation, etc.

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2012. 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: **S. Rotkin**, Lehigh University, e-mail: rotkin@lehigh.edu; **Y. Gogotsi**, Drexel University, e-mail: gogotsi@drexel.edu; and **R. Martel**, University of Montreal, e-mail: r.martel@umontreal.ca.

H5 Endofullerenes and Carbon Nanocapsules
(Fullerenes, Nanotubes, and Carbon Nanostructures / Sensor)

Original papers are solicited on all aspects of endofullerenes such as endohedral metallofullerenes and endohedral rare-gas and other types of fullerenes. Papers on carbon nanocapsules and metal encapsulates are also welcome. The topics of this symposium include synthesis, characterization, and properties of different types of endofullerenes and carbon nanocapsules.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **L. Echegoyen**, NSF, e-mail: lechegoy@nsf.gov; **T. Akasaka**, University of Tsukuba, e-mail: akasaka@tara.tsukuba.ac.jp; and **A. Balch**, University of California, e-mail: albalch@ucdavis.edu.

H6 Carbon Nanotubes and Nanostrucutes: Medicine and Biology
(Fullerenes, Nanotubes, and Carbon Nanostructures / Sensor)

Original papers are solicited on all aspects of pharmaceutical, biological, biotechnology, and medical applications of fullerenes, metallofullerenes, and nanotubes.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **T. Da Ros**, Universita di Trieste, e-mail: daros@univ.trieste.it; **Z. Aguilar**, Ocean Nano Tech, LLC, e-mail: zapaguilar@yahoo.com; **A. Hirsch** Friedrich-Alexander-Universität, Erlangen-Nürnberg, e-mail: andreas.hirsch@chemie.uni-erlangen.de; **A Simonian**, Auburn University, e-mail: als@eng.auburn.edu; and **L. Wilson**, Rice University, e-mail: durango@ruf.rice.edu.

H7 Porphyrins and Supramolecular Assemblies
(Fullerenes, Nanotubes and Carbon Nanostructures / Sensor)

The purpose of this symposium is to highlight recent advances in porphyrin chemistry. Through this symposium, we intend to cover a wide range of topics in order to generate discussions between interdisciplinary participants and favor the exchange of new ideas. We are thus soliciting 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.

Submission of papers is encouraged in the following topics: (1.) new challenging multi-porphyrinic devices; (2.) electronic properties of porphyrinic arrays; (3.) photoinduced processes in molecular and supra-molecular 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: **N. Solladie**, LCC-CNRS, Lab de Chimie de Coordination-G2SP, e-mail: solladie@lcc-toulouse.fr; **K. Kadish**, University of Houston, e-mail: kkadish@uh.edu; and **R. Paolesse**, University of Rome Tor Vergata, e-mail: Roberto.paolesse@uniroma2.it.

H8 Nanostructures for Energy Conversion
(Fullerenes, Nanotubes, and Carbon Nanostructures / Energy Technology)

Metal and semiconductor nanoparticles play an important role in fuel cells, solar energy conversion, catalyses and hydrogen production. The recent advances in the area of nanostructured materials have led to new understanding of the catalytic and photoelectrochemical properties of these nanomaterials and composites. Papers are invited in the following areas: synthesis and characterization of metal nanoparticles; functionalization with chromophores, bimetallic particles, and semiconductor-metal composites; size and shape 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, e-mail: imahori@kyoto-u.ac.jp; and **P. V. Kamat**, Dept. of Chemistry & Biochemistry, Radiation Laboratory, University of Notre Dame, e-mail: pkamat@nd.edu.

H9 Chemistry and Physics of Graphene and 2D Nanostructures
(Fullerenes, Nanotubes, and Carbon Nanostructures / Energy Technology)

The symposium focuses on the synthesis, functionalization, characterization, and physical and chemical properties of graphene and graphene based 2D nanostructures. Papers that describe optical, electrical, and electrochemical properties of these carbon nanostructures and composites, and their application in catalysis, batteries, fuel cells, optoelectronics, and solar energy conversion systems will be considered in 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: **P. V. Kamat**, Dept. of Chemistry & Biochemistry, Radiation Laboratory, University of Notre Dame, e-mail: pkamat@nd.edu; **H. Grebel**, Dept. of Electrical and Computer Eng., New Jersey Institute of Technology, e-mail: grebel@njit.edu; and **R. Haddon**, UC Riverside, e-mail: haddon@ucr.edu.

I — Physical and Analytical Electrochemistry

I1 Physical and Analytical Electrochemistry General Session
(Physical and Analytical Electrochemistry)

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: **R. Mantz**, Army Research Office, robert.a.mantz@us.army.mil.

I2 Biological Fuel Cells 5
(Physical and Analytical Electrochemistry / Energy Technology)

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 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: **S. Calabrese Barton**, Michigan State University, e-mail: scb@msu.edu; **P. Atanassov**, University of New Mexico, e-mail: plamen@unm.edu; and **S. Minteer**, University of Utah, e-mail: minteer@chem.utah.edu.

I3 Electroanalytical Chemistry Applied to Biomedical Applications
(Physical and Analytical Electrochemistry / Organic and Biological Electrochemistry / Sensor)

This symposium invites papers in the all areas of electroanalytical chemistry for biological applications. Papers on a wide scope of electrochemistry applied to diagnostics, electrotherapy, neurochemistry, cardiology, and biomaterials are invited. Topics covered include: amperometric and potentiometric biosensors, development of chemically modified electrode for sensing metabolites, inhibitors, and other biological molecules, self powered sensors, amperometric sensing on a microchip, and spectroelectrochemical techniques for understanding molecular biology.

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I4 Electrocatalysis Applied to Fuel Cells and Electrolyzers
(Physical and Analytical Electrochemistry / Energy Technology)

This symposium will cover the fundamental and applied aspects of electrode processes of relevance to fuel cell technology and development of electrolyzers. It will include such topics as: fundamental kinetics and mechanisms of multi-step reactions occurring at anodes and cathodes of fuel cells, photocells and electrolyzers; kinetics and mechanisms of poisoning and other electrode degradation processes; modeling, simulation, and evaluation of electrode microstructure/performance relationships and related phenomena; mechanisms and kinetics at the molecular level; interfacial aspects; novel electrode materials; new techniques to probe electrocatalytic and photoelectrocatalytic reactions; and electrode processes related to reversible fuel cells. The symposium will include both invited and contributed papers on all aspects of the chemistry, physics and materials engineering related to electrocatalysis applied to fuel cells and electrolyzers. The goal would be to bring together scientists of different backgrounds that are active in the areas mentioned above. Due to the number of papers expected, some may be selected for a poster session.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **P. J. Kulesza**, University of Warsaw, e-mail: pkulesza@chem.uw.edu.pl; **S. Fiechter**, Helmholz Center, e-mail: fiechter@helmholtz; **R. Marassi**, Camerino University, e-mail: roberto.marassi@unicam.it; and **R. Narayan**, Michigan State University, e-mail: narayan@msu.edu.

I5 Exploiting Magnets in Electrochemistry
(Physical and Analytical Electrochemistry)

Magnetic effects on electrochemical systems arise through interactions of magnetic fields on dynamics of transport and electron transfer. This symposium explores all aspects of magnetic interactions with electrochemical systems. Topics of interest include, but not limited to: *transport* – magnetohydrodynamics, gradient field transport, redox magnetohydrodynamics, field driven microfluidics, transport control; *electron transfer* – theory, rates, catalysis; *processes* – corrosion, magnetoelectrolysis, magnetoelectrosynthesis, electrorefining, deposition; *structures* – actuation in electrode structures, nanoparticles; and *systems* – biology, polymers, electrochemical power systems, separations, assays, analysis, liquid crystals. Theory, models, and speculation subject to thermodynamics are welcome.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **J. Leddy**, University of Iowa, e-mail: johna-leddy@uiowa.edu; and **I. Fritsch**, University of Arkansas, e-mail: ifritsch@uark.edu.

I6 Fundamental Aspects of the Electrochemical and Interfacial Properties of Carbon Nanostructures
(Physical and Analytical Electrochemistry / Battery)

Carbon nanostructures, such as carbon buckyballs, carbon nanotubes, nanowires, nanorods, graphenes, carbon fibers with micro- and meso-pores, and their variations; present a unique set of materials with interesting properties for electrochemical processes and energy storage applications. With a significant range of specific surface area and porosity distributions, accompanied with surface modifications that can be performed on these materials, many promising applications have been proposed and investigated. Papers that address the fundamental aspects of these carbon nanostructures are welcome.

Particularly interested are those dealing with the electrochemical and interfacial properties of this class of materials. Discussions that use electrodes, cells, or devices that illustrate such properties and relevant phenomena to facilitate the understanding of the electrochemical and interfacial properties of these nanostructures are also welcome.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **H. Martin**, Case Western Reserve University, e-mail: hbm@case.edu; and **B. Y. Liaw**, University of Hawaii, e-mail: bliaw@hawaii.edu.

I7 Recent Advances in Spectro-Electrochemistry
(All Divisions)

The symposium will provide an interdisciplinary forum to discuss new spectroscopic results as well new concepts and methodologies in the field of interfacial spectro-electrochemistry (with the focus on chemical biology). True revolution in force in recent years is due to application of new spectroscopic methods of surface studies with atomic-level specificity. One of the objectives of this symposium is to provide better understanding of interfacial reactions and help with synthesizing new catalytic materials, including, or begin with new bio-catalysts. A continuous addition of new spectral experimental tools for investigations of surface processes on fuel cell catalysts (membranes) and on model surfaces supports a rapid growth of the field. The progress in theory and experiment is intimately connected to surface science and heterogeneous catalysis where the demand for spectral data is overwhelming.

The focus is on use of vibrational techniques, but papers describing applications of synchrotron X-ray radiation may be submitted and will be accepted. The following topics will be highlighted: (1.) new methods of spectro-electrochemistry (novel approaches); (2.) biochemical and biological samples; (3.) new spectral theories: accuracy and predictability; (4.) factors that affect sensitivity, S/N; (5.) new spectral data illuminating processes involved in PEM electrocatalysis and in bio-fuel cells (relate to ligand or electronic mechanisms and to the ensemble effects); (6.) intermediates: stable vs. transient in a spectro-electrochemical experiment; and (7.) single crystal electrodes (adsorbates and deposits).

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **A. Wieckowski**, University of Illinois, e-mail: awieckow@uiuc.edu; and **S. Mukerjee**, Northeastern University, e-mail: s.mukerjee@neu.edu.

I8 Electrochemical Impedance Spectroscopy: Modeling and Interpretation
(Physical and Analytical Electrochemistry / Corrosion/ Industrial Electrochemistry and Electrochemical Engineering/ Sensor)

The purpose of this symposium is to bring together leading experts working in areas of electrochemical impedance spectroscopy, including development of new techniques and application to electrochemical systems. Papers are sought that emphasize development of models for the impedance response of electrochemical systems that are based on mathematical descriptions of physical processes and chemical or electrochemical reactions. The systems under study may include corrosion; electronic and ionic conducting polymers and coatings; energy storage systems; batteries; fuel cells; biological, biocellular, and biomedical sensors; solid electrolytes; electronic conductors; and systems for study of electrochemical kinetics. Papers are also sought which show the application of such models for the interpretation of impedance data. The aim is to show the power of electrochemical impedance spectroscopy for understanding electrochemical systems: characterizing homogeneous and heterogeneous materials by their charge transport and dielectric properties, recognizing effects and signatures of surface layers, studying space charge regions at the interfaces or in the bulk solution, determining kinetics of electrochemical and chemical reactions.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **P. Vanysek**, Northern Illinois University, e-mail: pvanysek@niu.edu; **D. C. Hansen**, University of Dayton e-mail: douglas.hansen@udri.udayton.edu; **V. Lvovich**, Crane Aerospace & Electronics, e-mail: vadim.lvovich@craneaerospace.com; and **M. E. Orazem**, University of Florida, e-mail: e-mail: meo@che.ufl.edu.

J — Sensors and Displays: Principles, Materials, and Processing

J1 Sensors, Actuators, and Microsystems General Session
(Sensor)

This symposium addresses all aspects of sensor, actuator and microsystems research and development. The inclusion of sensors and actuators into a range of application environments has been significantly increasing in order to provide improved system capabilities such as increased performance, decreased environmental impact, or higher efficiency. 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 sensors, actuators and microsystems not covered in other sessions. Both basic and applied aspects of sensor R&D are of interest in this symposium.

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. High temperature and low temperature applications will be discussed. 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 routes for the synthesis of materials with grain (pore) size control and distributions; (3.) novel sensor and actuator concepts, design, modeling and verification; (4.) sensing systems that include sampling systems and actuators, for example sensor arrays, electronic noses and tongues; (5.) physical, chemical and biological sensors and actuators, such as gas and liquid phase sensors, humidity, ion or molecular sensors, their system integration and actuating functions; (6.) optical, RF and wireless sensors and actuators, such as fiber optic sensors, microwave sensors, and optical and wireless integrations; (7.) emerging technologies and applications including sensors based on nanotechnology; and (8.) 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: **M. Carter**, KWJ Engineering, Inc., e-mail: mtcarter62@comcast.net; **Z. Aguilar**, Ocean Nano Tech, LLC, e-mail: zapaguilar@yahoo.com; **B. Ward**, Makel Engineering, Inc., e-mail: bward@makelengineering.com; and **N. Wu**, West Virginia University, e-mail: nick.wu@mail.wvu.edu.

J2 Nano/Bio Sensors
(Sensor)

This symposium will address all aspects of nano/bio sensors using nanomaterials as well as other materials. Nanomaterials have structural features and properties in between those of single atoms/molecules and continuous bulk materials. Nanomaterials have at least one dimension in the nanometer range (1 nm = 1 x 10-9 m). The nanoscale dimensions of nanomaterials bring optical, electronic, magnetic, catalytic and other properties that are distinct from those of atoms/molecules or bulk materials. In order to exploit the special properties that arise due to the nanoscale dimensions of materials, researchers must control and manipulate the size, shape, and surface functional groups of nanomaterials and structure them into periodically ordered assemblies to create new products, devices and technologies or improve existing ones. The art of controlling/manipulating the properties and utilizing these nanomaterials for the purpose of building microscopic machinery is termed as nanotechnology.

Papers are solicited in nanostructure technology that has opened up a new perspective for the development of improved bio sensors. These sensors are employed in the areas of medicine, food, agriculture, industry, and environmental monitoring. These technological innovations have improved the sensitivity, accuracy, and flexibility for the analysis of chemical and biochemical compounds. Moreover, the recent progress in micro and nanotechnology allows a cost effective production of miniaturized devices in various types of materials. Progress in polymer micro technology providing the opportunity of using disposable devices in various fields of application is also solicited. As a result, life sciences research and development methods are becoming faster, more automated, and less subjective or error prone. Furthermore, nano/biosensors that are used as novel tools for the analysis of genetic structures and their influence on cellular functions that allows the entire focus of medicine to shift from diagnosis and treatment to identification and prevention are amongst the current hot topics in sensors. These technologies may also augment drug discovery with diagnostics that could eventually allow widespread production of individually tailored patient-specific treatments and therapies.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **A Simonian**, Auburn University, e-mail: als@eng.auburn.edu; **Z. P. Aguilar**, Ocean Nano Tech, LLC, e-mail: zapaguilar@yahoo.com; **B. Chin**, Auburn University, e-mail: bchin@eng.auburn.edu; **J Li**, NASA, e-mail: jing.li-1@nasa.gov; and **L. Nagahara**, NIH, e-mail: nagaharl@mail.nih.

J3 Sensors for Safety and Security
(Sensor / Physical and Analytical Electrochemistry / New Technology Subcommittee)

Chemical and biological sensors have become an indispensable part of our technology-driven society and can be found in chemical process, pharmaceutical, food, biomedical, and environmental, clinical, indoor monitoring applications, security, and industrial safety to name just a few. This is a new symposium that aims to address the research and development of sensors that play or will play a role in maintaining desired margins of safety for humans, infrastructure, and the environment and welcomes papers loosely pertaining to applications in this regard. The scope of papers will include electrochemical based sensors (both high and low temperature electrolyte systems) as well as sensors based on other chemical sensing principles or hybrid approaches. Particular emphasis is placed on countering new, emerging threats from terrorism and organizations threatening to undermine homeland security for many nations. The desire to protect people and the environment is global in nature and sensors will play an ever expanding role to this end.

Papers for this symposium will be diverse and are solicited in, but not limited to the following areas: (1.) food, water supply, and agriculture safety; (2.) detection of toxic air and water-born substances; (3.) detection of chemical warfare agents; (4.) biological warfare agents; (5.) explosives and energetic materials including protection against a surge in availability of homemade explosives; (6.) hydrogen safety sensors for vehicle and infrastructure protection; (7.) air quality sensors for aircraft cabins; and (8.) novel techniques to expand and ensure sensor stability, reliability, and lower costs.

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