



call for papers



Home of the 2010 Olympic Winter Games

217th ECS Meeting
VANCOUVER, CANADA

April 25-30, 2010

Fairmont Hotel Vancouver * Hyatt Regency Vancouver

The 217th ECS Meeting will be held from April 25-30, 2010. 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.

Abstracts are due no later than November 16, 2009.

Please carefully check the symposium listing for any alternate abstract submission deadlines. For complete details on abstract submission and symposia topics, please see www.electrochem.org.

Abstract Submission and Deadlines

Submit one original meeting abstract electronically via www.electrochem.org, no later than **November 16, 2009**. Faxed abstracts, late abstracts, and abstracts more than one page in length will not be accepted. In January 2010, all presenting authors will receive an email from the ECS headquarters office notifying them of the date and time of their presentation. Only authors with a non-U.S. address 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 preformatted template located at: http://www.electrochem.org/meetings/guidelines/inst_a.htm. Programming for this meeting will occur in January of 2010, 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 of 2010. Oral presentations must be in English. Only LCD projectors will be provided for oral presentations. **Presenting authors will be required to bring their own laptops to the meeting.** We strongly suggest that presenting authors verify laptop/projector compatibility in the speaker ready room 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 4 feet high by 8 feet wide (1.22 meters high by 2.45 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 CD-ROM 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://ecsd.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 and young faculty seeking financial assistance should consider awarded travel grants (see the last pages of this Call for Papers.)

Hotel Reservations

The 217th Meeting will be held in Vancouver, BC, Canada, at both the Fairmont Hotel Vancouver (900 West Georgia Street) and the Hyatt Regency Vancouver (655 Burrard Street). Special rates have been reserved at both properties for participants attending this meeting. The reservation deadline is **March 26, 2010**. Please refer to ECS website for rates and reservations.

Meeting Registration

All participants, including authors and invited speakers of the 217th Meeting, are required to pay the appropriate registration fees. Hotel and meeting registration materials will be distributed in February of 2010 and will also be available on the ECS website (www.electrochem.org). The deadline for advance registration is **March 26, 2010**.

Short Courses

A number of short courses will be offered on Sunday, April 25, 2010, from 9:00 AM-4:30 PM. Short Courses **require advance registration** and may be cancelled if enrollments are too low. The Short Courses topics as of press-time are: Advanced Impedance Spectroscopy; Biofuels for Electrochemical Systems; Molecular Electronics; Interfaces, Traps, and Defects in High-k Gate Stacks; Scientific Writing; and Fundamentals of Solid-State Devices.

Technical Exhibit

The 217th 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 \$1,900 and include one free meeting registration. Literature display tables (unmanned by company representatives; no meeting registration included) will also be available for \$900. Coffee breaks are scheduled each day in the exhibit hall along with evening poster sessions to increase traffic.

Sponsorship Opportunities

The 217th ECS meeting provides an opportunity for your company to distinguish itself among industry leaders. Sponsor levels include recognition in *Interface*, the Meeting Program, the Exhibit Guide, on the registration bags, the ECS website, and in signage throughout the meeting. The Levels are: Platinum: \$5,000+, Gold: \$2,500+, Silver: \$1,000+, and Bronze: less than \$1,000. Additional opportunities to support the plenary talks, Student Mixer, Student Awards, and receptions are also available. For more information, contact Karla Stein at ECS headquarters 609.737.1902 or karla.stein@electrochem.org.

Contact Information

If you have any questions or require additional information, contact ECS, 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 — Nanotechnology General Session

B Batteries, Fuel Cells, and Energy Conversion

- B1 — Batteries and Energy Technology Joint General Session
- B2 — Advanced Organic and Inorganic Materials for Electrochemical Power Sources
- B3 — Batteries for Renewable Energy Storage
- B4 — Biological Fuel Cells 4
- B5 — Combinatorial Screening of Materials for Energy Conversion and Storage
- B6 — Economics and Policy Issues in Energy Conversion, Transmission, and Storage
- B7 — Electrode Processes Relevant to Fuel Cell Technology
- B8 — High Temperature Catalysis
- B9 — Hysteresis Phenomena in Energy Storage and Conversion
- B10 — Intercalation Compounds for Energy Conversion and Storage
- B11 — Ionic and Mixed Conducting Ceramics 7
- B12 — Metal/Air and Metal/Water Batteries

C Biomedical Applications and Organic Electrochemistry

- C1 — Electrochemistry in Medicine and Biomedical Applications
- C2 — Manuel M. Baizer Award Symposium on Organic Electrochemistry
- C3 — Organic and Biological Electrochemistry General Poster Session

D Corrosion, Passivation, and Anodic Films

- D1 — Corrosion General Session

E Dielectric and Semiconductor Materials, Devices, and Processing

- E1 — Advanced Gate Stack, Source / Drain, and Channel Engineering for Si-Based CMOS 6: New Materials, Processes, and Equipment
- E2 — Dielectrics for Nanosystems 4: Materials Science, Processing, Reliability, and Manufacturing
- E3 — Integrated Optoelectronics 5
- E4 — Nanoscale Luminescent Materials
- E5 — Thermal and Plasma CVD of Nanostructures and their Applications
- E6 — Wide-Bandgap Semiconductor Materials and Devices 11
- E7 — Graphene, Ge/III-V, and Emerging Materials for Post-CMOS Applications 2

F Electrochemical / Chemical Deposition and Etching

- F1 — Dealloying Process and Related Synthetic Opportunities
- F2 — Electrochemical Engineering for the 21st Century (dedicated to Richard C. Alkire)

G Electrochemical Synthesis and Engineering

- G1 — Industrial Electrochemistry and Electrochemical Engineering General Session
- G2 — Characterization of Porous Materials 3
- G3 — Electrochemical Technologies for Hydrogen Production
- G4 — Electrochemistry in Mineral and Metal Processing 8 (EMMP 8)
- G5 — Fuel Cell Membranes, Electrode Binders, and MEA Performance
- G6 — Tutorials in Electrochemical Technology: Design

H Fullerenes, Nanotubes, and Carbon Nanostructures

- H1 — Electron Transfer and Applications of Fullerenes and Nanostructured Materials
- H2 — Molecular and Supramolecular 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 — Energetics and Structure and Solid-State Physics
- H7 — Carbon Nanotubes and Nanostructures: Medicine and Biology
- H8 — Porphyrins and Supramolecular Assemblies
- H9 — Nanostructures for Energy Conversion
- H10 — Chemistry and Physics of Graphene and 2D Nanostructures

I Physical and Analytical Electrochemistry

- I1 — Physical and Analytical Electrochemistry General Session
- I2 — Electrochemical Detection in Molecular Biology
- I3 — Charge Transfer: Electrons, Protons, and other Ions
- I4 — Progress in Spectro-Electrochemistry and Surface Science of Electrocatalytical Interfaces (in memory of E. B. Yeager)
- I5 — In Situ Scanning Probe Microscopy and Spectroscopy in Electrochemistry

J Sensors and Displays: Principles, Materials, and Processing

- J1 — Sensors, Actuators, and Microsystems General Session
- J2 — Electrochemical Nano/Bio Sensors 2
- J3 — Sensors for Energy and Environment

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 May 28, 2010. 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. Desai Chaitanya**, New Mexico State University, e-mail: vimalc@nmsu.edu; **G. Botte**, Ohio University, e-mail: botte@ohio.edu, **V. R. Subramanian**, Tennessee Tech. Univ., e-mail: vsubramanian@tntech.edu, and **K. Sundaram**, Univ. of Central Florida, e-mail: sundaram@mail.ucf.edu.

A2 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 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 electrochemistry applications. Papers are solicited in all areas related to materials including metals, ceramics, semiconductors, molecular electronics, and organic compounds and polymers, and to devices including molecular/nano electronics, chemical and biological sensors, and actuators.

Areas of interest include: 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; nanostructured sensor surfaces; and biological applications of nanomaterials.

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text manuscript for the issue no later than May 28, 2010. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **W. van Schalkwijk**, EnergyPlex Corp, e-mail: walter@energyplex.com; **C. Bock**, National Research Council of Canada, Institute for Chemical Processes and Environmental Technologies, e-mail: Christina.Bock@nrc-cnrc.gc.ca; and **E. Traversa**, International Research Center for Materials Nanoarchitectonics (MANA), National Institute for Materials Science (NIMS), Tsukuba, Japan, e-mail: traversa.enrico@nims.go.jp.

B — Batteries, Fuel Cells, and Energy Conversion

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

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.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **W. van Schalkwijk**, EnergyPlex Corp., e-mail: walter@energyplex.com; and **S. R. Narayan**, Jet Propulsion Laboratory, e-mail: s.r.narayanan@jpl.nasa.gov.

B2 Advanced Organic and Inorganic Materials for Electrochemical Power Sources (Battery / Energy Technology / Industrial Electrochemistry and Electrochemical Engineering)

The development of advanced high-performance power sources is intimately determined by the availability of advanced organic and inorganic materials. Designing batteries, fuel cells, and supercapacitors with high-specific energy and power, long-cycle life and rapid-charge/discharge rates requires a deeper understanding of the relationship between materials structures and properties. Interfaces between reactive materials with tailored properties and exceptional stability are also needed. Specific areas to be covered in this symposium include but not limited to: (1.) electrode design, synthesis, and characterization; (2.) electrolyte design, synthesis, and characterization; (3.) interface studies; (4.) failure modes and mechanisms of materials in electrochemical power sources; and (5.) performance and safety characteristics of electrochemical power sources containing advanced materials.

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Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to

the symposium organizers: **X. Zhang**, North Carolina State University, e-mail: xiangwu_zhang@ncsu.edu; **D. Chu**, the US Army Research Laboratory, e-mail: dchu@arl.army.mil; **P. S. Fedkiw**, North Carolina State University, fedkiw@eos.ncsu.edu; and **C. Wang**, University of Maryland, e-mail: cswang@umd.edu.

B3 Batteries for Renewable Energy Storage (Battery / Energy Technology / Industrial Electrochemistry and Electrochemical Engineering)

Rechargeable batteries are an efficient electric energy storage medium and thus an essential element of emerging renewable energy generation, smart grid, and distributed energy resources. Due to the asynchronous nature of the power generation from renewable energy and demand cycles, battery systems for storage applications will require a unique set of performance characteristics. Improvements in battery material, chemistry, cell design, system configuration, operating management, and performance characteristics will be necessary to enable high efficiency, lower cost, high power, and high energy rechargeable battery storage applications. This symposium invites contributed papers that describe improved materials and components for all battery chemistries. Additionally, reports of improvements in cell and battery pack design and development that are suitable for renewable energy storage are invited. Studies of battery control systems and algorithms as well as system studies of grid-connected energy storage systems are welcome.

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Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **D. H. Doughty**, Battery Safety Consulting Inc., e-mail: dhoughty@batterysafety.net; **B. Y. Liaw**, Hawaii Natural Energy Institute, SOEST, University of Hawaii, e-mail: bliaw@hawaii.edu; **S. Narayan**, Jet Propulsion Laboratory, e-mail: narayan@jpl.nasa.gov; and **V. Srinivasan**, Lawrence Berkeley National Laboratory, e-mail: vsrinivasan@lbl.gov.

B4 Biological Fuel Cells 4 (Energy Technology / Physical and Analytical Electrochemistry / Organic and Biological Electrochemistry)

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 the 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; **K. Kano**, Kyoto University, e-mail: kkano@kais.kyoto-u.ac.jp; **S. Minteer**, Saint Louis University, e-mail: minteers@slu.edu; and **I. Taniguchi**, Kumamoto University, e-mail: taniguch@gpo.kumamoto-u.ac.jp.

B5 Combinatorial Screening of Materials for Energy Conversion and Storage (Energy Technology / Battery / Industrial Electrochemistry & Electrochemical Engineering)

Papers are solicited describing new research related to combinatorial screening of materials for energy conversion and storage. Applications of interest include (but are not limited to) batteries, fuel cells, capacitors, and electrolyzers. Papers describing new or improved experimental methods for combinatorial screening will also be welcome.

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Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **V. Ramani**, Department of Chemical and Environmental Engineering, Illinois Institute of Technology, e-mail: ramani@iit.edu; **J. Dahn**, Dalhousie University, e-mail: jeff.dahn@dal.ca; and **K. Rajeshwar**, Department of Chemistry and Biochemistry, University of Texas at Arlington, e-mail: rajeshwar@uta.edu.

B6 Economics and Policy Issues in Energy Conversion, Transmission, and Storage (Energy Technology / High Temperature Materials / Battery)

The successful implementation of an energy technology can depend strongly on economic and policy influences. In traditional technical fields, however, these "big picture" issues are frequently overlooked, and most of the focus is instead given to basic and applied science innovation. For this reason, an examination of the many relationships between science, technology, economics, and policy for energy devices is valuable, and inter-disciplinary research in these overlapping fields can lead to insights that can inform more efficient and meaningful basic research.

To this end, we welcome abstracts describing work that is aimed at elucidating the economic and/or policy implications of energy conversion, transmission, and storage technologies. Examples of topics include (but are not limited to): cost analyses at a materials or systems level, life cycle analyses (including recycling issues, environmental impact, carbon footprint analyses, and energy balance determination), lifetime/degradation issues, incentive structures/programs,

scalability issues, commodity market analyses, systems integration and efficiency analyses, operational costs, and international/cross boarder technology development issues. Other related topics will also be favorably considered.

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Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **J. Whitacre**, Carnegie Mellon University, e-mail: whitacre@andrew.cmu.edu; **B. Y. Liaw**, University of Hawaii, e-mail: bliaw@hawaii.edu; and **E. Traversa**, International Research Center for Materials Nanoarchitectonics (MANA), National Institute for Materials Science (NIMS), Tsukuba, Japan, e-mail: traversa.enrico@nims.go.jp.

B7 Electrode Processes Relevant to Fuel Cell Technology (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 will include such topics as: fundamental kinetics and mechanisms of multi-step reactions occurring at fuel cells anodes and cathodes; kinetics and mechanisms of poisoning and other electrode degradation processes; modeling, simulation, and evaluation of electrode microstructure/performance relationships and related phenomena; computational modeling of fuel cell reaction mechanisms and kinetics at the molecular level; interfacial aspects; novel electrode materials; new techniques to probe fuel cell electrode reactions; and electrode processes related to reversible fuel cells.

The symposium will include both invited and contributed papers on all facets of the chemistry, physics, physical chemistry and electrochemistry of electrode processes related to fuel cells. 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 the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **V. I. Birss**, University of Calgary, e-mail: birss@ucalgary.ca; **P. Kulesza**, University of Warsaw, pkulesza@alfa.chem.uw.edu.pl; and **W. Mustain**, University of Connecticut, mustain@engr.uconn.edu.

B8 High Temperature Catalysis (High Temperature Materials / Energy Technology)

This session invites papers on experimental aspects of materials that can be used in high temperature catalytic processes. The session focuses on high temperature materials in energy related applications such as reforming of hydrocarbons, carbon dioxide sequestration, and production of fuels.

Materials synthesis, characterization, surface properties, catalytic activities at high temperatures, and materials stability are topics of interest for this session.

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text manuscript for the issue no later than May 28, 2010. 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: **X. Zhou**, Pacific Northwest National Laboratory, e-mail: xiaodong.zhou@pnl.gov; **S. Adler**, University of Washington, e-mail: stuadler@u.washington.edu; and **V. (Ravi) Subramanian**, University of Nevada, Reno, e-mail: ravisv@unr.edu.

B9 Hysteresis Phenomena in Energy Storage and Conversion (Energy Technology)

This symposium will provide a forum to discuss issues related to hysteresis and phase-change phenomena in energy conversion and storage systems. In many systems, there exist multiple steady states and history-dependent phenomena. In some cases, hysteresis is independent of the rate of change of the independent variables; in others, the effect exists only when the system is traversed at finite rates, and is therefore related to kinetic phenomena. It is intended that this symposium will be a means of sharing information about the characterization and description of these phenomena among researchers whose work might otherwise be focused on just one specific application or set of materials.

These phenomena show up in a variety of systems. The following list is far from comprehensive, but should indicate the breadth of topics in which these phenomena appear: intercalation materials with multiple phases; electrocatalyst materials whose surface properties change as a function of potential, as in oxide-covered electrocatalysts; polymer systems with microstructures; equilibrium properties and transport properties that can change in response to local external conditions; and multiphase flow systems.

Researchers are encouraged to submit papers on characterization and identification of the mechanisms related to hysteresis, modeling of hysteresis phenomena, and control of systems exhibiting this behavior.

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Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **J. Meyers**, University of Texas, e-mail: jeremypmeyers@mail.utexas.edu; and **V. Srinivasan**, Lawrence Berkeley National Laboratory, e-mail: vsrinivasan@lbl.gov.

B10 Intercalation Compounds for Energy Conversion and Storage (Energy Technology / Battery)

This symposium will provide an international forum to discuss recent progress that has been made in the development of intercalation compounds for energy conversion and storage. The symposium will focus on both basic and applied research findings that have led to improved materials and to the understanding of the fundamental processes that determine and control electrochemical performance. A major (but not exclusive) theme of the symposium will be intercalation anodes and cathodes for batteries based on lithium or hydrogen transport. Specific topics of interest include: (1.) synthesis and characterization; (2.) materials processing and engineering; (3.) structure and reaction mechanisms; (4.) electrochemical properties and cell performance; (5.) structural stability as a function of state-of-charge and cycling; (6.) fundamental aspects of redox processes and charge transfer; (7.) physical

characterization of intercalation compounds, including NMR, electronic, magnetic, spectroscopic, and other methods; and (8.) theoretical modeling of intercalation compounds and electrochemical processes. Papers will be presented in both oral and poster sessions. Each session will contain both invited and contributed papers.

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Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **K. Zaghbi**, Institut de Recherche d'Hydro-Québec (IREQ), e-mail: zaghbi.karim@ireq.ca; **K. M. Abraham**, E-KEM Sciences, e-mail: kmabraham@comcast.net; **C. Julien**, Université P et M. Curie, e-mail: cjul@ccr.jussieu.fr; and **Z. Ogumi**, Kyoto University, e-mail: ogumi@sci.kyoto-u.ac.jp.

B11 Ionic and Mixed Conducting Ceramics 7 (High Temperature Materials / Energy Technology)

Ceramic materials that exhibit high ionic conduction or significant levels of both ionic and electronic conduction continue to be of great interest among researchers worldwide. This symposium will provide a forum to share data and discuss activities in this exciting field. Both fundamental and applied aspects of ionic conduction 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, electrolyzers, fuel cells, and batteries; mechanisms of mixed conduction in ceramics; role of microstructure in conduction; dense ceramic membranes for separation and chemicals production; electrocatalytic phenomena; ceramic sensors; electrochemistry of nano ceramics; 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 January 15, 2010. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **M. Mogensen**, Risoe National Laboratory, e-mail: mogens.mogensen@risoe.dk; **T. Armstrong**, Carpenter Technology Corporation, email: tarmstrong@cartech.com; **W. Chiu**, University of Connecticut, e-mail: wchiu@engr.uconn.edu; **T. Gur**, Stanford University, e-mail: turgut@stanford.edu; and **M. Manivanan**.

B12 Metal/Air and Metal/Water Batteries (Energy Technology / Battery)

Metal/air and metal/water batteries possess very high theoretical energy densities and are potentially attractive for a variety of applications. Yet various technical obstacles have hindered their development and kept their potential advantages far from being fully utilized, despite the fact that some systems such as zinc/air batteries with aqueous alkaline electrolytes have long been commercialized for certain niche applications. In recent years there has been a renewed interest in metal/air and metal/water batteries and various new approaches and designs, as well as new materials have been or are being developed. This symposium covers all aspects of metal/air and metal/water batteries.

Topics of interest include but are not limited to: (1.) catalysts for the air electrode and bi-functional catalysts; (2.) design of the air electrode; (3.) anode passivation and kinetics

and design of the anode; (4.) choice of electrolyte; (5.) system design; (6.) non-aqueous and polymer electrolytes, ionic liquids, and metal/air and metal/water batteries based on them; (7.) primary and rechargeable systems; and (8.) applications of metal/air and metal/water batteries.

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Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **K. Zaghbi**, Institut de Recherche d'Hydro-Québec (IREQ), e-mail: zaghbi.karim@ireq.ca; **K. M. Abraham**, E-KEM Sciences, e-mail: kmabraham@comcast.net, e-mail; and **S. R. Narayan**, JPL-NASA, e-mail: s.r.narayanan@jpl.nasa.gov.

C — Biomedical Applications and Organic Electrochemistry

C1 Electrochemistry in Medicine and Biomedical Applications (Organic and Biological Electrochemistry / Sensor / Physical and Analytical Electrochemistry)

The symposium solicits papers covering the aspects of electrochemistry in the field of medicine and biomedical technology. Papers on a wide scope of electrochemistry related to electrotherapy, neurochemistry, cardiology, and biomaterials are invited. Specific areas of interest include (but are not limited to): (1.) electrochemical cancer therapy; (2.) biochemical sensors; (3.) analytical chemistry and diagnostics in medical research; (4.) drug delivery applications; (5.) nerve signal transmission/transduction; (6.) neuro-stimulation; and (7.) cardiac stimulation (power sources in pacemakers and defibrillators).

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Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **C. Bock**, National Research Council of Canada, Institute for Chemical Processes and Environmental Technologies, e-mail: Christina.Bock@nrc-cnrc.gc.ca; **J. Burgess**, Case Western Reserve University, e-mail: jdb22@po.cwru.edu; **B. Eggers**, Bio-Logic USA, LLC., e-mail: bill.eggers@bio-logic.us; **P. Hesketh**, Georgia Institute of Technology, e-mail: peter.hesketh@me.gatech.edu; **C. Holmes**, Greatbatch Inc., e-mail: cholmes@greatbatch.com; and **J. Mauzeroll**, University of Quebec a Montreal, Canada, e-mail: mauzeroll.janine@uqam.ca.

C2 Manuel M. Baizer Award Symposium on Organic Electrochemistry (Organic and Biological Electrochemistry)

This symposium honors the 2010 winner of the Manuel Baizer Award in Organic Electrochemistry. Submissions are invited in all areas of synthetic and mechanistic organic electrochemistry.

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2010. All manuscripts will be submitted online, and must be in either MS Word or PDF format.

Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **A. Fry**, Wesleyan University, e-mail: afry@wesleyan.edu; and **J.-I. Yoshida**, Kyoto University, e-mail: yoshida@sbchem.kyoto-u.ac.jp.

C3

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.

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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.

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 organizers: **D. Hansen**, University of Dayton, e-mail: douglas.hansen@udri.udayton.edu; and **A. Alfantazi**, University of British Columbia, e-mail: alfantaz@interchange.ubc.ca.

E — Dielectric and Semiconductor Materials, Devices, and Processing

E1

Advanced Gate Stack, Source / Drain, and Channel Engineering for Si-Based CMOS 6: New Materials, Processes, and Equipment

(Electronics and Photonics / Dielectric Science and Technology / High Temperature Materials)

This symposium will cover the latest developments in advanced processes and materials for CMOS front-end integration including gate stack, source/drain, and channel engineering. Researchers are encouraged to submit abstracts on novel processes, electrical/analytical characterization, material/device modelling, as well as design and fabrication of new device structures for ultimate CMOS. Topics of particular interest include the following.

(1.) High Mobility Channel Materials: (a.) strained Si, SiGe, pure Ge, and Si:C channels; (b.) GaAs, InGaAs, GaN, and other new III-V channel materials; (c.) integration of III-V channels on Si; and (d.) novel, low-temperature epitaxial processes.

(2.) Advanced Gate Stacks: (a.) high-k gate dielectrics on Si and new high mobility channel materials; and (b.) metal gate electrodes.

(3.) Ultra-Shallow Junctions: (a.) advanced doping and annealing technologies; (b.) dopant activation and diffusion in new channel materials; and (c.) self-aligned or selectively deposited contacts to ultra-shallow junctions.

Researchers are also encouraged to submit abstracts on new developments in advanced processing equipment for the materials and processes listed above. Technologies of interest include but are not limited to: chemical vapor deposition (ALD, MOCVD, RTCVD, UHV-CVD and molecular beam epitaxy), rapid thermal, UV, plasma, or laser-assisted processes. Abstracts on new analytical and electrical characterization methods for the above materials as well as inspection equipment to improve throughput, uniformity, *in situ* monitoring, non-intrusive wafer inspection, and process are also of interest to this symposium.

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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**, Eindhoven University of Technology, e-mail: f.roozeboom@tue.nl; **E. P. Gusev**, Qualcomm MEMS Technologies, e-mail: gusev@qualcomm.com; **H. Iwai**, Tokyo Institute of Technology, e-mail: iwai@ae.titech.ac.jp; **S. J. Koester**, IBM Corp, e-mail: skoester@us.ibm.com; **D-L. Kwong**, Institute of Microelectronics, e-mail: kwongdl@ime.a-star.edu.sg; **M. C. Ozturk**, North Carolina State University, e-mail: mco@ncsu.edu; and **P. J. Timans**, Mattson Technology Inc., e-mail: Paul.Timans@mattson.com.

E2

Dielectrics for Nanosystems 4: Materials Science, Processing, Reliability, and Manufacturing

(Dielectric Science and Technology)

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. 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.

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Abstracts should be submitted electronically to the 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**, IMEP, France, 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.

E3 Integrated Optoelectronics 5 (Electronics and Photonics / Dielectric Science and Technology)

This fifth 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. The symposium will consist of invited as well as contributed papers.

Examples of topics in integrated optoelectronics of interest are: (1.) advanced epitaxial growth and device processing technologies; (2.) applications to diagnostic and screening devices for health care applications; (3.) applications to environmental sciences; (4.) biophotonics and related areas; (5.) current, emerging, and novel materials and devices; (6.) detectors, detector arrays and transmitters; (7.) integration of silicon optoelectronics and electronics circuitry and compound semiconductor components (fabrication issues, reliability and performance); (8.) integrated lasers/modulators or multi-wavelength laser arrays; (9.) integrated optoelectronic passive components; (10.) integration technologies based on quantum well and quantum dot structures; (11.) micro-opto-electro-mechanical systems (MOEMS); (12.) 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.

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Abstracts should be submitted electronically to the 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-nrc.ca.

E5 Thermal and Plasma CVD of Nanostructures and their Applications (Dielectric Science and Technology / Fullerenes, Nanotubes, and Carbon Nanostructures)

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

E6 Wide-Bandgap Semiconductor Materials and Devices 11 (Electronics and Photonics / Sensor / Luminescence and Display Materials)

This symposium will focus on issues pertinent to development of wide-bandgap semiconductor materials and device applications. All inorganic 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.) materials 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 at Charlotte, e-mail: ebstokes@uncc.edu; **G.W. Hunter**, NASA Glenn Research Center, e-mail: ghunter@grc.nasa.gov; **J. Kim**, e-mail: hyunhyun7@korea.ac.kr; and **S. Sarkozy**, Northrop Grumman Space Technology, e-mail: sjs95@cam.ac.uk.

E7 Graphene, Ge/III-V, and Emerging Materials for Post-CMOS Applications 2 (Dielectric Science and Technology)

The objectives of this symposium are to assemble researchers and technical support personnel from industry, universities, and government laboratories around the globe to address all current and future issues related to emerging materials for post-CMOS applications. This symposium will address the fundamental materials science, characterization, and applications of emerging materials designed for alternatives technologies to replace CMOS. Special emphasis on will be placed on "Beyond CMOS" integration schemes / technology development and on the impact of non-traditional materials into nanoelectronics.

Papers will be solicited in the following areas: (1.) emerging research materials science and technology; (2.) emerging research materials processing and modeling; (3.) emerging research materials and process integration issues; (4.) emerging research materials related defect detection and characterization; (5.) electrical characterization of emerging research materials; (6.) ESH of emerging research materials; and (7.) introduction to "More than Moore" and "Beyond CMOS" integration schemes/technology.

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

F — Electrochemical / Chemical Deposition and Etching

F1 Dealloying Process and Related Synthetic Opportunities (Electrodeposition / Corrosion)

Dealloying has been a topic of sustained interest to the metallurgical community dating from the earliest days of the discipline. From the ancient craft of depletion gilding to purification schemes based on critical alloying thresholds, known as "parting limits," dealloying continues to find important practical applications in materials synthesis. At the same time the dissolution process lies at the root of several challenging issues related to the environmental stability and sensitivity of many engineering materials.

Presently, there is an expanding interest in the properties of the resulting nanoporous materials relevant to electrocatalysis, sensors, actuators, and scaffolds for use in a combination of chemical, electrical, mechanical, and optical studies. This symposium intends to bring together a diverse group of researchers interested in understanding the mechanisms of dealloying and the exploration of emerging technical applications of the process and characterization of the resulting properties.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **T. P. Moffat**, NIST, e-mail: thomas.moffat@nist.gov; **J. Erlebacher**, John Hopkins University, e-mail: jonah.erlebacher@jhu.edu; and **R. C. Newman**, University of Toronto, e-mail: roger.newman@utoronto.ca.

F2 Electrochemical Engineering for the 21st Century (dedicated to Richard C. Alkire) (Electrodeposition / Industrial Electrochemistry and Electrochemical Engineering / Corrosion / 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 will 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.

This symposium will be held in honor of Richard Alkire, in recognition of his significant contributions to the discipline of electrochemical engineering and to ECS.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **J. Harb**, Brigham Young University, e-mail: john_harb@byu.edu; **H. Deligianni**, IBM, e-mail: lili@us.ibm.com; **J. Fenton**, University of Central Florida, e-mail: jfenton@fsec.ucf.edu; **K. Hebert**, Iowa State University, e-mail: krhebert@iastate.edu; **V. Subramanian**, Tennessee Tech University, email: VSubramanian@tntech.edu; and **R. Varjian**, AIC Labs, e-mail: richard.varjian@apicap.com.

G — Electrochemical Synthesis and Engineering

G1 Industrial Electrochemistry and Electrochemical Engineering General Session

(Industrial Electrochemistry 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. Contributed papers will be programmed in a related order, depending on the titles and content of the abstracts.

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Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizer: **G. Pillay**, Rowan University, e-mail: pillay@rowan.edu.

G2 Characterization of Porous Materials 3 (Industrial Electrochemistry and Electrochemical Engineering / Physical and Analytical Electrochemistry)

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

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Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **B. Lakshmanan**, Materials System Interface, GM-Fuel Cell, e-mail: balsu.lakshmanan@gm.com; **G. Brisard**, University of Sherbrooke, e-mail: Gessie.Brisard@USherbrooke.ca; **A. Lasia**, University of Sherbrooke, e-mail: A.Lasia@USherbrooke.ca; and **V. Sethuraman**, Lawrence Berkeley Laboratory, e-mail: vasethuraman@lbl.gov.

G3 Electrochemical Technologies for Hydrogen Production (Industrial Electrochemistry and Electrochemical Engineering / Energy Technology / High Temperature Materials)

Hydrogen is the most abundant chemical-energy resource in the world, but unlike oil and natural gas it is an "energy carrier" not an "energy source." There are no H₂ "wells" available in the world. It must be produced from some other primary energy source. Hydrogen is, however, a means to store large quantities of energy. Therefore, it could become a critical link between the mismatch between the supply of renewable energy and demand. The objective of this symposium is to bring

together researchers working in all areas of electrochemical technologies for hydrogen production, including but not limited to solar-hydrogen production, electrolysis, and thermochemical routes to hydrogen production. Papers are solicited on topics ranging from fundamental materials (e.g., electrocatalysis, membranes) to system-level analysis.

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Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **S. N. Lvov**, Pennsylvania State University, e-mail: lvov@psu.edu; **V. (Ravi) Subramanian**, University of Nevada, Reno, e-mail: ravisv@unr.edu; **J. W. Weidner**, University of South Carolina, e-mail: weidner@engr.sc.edu; and **M. Williams**, University of Utah, e-mail: markwilliams1@verizon.net.

G4

Electrochemistry in Mineral and Metal Processing 8 (EMMP 8)

(Industrial Electrochemistry and Electrochemical Engineering)

Papers are solicited on electrochemical aspects of concentrating and extracting base, precious and light metals from their ores and secondary materials, and associated energy and environmental considerations. Both fundamental and applied work will be covered with emphasis placed on recent progress in: (1.) mineral flotation, (2.) hydrometallurgy, (3.) electrowinning and refining, (4.) environmental technologies associated with mineral and metal processing, (5.) electrochemical methods for secondary metal production, and (6.) recovery of metals from wastes.

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Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **R. Woods**, School of Science, Griffith University, e-mail: re_woods@bigpond.net.au; **F. M. Doyle**, University of California, e-mail: fmdoyle@berkeley.edu; and **G. Kelsall**, Department of Chemical Engineering, Imperial College London, e-mail: g.kelsall@imperial.ac.uk.

G5

Fuel Cell Membranes, Electrode Binders, and MEA Performance

(Industrial Electrochemistry 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 ("binders") 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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Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **B. Pivovar**, National Renewable Energy Laboratory, e-mail: bryan_pivovar@nrel.gov; **P. Pintauro**, Department of Chemical and Biomolecular Engineering, Vanderbilt University, e-mail: peter.pintauro@vanderbilt.edu; and **J. Muldoon**, Toyota Research Institute of North America, e-mail: john.muldoon@tema.toyota.com.

G6

Tutorials in Electrochemical Technology: Design

(Industrial Electrochemistry and Electrochemical Engineering / Energy Technology)

This symposium provides a forum for tutorial presentations concerning all aspects of design methodology related to electrochemical processes. The processes may energy technology and batteries, electrochemical reactors, and solid-state devices and/or the elucidation of physical phenomena, such as corrosion and other electrochemical reactions. Contributions related to both fundamentals and applications are encouraged. Papers are also solicited on the influence of systems design on interpretation of experimental results and the development of mathematical models. The tutorials should be useful for students and for professionals seeking to diversify their background or break into new technological areas. The symposium will consist of both invited and contributed papers.

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Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **G. Pillay**, Rowan University, e-mail: pillay@rowan.edu; **J. M. Fenton**, University of Central Florida, e-mail: jfenton@fsec.ucf.edu; **M. E. Orazem**, Department of Chemical Engineering, University of Florida, e-mail: meo@che.ufl.edu; and **V. K. Ramani**, Illinois Institute of Technology, e-mail: ramani@iit.edu.

H — Fullerenes, Nanotubes, and Carbon Nanostructures

H1 to H10

Fullerenes, Nanotubes, and Carbon Nanostructures

Papers are invited for this symposium in the areas listed below. The organizers of each symposium will determine the suitability of the papers for inclusion in the oral or poster presentation of the program.

Abstracts, suggestions, and inquiries should be sent electronically to the ECS headquarters office and to the organizers of the corresponding symposium listed below.

Comments and inquiries about the symposium may be sent to the organizers: **D. M. Guldi**, Friedrich-Alexander-Universität Erlangen-Nürnberg, e-mail: dirk.guldi@chemie.uni-erlangen.de; and **R. B. Weisman**, Rice University, e-mail: weisman@rice.edu.

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

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 the 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; and **D. M. Guldi**, Friedrich-Alexander-Universität Erlangen-Nürnberg, e-mail: dirk.guldi@chemie.uni-erlangen.de.

H2 Molecular and Supramolecular 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 the 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**, Groupe de Chimie des Fullères et des Systèmes Conjugués, 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 the 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 / Sensor)

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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Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **S. Rotkin**, Lehigh University, e-mail: rotkin@lehigh.edu; **Y. Gogotsi**, Drexel University, e-mail: gogotsi@drexel.edu; and **M. Heben**, NREL, e-mail: michael_heben@nrel.gov.

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

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 the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **H. Shinohara**, Nagoya University, e-mail: noris@cc.nagoya-u.ac.jp; **T. Akasaka**, University of Tsukuba, e-mail: akasaka@tara.tsukuba.ac.jp; and **A. Balch**, University of California, e-mail: albalch@ucdavis.edu.

H6 Energetics and Structure and Solid-State Physics (Fullerenes, Nanotubes, and Carbon Nanostructures)

Original research papers that address both theoretical and experimental aspects of fullerenes and carbon nanoclusters are being solicited for this symposium. The topics include quantum chemistry, topology, statistical mechanics, molecular dynamics, thermodynamics, kinetics, thermal properties, solubility, mechanism, ionization, collisions, electronic properties, and catalysis.

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Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **Z. Slanina**, Institute of Chemistry, Academia Sinica, e-mail: slanina@cochem2.tutkie.tut.ac.jp; **O. Boltalina**, Colorado State University, e-mail: ovbolt@lamar.colostate.edu; and **P. Reinke**, University of Virginia, e-mail: petrareinke@virginia.edu.

H7 Carbon Nanotubes and Nanostructures: Medicine and Biology (Fullerenes, Nanotubes, and Carbon Nanostructures)

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 the 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; **L. Wilson**, Rice University, e-mail: durango@ruf.rice.edu; and **A. Hirsch**, Friedrich-Alexander-Universität Erlangen-Nürnberg, e-mail: andreas.hirsch@chemie.uni-erlangen.de.

H8 Porphyrins and Supramolecular Assemblies (Fullerenes, Nanotubes, and Carbon Nanostructures)

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 the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **N. Sollandie**, Nathalie Sollandié Groupe de Synthèse de Systèmes Porphyriniques (G2SP), Laboratoire de Chimie de Coordination du CNRS, 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.

H9 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 the 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.

H10 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 2-D 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 the 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; and **H. Grebel**, Dept. of Electrical and Computer Eng., New Jersey Institute of Technology, e-mail: grebel@njit.edu.

I — Physical and Analytical Electrochemistry

11 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 the ECS headquarters, and questions and inquiries should be sent to the symposium organizer: **S. Minteer**, Saint Louis University, minteers@slu.edu.

12 Electrochemical Detection in Molecular Biology (Physical and Analytical Electrochemistry / Sensor/ Organic and Biological Electrochemistry)

This symposium invites papers in the all areas of electroanalytical chemistry for biological applications. 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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Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **S. Minteer**, Saint Louis University, minteers@slu.edu; **Z. Aguilar**, Ocean Nano Tech, LLC, e-mail: zapaguilar@yahoo.com; **J. Burgess**, Case Western Reserve University, e-mail: jdb22@case.edu; and **P. Tunon-Blanco**, Universidad de Oviedo, e-mail: ptb@fluor.quimica.uniovi.es.

13 Charge Transfer: Electrons, Protons, and other Ions (Physical and Analytical Electrochemistry)

Charge transfer is important to both the frontier of fundamental science and in the long term solutions for energy generation, conversion, and storage. Applications are diverse and include: hybrid inorganic-polymer composite photovoltaic solar cells, polymer electrolyte membrane fuel cells, and lithium ion batteries, to name but a few. Although the charge carrier may be different in these devices there are common features in all charge transfer events or reactions. This symposium will provide a forum to present recent progress in understanding how the local (i.e., from 1-50 nm) environment determines the nature and energetics of charge transfer in various systems and devices. Current interest ranges from: (a.) utilization of single or small groups of organic molecules or polymers as components in electronic devices; to (b.) exploitation

of semiconductor and metal or metal oxide nanoparticles because of their high surface areas and other size-dependent properties; to (c.) the effects of the density and distribution of fixed and/or mobile ions in electrodes and electrolytes. Papers of interest include both experimental and theoretical studies that may be either applied or fundamental in focus.

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Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **S. Paddison**, University of Kentucky, e-mail: spaddiso@utk.edu; and **P. Trulove**, U.S. Naval Academy, e-mail: truelove@usna.edu.

14 Progress in Spectro-Electrochemistry and Surface Science of Electrocatalytical Interfaces (in memory of E. B. Yeager) (Physical and Analytical Electrochemistry)

This symposium is being organized to honor the memory of Prof. Ernest B. Yeager. When retiring from the position of the director of the Case Center for Electrochemical Sciences (CCES) in 1990 E. Yeager could look back onto a distinguished career in chemistry, in particular in physical chemistry and electrochemistry. Beyond numerous contributions to our current understanding of electrocatalysis, electrode kinetics, and the use of spectroscopic methods, he established an active center of research: the Case Laboratories for Electrochemical Studies (CLES) he founded 1976 at Case Western Reserve University. Yeager's passing in 2002 was a tremendous loss to the fields of fundamental and applied electrochemistry.

All interested friends, former students, and colleagues are invited to submit abstracts in topics to which Prof. Yeager contributed including: electrocatalysts, oxygen electroreduction, non-platinum catalysts, ion-conduction, electrochemistry on single crystals, catalyst supports, and *in situ* spectroelectrochemistry.

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Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **R. Holze**, Chemnitz University of Technology, e-mail: rudolf.holze@chemie.tu-chemnitz.de; and **D. Gervasio**, Arizona State University, e-mail: don.gervasio@asu.edu.

15 *In Situ* Scanning Probe Microscopy and Spectroscopy in Electrochemistry (Physical and Analytical Electrochemistry / Corrosion / Energy Technology)

Over the past 20 years, scanning probe microscopy methods, such as scanning tunneling or atomic force microscopy, have proven to be unique tools for characterizing solid/liquid interfaces on the atomic and nanometer scale. These techniques as well as spectroscopy based on these local probes have guided fundamental advances in many areas of electrochemistry, including self-assembly, electrodeposition, corrosion, or adsorption of ionic and molecular species by providing invaluable structural, morphological, and electronic information. The contribution of scanning probe microscopy to electrochemistry is continuing and has expanded to more complex systems while refinement to the hardware and software allows for improvements in

spatial and temporal resolution on a quasi-routine basis. This symposium will focus on: (1.) applications of *in situ* scanning tunneling microscopy and spectroscopy to gain new insights into the molecular scale structure of the electrochemical double layer and adsorbed layers; (2.) microscopic studies of the atomic or molecular dynamics at interfaces under equilibrium conditions and during electrochemical reactions; (3.) novel experimental developments in *in situ* scanning probe microscopy and spectroscopy including improvements in instrumentation; and (4.) theoretical and computational approaches to further the understanding of *in situ* STM/AFM imaging and spectroscopy.

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Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **S. Morin**, York University, e-mail: smorin@yorku.ca; **O. M. Magnussen**, Christian Albrechts Universität, e-mail: magnussen@physik.uni-kiel.de; and **N. A. Missert**, Sandia National Laboratories, e-mail: namisse@sandia.gov.

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

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

This symposium will address 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 the 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.

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 as well as 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 like sensor arrays, and electronic noses and tongues; (5.) physical, chemical, and biological sensors and actuators, such as gas, 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,

optical and wireless integrations; (7.) emerging technologies and applications including sensors based on nanotechnology; and (8.) novel techniques to expand and insure sensor stability and reliability.

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Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **G. Hunter**, NASA Glenn Research Center, e-mail: ghunter@grc.nasa.gov; **Z. Aguilar**, Vegrandis, LLC, e-mail: zapaguilar@yahoo.com; **M. Carter**, Eltron Research, Inc., e-mail: mcarter@eltronresearch.com; and **J. Li**, NASA Ames Research Center, e-mail: Jing.Li-1@nasa.gov.

J2 Electrochemical Nano/Bio Sensors 2 (Sensor / Physical and Analytical Electrochemistry / Organic and Biological Electrochemistry / High Temperature Materials)

The purpose of this symposium is to bring together leading experts with a variety of different experimental and theoretical skills working in the sensing area. Of particular interest is work addressing nanofabricated sensors and sensor arrays, and nanofabricated recognition elements including fundamental studies of nanometer length diffusion and electron transfer pathways inherent to sensor actuation. Detection of ultra-small amounts of material in localized environments such as single cells or tissue regions are suitable examples of work that is invited. Also of interest are studies characterizing the electro-oxidation properties of metal nanoparticles as sensor elements/platforms.

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Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **J. Burgess**, Case Western Reserve University, e-mail: jdb22@case.edu; **H. De Long**, AFOSR, e-mail: hugh.delong@afosr.af.mil; **L. Nagahara**, National Cancer Institute, e-mail: Nagaharl@mail.nih.gov; **A. Simonian**, Auburn University, e-mail: als@eng.auburn.edu; **I. Taniguchi**, Kumamoto University, e-mail: taniguch@gpo.kumamoto-u.ac.jp; and **E. Traversa**, International Research Center for Materials Nanoarchitectonics (MANA), National Institute for Materials Science (NIMS), Tsukuba, Japan, e-mail: traversa.enrico@nims.go.jp.

J3 Sensors for Energy and Environment (Sensor / High Temperature Materials / Energy Technology)

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

plug-in hybrids will necessitate a smarter grid system requiring the use of wireless sensors for monitoring.

This symposium will provide a forum for the discussion of the latest advancements in chemical sensor research and development. The primary focus will be on sensor and sensor systems used in environmental, energy conversion, devices, and smart grid applications. Researchers from industries, universities, and national laboratories that work in the field of chemical sensors are invited to participate. Papers on all sensing mechanisms (e.g., electrical, electrochemical, resistive/semiconductive, acoustic, optical, gravimetric, and thermal) that address novel materials, synthesis, device configuration, evaluation techniques, and system design are welcome.

Papers are solicited, but not limited to the following topics of interest: (1.) sensors for the monitoring of pollutants like nitrogen oxides, sulfur oxides, carbon dioxide, hydrocarbons, and halogens in the atmosphere; (2.) sensors for fuel cell systems including hydrogen, carbon-monoxide, sulfur, humidity, and methanol sensors; (3.) sensors for automotive emission systems including oxygen, nitrogen oxide,

hydrocarbon, ammonia, and carbon monoxide sensors; (4.) sensors for wireless monitoring of grid reliability; (5.) novel processing methods used in the manufacture of various sensors; and (6.) the development and analysis of sensor arrays and wireless systems for these applications.

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Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **R. Mukundan**, Los Alamos National Lab, e-mail: mukundan@lanl.gov; **J. Fergus**, Auburn University, e-mail: jwfergus@eng.auburn.edu; **J. Grate**, Pacific National Laboratory, e-mail: jwgrate@pnl.gov; **J. Stetter**, e-mail: Jrstetter99@aol.com; **W. van Schalkwijk**, EnergyPlex Corp, e-mail: walter@energyplex.com; and **K. Zaghbi**, Institut de Recherche d'Hydro-Québec (IREQ), e-mail: zaghib.karim@ireq.ca.

Future Technical Meetings



Oct. 4-9, 2009
Vienna, Austria

April 25-30, 2010
Vancouver, BC, Canada

Oct. 10-15, 2010
Las Vegas, NV

May 1-6, 2011
Montréal, Québec,
Canada

Oct. 9-14, 2011
Boston, MA



For more information on these future meetings, contact ECS

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

Major Subject: _____ Grade point average: _____ out of possible: _____

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

Symposium Title (#): _____

Title of paper to be presented at the meeting: _____

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

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

Estimated meeting expenditures: \$ _____

Signature: _____ Date: _____

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

- Battery—*Send to:* Daniel Doughty, Battery Safety Consulting, Inc., 139 Big Horn Ridge Dr. NE, Albuquerque, NM 87122-1903, USA, e-mail: dhddoughty@gmail.com
- Corrosion—*Send to:* N. Missert, Sandia National Labs, MS 1415, P.O. Box 5800, Albuquerque, NM 87185-0100, USA, e-mail: namisse@sandia.gov
- Dielectric Science & Technology—*Send to:* H. Rathore, IBM, Retired, e-mail: rathore@yahoo.com
- Electrodeposition—*Send to:* Stanko Brankovic, University of Houston, Dept. of ECE, Bldg. 1 N308, Houston, TX 77204, USA, e-mail: stanko.brankovic@mail.uh.edu
- Electronics and Photonics—*Send to:* F. Ren, University of Florida, Dept. of Chem. Engr., Gainesville, FL 32611, USA, e-mail: ren@che.ufl.edu
- Energy Technology—*Send to:* Matthew Mench, Penn State University, Dept. of Mech. Eng., 327 Reber Bldg., University Park, PA 16802, USA, e-mail: mmench@psu.edu
- HTM—*Send to:* Tim Armstrong, Carpenter Technology, Bldg. 68, P.O. Box 14662, Reading, PA 19612, USA, e-mail: tarmstrong@cartec.com
- IE&EE—*Send to:* G. Venkat Subramanian, Tennessee Tech Univ., Dept. of Chemical Engineering, Cookeville, TN 38505, USA, e-mail: vsubramanian@tntech.edu
- OBE—*Send to:* I. Taniguchi, Kumamoto University, Fac. of Appl. Chem & Biochem., 2-39-1 Kurokami, Kumamoto 860-8555, Japan, e-mail: taniguch@gpo.kumamoto-u.ac.jp
- Physical and Analytical Electrochemistry—*Send to:* Pawel J. Kulesza, University of Warsaw, Dept. of Chemistry, Krakowskie Przedmiescie 26/28, Warsaw, PL-00-927, Poland, e-mail: pkulesza@chem.uw.edu.pl
- Sensor—*Send to:* Y-L. Chang, Nanomix, Inc., 5980 Horton Street, Suite 600, Emeryville, CA 94608, USA, e-mail: ychang@nano.com

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- Battery—*Send to:* Daniel Doughty, Battery Safety Consulting, Inc., 139 Big Horn Ridge Dr. NE, Albuquerque, NM 87122-1903, USA, e-mail: dhdoughty@gmail.com
- HTM—*Send to:* Tim Armstrong, Carpenter Technology, Bldg. 68, PO Box 14662, Reading, PA 19612, USA, e-mail: tarmstrong@cartec.com

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