call for papers

Abstracts are due no later than May 7, 2010.

218th ECS Meeting

las vegas

October 10-15, 2010 **Nevada**

The 218th ECS Meeting will be held from October 10-15, 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 May 7, 2010.

Note: Some abstracts may be due earlier than May 7, 2010. Please carefully check the symposium listings for any alternate abstract submission deadlines. For complete details on abstract submission and symposia topics, please see www.electrochem.org.

Abstract Submission and Deadlines

Submit one original meeting abstract electronically via www.electrochem.org, no later than **May 7, 2010.** Faxed abstracts, late abstracts, and abstracts more than one page in length will not be accepted. In June 2010, all presenting authors will receive an e-mail 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 two column template located at: http://www.electrochem.org/meetings/guidelines/inst_a.htm. Programming for this meeting will occur in June and July, 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 June 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://ecsdl.org/ECST/) for additional information, including overall guidelines, deadlines for submissions and reviews, author and editor instructions, a manuscript template, and much more.

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

Financial Assistance

Financial assistance is very limited and generally governed by the symposium organizers. Individuals may inquire directly to the symposium organizers of the symposium in which they are presenting their paper to see if funding is available. Individuals requiring an official letter of invitation should write to the ECS headquarters office; such letters will not imply any financial responsibility of ECS. Students seeking financial assistance should consider awarded travel grants (see the last pages of this Call for Papers).

Hotel Reservations

The 218th ECS Meeting will be held at the Riviera Hotel & Conference Center, located at 2901 Las Vegas Blvd. South, Las Vegas, NV 89109, USA. Special rates have been reserved at the property for participants attending this meeting. The reservation deadline is **September 10, 2010**. Please refer to ECS website for rates and reservations.

Meeting Registration

All participants, including authors and invited speakers of the 218th ECS Meeting, are required to pay the appropriate registration fees. Hotel and meeting registration materials will be distributed in July of 2010 and will also be available on the ECS website (www.electrochem.org). The deadline for advance registration is **September 10, 2010.**

Short Courses

A number of short courses will be offered on Sunday, October 10, from 9:00 AM-4:30 PM. Short Courses **require advance registration** and may be cancelled if enrollments are too low. Short Course fees do not include the regular meeting registration fees. The following Short Courses are planned for the meeting: Basic Impedance Spectroscopy, PE Fuel Cells, Electrodeposition, Fundamentals of Electrochemistry, Magnetic Materials, and Solar Cells and Photovoltaics. Please check the ECS website for the final list of offerings.

Technical Exhibit

The 218th ECS Meeting will also include a Technical Exhibit, featuring presentations and displays by over 30 manufacturers of instruments, materials, systems, and software of interest to meeting attendees. Full exhibit booths manned by company representatives cost $2,000 and include one free meeting registration. Literature display tables (unmanned by company representatives; no meeting registration included) will also be available for $1,000. Parties interested in exhibiting should contact Tim Fest at ECS headquarters office (+1 609.737.1902, ext. 126 or tim.fest@electrochem.org) for more information. ECS makes all attempts to maximize the traffic flow to the Exhibit with scheduled coffee breaks and the evening poster session in the Exhibit area. Exhibitors will be recognized on the ECS website with their logo and link as well as in the meeting exhibit brochure.

Sponsorship & Advertising Opportunities

The ECS biannual meeting sponsorships provide an excellent opportunity to support the education and advancement of electrochemistry and solid-state science and technology while marketing your organizations services or product. Call today and join other highly respected and renowned organizations that are committed to making a difference. Sponsorship opportunities are available at a variety of levels ranging from $1,000-$10,000 to support symposia, student mixers, the plenary session, the student poster session, coffee breaks, and much more, to accommodate all budgets. Please contact Tim Fest at ECS headquarters office +1 609.737.1902, ext. 126 or tim.fest@electrochem.org) to identify the sponsorship that is most effective for your organization. Sponsors will be recognized on the ECS website with their logo and link, in the meeting program as well as on signage at the meeting, based on level of sponsorship.

Advertising opportunities—in the meeting program as well as in *Interface*—are available. Please contact Tim Fest at ECS headquarters office to discuss.

Contact Information

If you have any questions or require additional information, contact ECS, 65 South Main Street, Pennington, New Jersey, 08534-2839, USA; tel: +1 609.737.1902; fax: +1 609.737.2743; e-mail: ecs@electrochem.org; or on the Web at www.electrochem.org.

SYMPOSIUM TOPICS

A General Topics

A1 — General Student Poster Session

A2 — Nanotechnology General Session

A3 — Tutorials in Nanotechnology: Focus on Luminescence and Display Materials

B Batteries, Fuel Cells, and Energy Conversion

B1 — Battery/Energy Technology Joint General Session

B2 — Battery Safety and Abuse Tolerance

B3 — Electrochemistry of Novel Electrode Materials for Energy Storage and Conversion

B4 — Electrode-Electrolyte Interfaces in Li-ion Batteries

B5 — Materials Design and Electrode Architecture for Batteries

B6 — Non-Aqueous Electrolytes for Lithium Batteries

B7 — Polymer Electrolyte Fuel Cells 10

B8 — Rechargeable Lithium and Lithium Ion Batteries

B9 — Solid State Ionic Devices 8 — NEMCA

D Corrosion, Passivation, and Anodic Films

D1 — Corrosion General Poster Session

D2 — Corrosion and Biofuels

D3 — Corrosion Issues in Nuclear Waste Storage: A Symposium in Honor of the 65th Birthday of David Shoesmith

D4 — Corrosion Modelling

D5 — High Resolution Characterization of Corrosion Processes 2

D6 — Pits and Pores 4: New Materials and Applications

E Dielectric and Semiconductor Materials, Devices, and Processing

E1 — Solid State Topics General Session

E2 — Atomic Layer Deposition Applications 6

E3 — Chemical Mechanical Polishing 11

E4 — Compound Semiconductors for Ultra-Low Power Logic Applications

E5 — High Dielectric Constant and Other Dielectric Materials for Nanoelectronics and Photonics 8

E6 — High Purity Silicon 11

E7 — Low-Dimensional Nanoscale Electronic and Photonic Devices 4

E8 — Photovoltaics for the 21st Century 6

E9 — Processing, Materials, and Integration of Damascene and 3D Interconnects

E10— Science and Technology of Dielectrics for Active and Passive Devices

E11— Semiconductor Wafer Bonding 11: Science, Technology, and Applications

E12— State-of-the-Art Program on Compound Semiconductors 52 (SOTAPOCS 52)

E13— Thin Film Transistors 10 (TFT 10)

E14— SiGe, Ge, and Related Compounds: Materials,
-E22 Processing, and Devices 4

F Electrochemical / Chemical Deposition and Etching

F1 — Electroless Deposition Principles, Activation, and Applications

F2 — Electronics and 3D Packaging 4

F3 — Magnetic Materials, Processes, and Devices 11

F4 — Molecular Structure of the Solid–Liquid Interface and Its Relationship to Electrodeposition 7

G Electrochemical Synthesis and Engineering

G1 — Large-Scale Energy Storage for Smart Grid Applications

I Physical and Analytical Electrochemistry

I1 — Physical and Analytical Electrochemistry General Session

I2 — Electrochemistry in Nanospaces

I3 — Molten Salts and Ionic Liquids 17

I4 — Oscillations and Pattern Formation in Electrochemical Systems

I5 — Professor V. S. Bagotsky – 65 Years in Theoretical Electrochemistry, Electrocatalysis, and Applied Electrochemistry

J Sensors and Displays: Principles, Materials, and Processing

J1 — Chemical Sensors 9: Chemical and Biological Sensors and Analytical Systems

J2 — Luminescence and Energy Efficiency

J3 — Microfabricated and Nanofabricated Systems for MEMS/NEMS 9

J4 — Physics and Chemistry of Luminescence and Display Materials

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 November 19, 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. R. Subramanian**, Washington University, e-mail: vsubramanian@seas.wustl.edu; and **V. Desai Chaitanya**, New Mexico State University, e-mail: vimalc@nmsu.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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Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **O. Leonte**, Berkeley Polymer Technologies, Inc., e-mail: odleonte@comcast.net; **Z. Aguilar**, Ocean Nano Tech, LLC, e-mail: zapaguilar@yahoo.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.

A3 Tutorials in Nanotechnology: Focus on Luminescence and Display Materials (All Divisions)

This symposium will feature invited talks on the luminescence of nanoscale materials. 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 nanostructures (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.

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 June 18, 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 organizer: U. Happek, The University of Georgia, e-mail: uhappek@physast.uga.edu.

B — Batteries, Fuel Cells, and Energy Conversion

B1 Battery / 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 the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **N. Dudney**, Oak Ridge National Laboratory, email: dudneynj@ornl.gov; **C. Johnson**, Argonne National Laboratory, e-mail: cjohnson@anl.gov; **A. Manivannan**, US DOE/NETL, e-mail: manivana@netl.doe.gov; and **S. R. Narayan**, Jet Propulsion Laboratory, e-mail: narayan@jpl.nasa.gov.

B2 Battery Safety and Abuse Tolerance
(Battery)

Safety and abuse tolerance need to be improved to assure commercial acceptance of many advanced renewable energy storage systems. Safety lapses have caused higher scrutiny of advanced batteries by regulatory agencies. Higher energy content and high power capacity of today's batteries make achieving these goals more challenging.

This symposium invites contributed papers that describe improved safety of materials and systems for all battery chemistries. Cathodes that are more stable at high temperature, electrolytes and additives that exhibit reduced reactivity at the electrode surfaces, as well as more stable anodes are topics on which this symposium will focus. Additionally, reviews of regulatory initiatives and test standard development, as well as reports of improved abuse tolerance due to cell and battery pack design and development are invited. Studies of battery control systems and algorithms that increase safety of energy storage systems are also welcome.

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Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizer: **D. H. Doughty**, Battery Safety Consulting Inc., e-mail: dhdoughty@batterysafety.net.

B3 Electrochemistry of Novel Electrode Materials for Energy Storage and Conversion
(Energy Technology)

Fundamental breakthroughs in electrochemical energy storage and conversion lie in large part in the design and development of new materials with superior properties and performance. This symposium provides a forum for recent advances in electrochemistry of novel electrode materials for various electrochemical energy conversion devices. Topics of interest include but are not limited to the design, modeling, synthesis, characterization, and application of nanostructured anode and cathode materials for various rechargeable batteries, metal-air batteries, metal-water batteries, super capacitors, hybrid power sources, and non-conventional power sources not covered in other symposia.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **K. Zaghib**, Institute de Recherche d'Hydro-Québec (IREQ), e-mail: zaghib.karim@ireq.ca; **C. Julien**, e-mail: cjul@cœcr.jussieu.fr; and **V. Ramani**, e-mail ramani@itt.edu.

B4 Electrode-Electrolyte Interfaces in Li-ion Batteries
(Battery / Physical and Analytical Electrochemistry)

Electronic and ionic transport across electrode-electrolyte interfaces is crucial to the operation of Li-ion batteries. Understanding structure and reactivity at interfaces is particularly important for understanding battery performance and failure modes. Formation of stable interphases at the surface of anodes and cathodes represents an important factor that determines electrochemical properties of Li-ion systems. A better understanding of the underlying principles that govern these phenomena is inextricably linked to our ability to sense and monitor electrode surface proceses in situ, in real time, and with adequate spatial resolution.

Papers that leverage advances in each of these areas are welcome. Contributions on experimental and theoretical modeling approaches to characterize and describe the mechanism of interfacial phenomena and their impact on the electrochemical performance of the materials, composite electrodes, and Li-ion systems are strongly encouraged. Communications on new research opportunities offered by emerging in situ instrumentation and methods are sought.

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 November 19, 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: **B. Y. Liaw**, Hawaii Natural Energy Institute, SOEST, University of Hawaii, e-mail: bliaw@hawaii.edu; and **R. Kostecki**, Lawrence Berkeley National Laboratory, e-mail: r_kostecki@lbl.gov.

B5 Materials Design and Electrode Architecture for Batteries
(Battery)

Rational design and performance evaluation of electrode microstructures in chemical energy storage systems constitutes one of the grand challenges for material scientists and engineers. Currently, macroscopic material synthesis and electrode fabrication methods allow limited control over battery performance and lifetime and do not provide an effective means of correlating and exploiting material-specific fundamental properties in high performance battery systems. A classic example is the incorporation of intercalation processes in composite battery electrodes via the use of multidimensional electrode architecture which takes into account the structural details of the various battery materials.

Papers that leverage advances in each of these areas are welcome. Contributions on experimental and theoretical modeling approaches to rational design of battery materials and electrodes, and their impact on the electrochemical performance of the electrodes, and battery systems are strongly encouraged. Communications on new synthesis routes of materials composites, electrode fabrication techniques, 3-dimensional electrode and battery architectures, and multiscale modeling are sought.

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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. Kostecki**, Lawrence Berkeley National Laboratory, e-mail: r_kostecki@lbl.gov, and **N. Dudney**, Oak Ridge National Lab, dudneynj@ornl.gov.

B6 Non-Aqueous Electrolytes for Lithium Batteries
(Battery / Physical and Analytical Electrochemistry)

The electrolyte plays a vital role in the performance of rechargeable lithium batteries. A better understanding of the elementary processes involved in the formation of the electrolyte/electrode interface and charge transfer kinetics in relation to solvent, salt, additive and electrode material is crucial to the further optimization of Li and Li-ion batteries. This symposium will focus on both the fundamental and applied aspects of the electrolyte for Li and Li-ion batteries. Topics of interest include, but are not restricted to, the theoretical and experimental studies of structure-property relationships of electrolytes; development of new salts, solvents and additives; development of ionic liquid electrolytes; development of electrolytes for 5 V Li and Li-ion batteries; studies and approaches leading to the understanding of electrode/electrolyte interfacial phenomena and the charge transfer processes; electrolytes with enhanced non-flammability; electrolytes for wide temperature range operations; and cell performance improvement with respect to that of electrolyte 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: **B. Lucht**, University of Rhode Island, e-mail: blucht@chm.uri.edu; **W. A. Henderson**, North Carolina State University, e-mail: whender@ncsu.edu; **T. R. Jow**, U.S. Army Research Laboratory, e-mail: rjow@arl.army.mil; and **M. Ue**, Mitsubishi Chemical Corporation, e-mail: 3707052@cc.m-kagaku.co.jp.

B7 Polymer Electrolyte Fuel Cells 10
(Energy Technology / Physical and Analytical Electrochemistry / Battery / Industrial Electrochemistry and Electrochemical Engineering)

This international symposium is devoted to all aspects of research, development, and engineering of polymer electrolyte fuel cells (PEFCs), as well as low-temperature direct-fuel cells using either anion or cation exchange membranes. The intention is to bring together the international community working on the subject and to enable effective interactions between research and engineering communities. The symposium is structured as five different sections: diagnostic techniques and systems design/components for both acid and alkaline fuel cells, catalysts and membranes for acid fuel cells, and catalysts and membranes for alkaline fuel cells. Abstracts for oral or poster contributions must be submitted to the symposium via the ECS website; please send a copy of your abstract to the respective Session Chairs (please cc the Lead Editor). Since the number of time slots for oral presentations are limited, we would appreciate it if research groups which submit several abstracts could seek a reasonable balance between oral and poster contributions.

Section A: Diagnostics/Characterization Methods, MEA Design/Model
Organizers: H. Gasteiger, F. Büchi, V. Ramani, and A. Weber

Presentations related to acid and alkaline fuel cells that discuss: (1.) novel gas diffusion medium substrates and micro-porous layer designs; (2.) modeling and diagnostic methods to characterize mass- and heat-transport related phenomena (*e.g.*, water flooding) in cells and membrane electrode assemblies; (3.) CO_2 tolerance modeling of anion-exchange membrane fuel cells; (4.) *in-situ* measurement or visualization (X-ray tomography, neutron scattering, etc.); (5.) advanced *ex-situ* characterization methods (TEM, STM); (6.) AC-impedance methods; and (7.) electrode and MEA electrochemical modeling.

Section B: Fuel Cell Systems, Stack/BOP Design, Gas Processing
Organizers: P. Shirvanian, T. Fuller, R. Darling, and S. R. Narayanan

Presentations related to acid and alkaline fuel cells that discuss: (1.) hydrogen or hydrogen-reformate fuel cells; (2.) direct-fuel fuel cells (DMFC, borohydride, etc.); (3.) alkaline (membrane) fuel cells; (4.) portable fuel cells; (5.) new cell and stack structures, including new types of bipolar plates and flow fields; (6.) hydrogen-reformate synthesis; and (7.) balance-of-plant (BOP) components; and (8.) design and specifications of complete power systems in the context of transportation and stationary power generation applications as well as for micro-fuel cell systems.

Section C: Cation-Exchange Membrane Performance/ Durability
Organizers: M. Inaba, S. Cleghorn, D. Jones, and T. Zawodzinski

Presentations related to acid fuel cells that discuss: (1.) advanced cation-exchange membranes and ionomers (PFSAs, hydrocarbon-based, etc.); (2.) high-temperature membranes; (3.) physical-chemical properties of fuel cell membranes; (4.) structural characterization of membranes; (5.) degradation/ aging of membranes (chemical and mechanical); and (6.) molecular modeling of membrane properties.

Section D: Catalyst Activity/Durability for Acid Fuel Cells
Organizers: H. Uchida, C. Lamy, and P. Strasser

Presentations related to acid fuel cells that discuss: (1.) fuel cell electrocatalysts for hydrogen and hydrogen-reformate fuel cells; (2.) fuel cell electrocatalysts for direct-fuel fuel cells; (3.) novel catalyst supports; (4.) degradation of fuel cell electrocatalysts and catalyst supports; and (5). *ab initio* computational studies of catalytic mechanisms and for the design of novel catalysts.

Section E: Alkaline Fuel Cell Membranes and Catalysts
Organizers: R. Mantz, D. Chu, and T. Schmidt

Presentations related to alkaline fuel cells that discuss: (1.) electrocatalysts for hydrogen oxidation and oxygen reduction; (2.) catalysts for the direct electrooxidation of alternative fuels (e.g., methanol, ethanol, ammonia, etc.); (3.) catalysts for direct-borohydride applications; (4.) novel anion-exchange membranes; and (5.) degradation mechanisms of anion-exchange membranes.

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

Section A: H. Gasteiger (Lead Editor), Technical University Munich, Germany, e-mail: hubert.gasteiger@gmail.com; **F. Büchi**, Paul Scherrer Institut, Switzerland, e-mail: felix.buechi@psi.ch; **V. Ramani**, Illinois Institute of Technology, Chicago, USA, e-mail: ramani@iit.edu; and **A. Weber**, Lawrence Berkeley National Laboratory, USA, e-mail: azweber@lbl.gov.

Section B: P. Shirvanian, Ford Motor Co., USA, e-mail: ashirvan@ford.com; **T. Fuller**, Georgia Institute of Technology, Atlanta, USA, e-mail: tom.fuller@gtri.gatech.edu; **R. Darling**, UTC Power Corporation, USA, e-mail: Robert.Darling@utcpower.com; and **S. R. Narayanan**, Jet Propulsion Laboratory, USA, e-mail: s.r.narayanan@jpl.nasa.gov.

Section C: M. Inaba, Doshisha University, Japan, e-mail: minaba@mail.doshisha.ac.jp; **S. Cleghorn**, W. L. Gore & Associates, Elkton, MD, USA, e-mail: scelghorn@wlgore.com; **D. Jones**, Université Montpellier, France, e-mail: Deborah.Jones@univ-montp2.fr; and **T. Zawodzinski**, Univ. Tennessee, USA, e-mail: taz5@po.cwru.edu.

Section D: H. Uchida, University of Yamanashi, e-mail: h-uchida@yamanashi.ac.jp; **C. Lamy**, Universite de Poitiers, France, e-mail: claude.lamy@univ-poitiers.fr; and **P. Strasser**, Technical University Berlin, Germany, e-mail: PStrasser@tu-berlin.de.

Section E: R. Mantz, U.S. Army Research Office, USA, e-mail: robert.a.mantz@us.army.mil; **D. Chu**, U.S. Army Research Laboratory/SEDD, USA, e-mail: deryn.chu@us.army.mil; and **T. Schmidt**, BASF Fuel Cell GmbH, Frankfurt, Germany, e-mail: thomas.justus.schmidt@basf.com.

In order to encourage active participation of new and talented researchers in the field, we anticipate awarding **Travel Grants** of at least $500 and free registration in support of outstanding **graduate students** and **postdoctoral fellows**. Awards will be made based on originality of the work and importance to the field. To be considered for the award, an abstract for an oral or poster presentation as well as a manuscript for the symposium proceedings must be submitted by the respective deadlines. If you would like to apply for the travel grant, please submit your abstract, your proceedings manuscript, your resume, and your publication list to Adam Weber (azweber@lbl.gov) before the deadline for the proceedings manuscript. **Student Poster Prizes** of a total of $3,000 will be awarded with a $1,000 top prize. Students who want to participate need to submit an abstract for a poster contribution to the ECS and send a copy of their abstract to Jim Fenton (jfenton@fsec.ucf.edu). A **Short Course** on fundamental catalysis and how it can be applied to low-temperature fuel cell diagnostics and kinetic studies will be held the Sunday of the meeting (Instructors: T. Schmidt and H. Gasteiger).

B8 Rechargeable Lithium and Lithium Ion Batteries
(Battery)

Lithium ion batteries have revolutionized the portable electronics market, and there is immense global interest to develop them for hybrid electric vehicles, plug-in hybrid electric vehicles, and stationary electrical energy storage. This symposium provides a forum for recent advances in rechargeable lithium and lithium ion batteries. Papers are solicited on both fundamental and applied aspects of rechargeable lithium and lithium ion batteries. Specific areas to be covered include but not limited to (1.) cathode design, synthesis, characterization, and performance; (2.) anode design, synthesis, characterization, and performance; (3.) electrolyte design, synthesis, characterization, and performance; (4.) electrode processing and cell design; (5.) interfacial studies; (6.) materials and cell modeling; (7.) failure modes and mechanisms of cells and batteries; and (8.) performance and safety characteristics of cells and 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: **A. Manthiram**, University of Texas at Austin, e-mail: rmanth@mail.utexas.edu; **K. M. Abraham**, Northeastern University, e-mail: kmabraham@comcast.net; **S. Meng**, University of California at San Diego, Shirleymeng@ucsd.edu; and **C. Wang**, University of Maryland, cswang@umd.edu.

B9 Solid State Ionic Devices 8 – NEMCA
(High Temperature Materials / Energy Technology / Battery / Physical and Analytical Electrochemistry / Sensor / New Technology Subcommittee)

Solid-state electrochemical devices, such as batteries, fuel cells, membranes, and sensors, are critical components of technologically advanced societies in the 21st century and beyond. The development of these devices involves common research themes such as ion transport, interfacial phenomena, and device design and performance, regardless of the class of materials or whether the solid state is amorphous or crystalline. The intent of this international symposia series is to provide a forum for recent advances in solid-state ion conducting materials and the design, fabrication, and performance of devices that utilize them.

For this, the eighth in the series of international symposia, emphasis will be given to electrocatalysis and non-Faradaic electrochemical modification of catalytic activity (NEMCA). Papers on heterogeneous electrocatalytic activity at electrode interfaces and the modification of catalytic activity by applied fields are particularly encouraged. In addition, papers are solicited in such topics as modeling and characterization of defect equilibria, ionic and electronic transport; novel synthesis and processing of thin films, membranes; permeation studies; materials characterization and crystallographic investigations; extreme engineering applications; and the design, and performance of solid state ionic devices: fuel cells, thermal energy converters, solid-state batteries and microbatteries, chemical sensors, supercapacitors, membranes, and electrochromic devices.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizer: **E. D. Wachsman**, University of Maryland, e-mail: ewach@umd.edu; **C. Bock**, National Research Council of Canada, e-mail: Christina.Bock@nrc-cnrc.gc.ca; **G. Hunter**, NASA Glenn Research Center, e-mail: ghunter@grc.nasa.gov; 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.

D — Corrosion, Passivation, and Anodic Films

D1 Corrosion General Poster 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 the ECS headquarters, and questions and inquiries should be sent to the symposium organizer: **D. Hansen**, University of Dayton, e-mail: douglas.hansen@udri.udayton.edu.

D2 Corrosion and Biofuels
(Corrosion / Energy Technology)

The development of biofuels from various sources (1st generation – 3rd generation) have become more prevalent and therefore have posed numerous materials compatibility issues that are still being addressed in various forms around the world. One of these issues is the aggressiveness of biofuels in terms of corrosivity and their interaction with materials involved in the processing, transportation and ultimate utilization as an energy source. This symposium will serve as an interdisciplinary forum on all applications and recent developments concerning the interaction of biofuels with materials and the corrosion and/or degradation of those materials. Topics of interest including but not limited to: the generation of biofuels (solid, liquid or gaseous phases), mechanisms of and susceptibililty to localized corrosion and stress corrosion cracking in biofuels, corrosion measurement methods, degradation of non-metallics, monitoring for corrosion and corrosivity, effects of additives, effects of blending, burning processes and emissions of bioalcohols, biodiesels, bioethers, synthetic gases, solid biofuels, biofuels from non-food crops, algae fuel and Fischer-Tropsch fuels.

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Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizer: **D. Hansen**, University of Dayton, e-mail: douglas.hansen@udri.udayton.edu; **G. S. Frankel**, Ohio State University, e-mail: frankel@matsceng.ohio-state.edu; **M. Iannuzzi**, Det Norske Veritas, e-mail: mariano.iannuzzi@dnv.com; and **N. R. Sekharipuram**, NASA, JPL, e-mail: sekharipuram.r.narayanan@jpl.nasa.gov.

D3 Corrosion Issues in Nuclear Waste Storage: A Symposium in Honor of the 65th Birthday of David Shoesmith
(Corrosion / Sensor)

Oral presentations are invited on corrosion research concerning issues involved in the short-, intermediate-, and long-term storage or disposal of nuclear wastes, including corrosion of the waste containers, of the storage superstructure, and of the wasteform itself. We also encourage papers on the development of sensors that focus on corrosion, waste leakage, and waste leakage effects on the surrounding environment for short- and long-term remote monitoring. The scope of the talks includes materials and their characterization, corrosion mechanisms and passivity, corrosion rate determination, radiation effects on corrosion, various types of sensors and their applications to nuclear waste storage corrosion monitoring, modeling of corrosion processes, and projection of corrosion lifetimes.

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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. Noël**, University of Western Ontario, e-mail: jjnoel@uwo.ca; **Z. Aguilar**, Ocean Nano Tech, LLC, e-mail: zapaguilar@yahoo.com; and **X. He**, Southwest Research Institute, e-mail: xhe@cnwra.swri.edu.

D4 Corrosion Modelling
(Corrosion)

Corrosion modeling and simulation continue to advance in terms of both the fidelity of the models and the coverage of the range of size scales. Engineering scale models have been constructed that combine inputs of measurable parameters with an abstracted representation of smaller scales to predict future performance. Continuum level models have started to move from being mostly qualitative to being able to guide material design. Nanoscale models have benefited greatly from the increase in available computational power and the development of frameworks to begin to probe reaction rates and surface morphology development. Atomistic scale models of surfaces heretofore used only for vapor phase reactions have been extended to the case of metals immersed in solution and can simulate the effects of applied potential, providing a means to calculate the structure and energetics of the metal/solution interface from first principles. Improved experimental tools for both input data generation for the models and validation of the outputs of the models have also been developed. This symposium will provide a forum for the presentation and discussion of the state-of-the-art in the modeling of corrosion and dissolution processes. Original papers of interest include, but are not restricted to, the following: (1.) processes and forms of corrosion: general corrosion, pitting, crevice corrosion, intergranular corrosion, environment-assisted cracking, coating failure; (2.) experimental validation of models; (3.) new modeling and simulation methods, including linking across spatial and temporal scales, and (4) experience with the use of models in engineering 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. G. Kelly**, University of Virginia, e-mail: rgkelly@virginia.edu; **F. Martin**; Center for Corrosion Science and Engineering U.S. Naval Research Laboratory, e-mail: farrel.martin@nrl.navy.mil; and **C. Taylor**, Los Alamos National Lab, e-mail: cdtaylor@lanl.gov.

D5 High Resolution Characterization of Corrosion Processes 2
(Corrosion)

This symposium will provide a forum for all studies of corrosion that are highly resolved in space and/or time and applied with the aim of elucidating kinetics and mechanisms. Particular interest will be directed toward techniques providing fresh insight into the localization and/or time-dependence of corrosion phenomena as they occur on metal surfaces in an uncoated or coated state in the presence or absence of corrosion inhibitors.

Techniques of interest include, but are not limited to: X-ray synchrotron spectroscopy and tomography, *in situ* optical imaging/microscopy, laser scanning microscopy, confocal microscopy, acoustic (ultrasound) microscopy, magnetic imaging techniques, scanning Kelvin probe (SKP), Kelvin force microscopy (KFM), atomic force microscopy (AFM), scanning electrochemical microscopy (SECM), scanning

reference electrode technique (SRET), scanning vibrating electrode technique (SVET), and localized electrochemical impedance spectroscopy (LEIS). The organizers encourage papers dealing with: metastable and stable pitting, crevice corrosion, differential aeration effects, intergranular corrosion, dealloying, re-plating, galvanic corrosion, erosion corrosion, stress-corrosion cracking, and corrosion fatigue. Also, papers dealing with corrosion-driven processes affecting coated metals such as cathodic disbondment, anodic undercutting and filiform corrosion are of interest. The organizers extend the call to those who wish to report high resolution studies of etching, nanostructure evolution and MEM (microelectromechanical machine) development.

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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. McMurray**, University of Wales, Swansea, e-mail: H.N.McMurray@swansea.ac.uk; **B. Connolly**, Metallurgy & Materials, Edgbaston, Birmingham, e-mail: b.j.connolly@bham.ac.uk; **J. Frankel**, Ohio State University, e-mail; frankel@matsceng.ohio-state.edu; **D. Hansen**, University of Dayton, e-mail: douglas.hansen@udri.udayton.edu; **H. Masuda**, National Institute for Materials Science, e-mail: masuda.hiroyuki@nims.go.jp; **P. Schmutz**, EMPA, e-mail: Patrik.Schmutz@empa.ch; and **K. Zavadil**, Sandia National Lab, e-mail: krzavad@sandia.gov.

D6 Pits and Pores 4: New Materials and Applications
(Corrosion / Luminescence and Display Materials)

The symposium is aimed at a more detailed understanding of growth mechanisms and the physical and chemical properties of all types of porous structures. The symposium is a continuous attempt to integrate the diverse research in different fields such as localized metal corrosion, semiconductor electrochemistry, deposition into pores, matrix materials and optical spectroscopy in order to develop a highly transdisciplinary approach to the topic. Emphasis will be on pit and pore formation, porous structure/surface property relations, work relevant to the formation of advanced materials and applications of these materials in different areas of science.

Of special interest in this symposium is experimental as well as theoretical work dealing with: (1.) causes for the localized nature of attack (dissolution); (2.) kinetics (growth laws), stability and morphology of pit and pore growth and chemistry within pits, pores, and etch tunnels; (3.) critical factors (conditions, chemical environment) for maintaining pit and pore growth; (4.) selective dissolution (dealloying); (5.) porous templates and material deposition into pores; (6.) transport processes within pores and porous structures; (7.) analogies and differences between localized corrosion of metals and semiconductors; (8.) pore morphology and interface chemistry effects on optical properties; (9.) passivation of porous surfaces; (10.) optical characterization of porous materials, nanoparticles, and composites; (11.) porous cages, matrices and composites; (12.) work related to life sciences; and(13.) applications.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **R. Boukherroub**, Institut de Recherche Interdisciplinaire (IRI) and Institut d'Électronique, de Microélectronique et de Nanotechnologie (IEMN), e-mail: rabah.boukherroub@iemn.univ-lille1.fr; **D. Lockwood**, Institute for Microstructural Sciences, National Research Council of Canada, e-mail: david.lockwood@nrc-cnrc.gc.ca; **Y. Ogata**, Institute of Advanced Energy, e-mail: y-ogata@iae.kyoto-u.ac.jp; and **P. Schmuki**, University of Erlangen-Nuremberg, e-mail : schmuki@ww.uni-erlangen.de.

E — Dielectric and Semiconductor Materials, Devices, and Processing

E1 Solid State Topics General Session
(Dielectric Science and Technology / Electronics and Photonics)

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

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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. Sundaram**, University of Central Florida, e-mail: sundaram@mail.ucf.edu; **A. Baca**, Sandia National Laboratory, e-mail: agbaca@sandia.gov; **O. Leonte**, Berkeley Polymer Technologies, Inc., e-mail: odleonte@comcast.net; **R. Todi**, IBM Microelectronics, e-mail: rmtodi@us.ibm.com; and **X. Wang**, Georgia Southern University, e-mail: xwang@georgiasouthern.edu.

E2 Atomic Layer Deposition Applications 6
(Dielectric Science and Technology / Electronics and Photonics)

Recent advances in nanotechnology have created a need for precise, conformal, atomic level deposition of thin film materials. Atomic Layer Deposition (ALD) enables the precise deposition of ultra-thin, highly conformal coatings over complex, 3D topographies, with controlled composition and properties. Consequently, ALD has become the technology of choice for a large variety of applications far and beyond the semiconductor industry, as proven from the countless applications emerging. Over the past four years, this symposium has earned a leading position among the technology symposia where atomic layer deposition is being discussed. This symposium offers an excellent forum for sharing cutting edge research on both existing and emerging, non-mainstream ALD applications, as well as fundamental aspects of ALD technologies.

Contributions are solicited in the following areas: (1.) semiconductor CMOS applications: development and integration of ALD high-k oxides and metal electrodes with conventional and high-mobility channel materials; (2.) volatile and non volatile memory applications: extendibility, Flash, MIM, MIS, RF capacitors, etc.; (3.) interconnects and contacts: integration of ALD films with Cu and low-k materials; (4.) fundamentals of ALD processing; (5.) productivity enhancement of ALD equipment and processes; (6.) precursor and delivery system development for ALD; (7.) advanced and novel integration schemes of ALD films; (8.) ALD for optical and photonic applications; (9.) coating of nanoporous

materials by ALD; (10.) selective area ALD for patterning of nanoscale films; (11.) ALD coatings on nanoporous materials (e.g. (bio) templates); and (12.) applications for ALD in other areas, such as disk drives, MEMS, nanotechnology, deposition on polymers, fuel cells, novel energy applications (e.g. solar energy), 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: **J. W. Elam**, Argonne National Laboratory, e-mail: jelam@anl.gov; **S. F. Bent**, Stanford University, e-mail: sbent@stanford.edu; **A. Delabie**, IMEC, e-mail: Annelies.Delabie@imec.be; **S. De Gendt**, IMEC, e-mail: Stefan.Degendt@imec.be; **A. Londergan**, Qualcomm MEMS Technologies, e-mail: alondergan @qualcomm.com; **F. Roozeboom**, Eindhoven University of Technology, e-mail: f.roozeboom@tue.nl; and **O. van der Straten**, IBM Research, email: ovander@us.ibm.com.

E3 Chemical Mechanical Polishing 11
(Dielectric Science and Technology)

This symposium will address the fundamentals of chemical mechanical planarization (CMP) and its applications in interlayer dielectrics (ILD) polishing, metal polishing, and trench and mesa isolation. The symposium will also discuss post CMP cleaning, consumable characterization, polish end point detection, CMP process integration, and manufacturing issues, as well as other pertinent issues of this technology. Papers will be solicited in the following areas: (1.) CMP polishing science and technology; (2.) CMP process modeling; (3.) CMP process optimization and control; (4.) CMP consumables characterization; (5.) CMP process integration issues; (6.) surface and electrochemical aspects of CMP; (7.) surface and electrochemical aspects of post CMP cleaning; (8.) CMP related defect detection and characterization; (9.) electrical characterization of post CMP surfaces; (10.) aspects of nanotechnology; and (11.) environment aspects of CMP.

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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. Banerjee**, Air Products and Chemicals, Inc., e-mail: banerjg@airproducts.com; **V. Desai,** New Mexico State University, e-mail: vimalc@nmsu.edu; **Y. Obeng,** Nkanea Technologies Inc., e-mail: YSOA1@aol.com; and **K. Sundaram,** University of Central Florida, e-mail: sundaram@mail.ucf.edu.

E4 Compound Semiconductors for Ultra-Low Power Logic Applications
(Electronics and Photonics)

This symposium will cover a wide range of topics related to the high mobility semiconductors involving germanium, grapheme, and compound semiconductors. Submissions are solicited in the areas of thin film growth and characterization of high mobility semiconductors; heterogeneous integration strategies of these materials onto silicon, various embodiments of alternate channel devices including but not limited to MOSFETs, QWFETs, HFETs, nanowire FETs, tunnel FETs, NDR based devices, and other issues within the broadly understood scope of this symposium, including those involving interface issues between high-mobility semiconductors and high-k dielectrics, heavily doped shallow junction formation, and low resistivity contacts. Depending on the number of accepted papers a poster session may be scheduled in addition to oral presentations.

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Abstracts should be submitted electronically to ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **S. Datta**, Penn State University, e-mail: sdatta@engr.psu.edu; and **J. Ruzyllo**, Penn State University, e-mail: jruzyllo@psu.edu.

E5 High Dielectric Constant and Other Dielectric Materials for Nanoelectronics and Photonics 8
(Dielectric Science and Technology / Electronics and Photonics)

Presentations at this symposium will cover the following topical areas: (1.) Ge, GaAs, InGaAs, InAs, InAlAs, InP, GaN, SeGe, strained-Si, graphene, and diverse high mobility substrates: interface modeling; band-offsets; interface passivation techniques, anomalous C-V and G-V characteristics; optimal high-k materials; sub-1-nm realization; high mobility FETs; (2.) high k materials: (doped, ternary) Hf-based and La-based and future generation higher-k materials; new gate insulators: e.g. Sc_2O_3, Lu_2O_3, NdON, YON, Er_2O_3, $ErTiO_5$, $SrTiO_3$; epitaxial gate insulators: e.g. Sm_2O_3, Sc_2O_3, $LaScO_3$, Gd_2O_3, $SrHfO_3$; materials for volatile, non-volatile, and novel (e.g. RRAM) memory applications: e.g. $BaHfO_3$, BaNiWTiO, Y_2TiO_5, $SrTiO_3$, Nb_2O_5, $BiTaO_x$, $HfTiO_4$, $SrTaO_3$, $BaZrO_3$, NiO; nano-crystal embedded gate insulators: e.g. Au, Ag, TiN, ITO, Ge nano particles; *ab initio* models; (3.) metal gate electrode materials: work function tuning; novel metal electrodes; (4.) deposition techniques: discussion and understanding of the complexities associated with the deposition of the dielectric materials and metals targeted in this call: e.g. precursor interactions, low temperature processing, non planar substrates, surface sensitivity, sputter effects, intermixing; (5.) bulk material properties: thermal stability of new materials; effects of composition on material properties; material interactions; moisture sensitivity; fundamental understanding regarding device functionality; (6.) flat-band voltage issues and control: anomalous flat-band voltage shift; dipoles at high-k/SiO_2 and high-k/metal interfaces; dipole formation models; role of oxygen vacancies; Schottky barrier modelling; (7.) interfaces: Si/SiO_2, SiO_2/high-k and high-k/metal interfaces; mechanisms of interface layer formation; interface engineering; thermal stability of interfaces; electrical properties and defects of/at interfaces; interface passiviation; (8.) gate stack reliability: defect generation mechanisms and models; charge trapping; new reliability testing techniques; bias temperature instability, dielectric breakdown; transport mechanisms through gate stack; metallic cross-contamination across layers; mechanisms of mobility degradation; (9.) electrical, chemical, and physical characterization: diverse electron microscope, X-ray, and AFM characterization; determination of layer composition and depth profiles; novel electrical characterization techniques; (10.) novel applications: carbon nanotubes; Nanowire Transistors; Use of High-k Nanosheets; Organic FET and TFT with High-k Dielectrics; new concepts in transistors, memory, and switching; new transistor concepts, structures, and configurations; (11.) high-k and diverse insulators for photonics: oxides and insulators for active layers, passivation, photon capture, and anti-reflection

coating in solar cells, photo-transistors, lasers, and LEDs; and (12.) high-k processing/manufacturing: development and research of post deposition treatments, surface preparations, cleaning, etchability, etc. of high-k materials.

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E6 High Purity Silicon 11
(Electronics and Photonics)

This symposium provides a forum for discussion of the latest developments in the growth, characterization, device processing, and applications of high purity silicon and silicon-based materials in either bulk or epitaxial form. The emphasis is on the control and prevention of impurity incorporation, characterization and detection of defects and impurity states in high purity and high resistivity silicon for superior device performances. Device and circuit aspects related to the use of devices high resistivity silicon wafers will also be addressed. Special attention will be given to alternative and high-mobility substrates and their material and device aspects. Contributed papers are solicited in the following main areas: (1.) high purity bulk growth techniques: Czochralski (Cz), float zone, magnetic Cz, and other novel growth techniques**,** progress in polysilicon manufacturing, influence of poly quality on the purity of monocrystals**;** impact of auxiliaries, e.g. quartz, graphite, furnace parts, and gas media purity on crystal properties; (2.) impurity related and intrinsic bulk defects: point defect mechanisms and clustering, influence of doping concentrations, carrier lifetime behavior, denuded zone (DZ) formation and influence of bulk quality (e.g. D-defects) on defect kinetics behavior, oxygen, nitrogen, carbon, and hydrogen in silicon, defect engineering and control, transition metal impurities and their gettering; (3.) diagnostic techniques: lifetime and impurity level studies, spectroscopic techniques, spreading resistance probing, Hall-effect, contamination detection and monitoring in handling and packaging high purity silicon, characterization techniques relevant to the assessment of impurities and defects; (4.) epitaxial wafers and alternative substrates: epitaxial fabrication techniques, epi layer processing, interaction with substrate properties, bulk and interface defect control and characterization, Silicon-on-Insulator (SOI) and Germanium-on-Insulator (GeOI), strained layers on silicon, high-mobility substrates; and (5.) device and circuit application: radiation and high energy particle detectors, avalanche photodiodes, strip- and pixel detectors, infrared components, power devices, radiation hardening of silicon materials, device physics, radiation sensitivity, noise performance, low temperature operation, and reliability aspects.

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E7 Low-Dimensional Nanoscale Electronic and Photonic Devices 4
(Electronics and Photonics / Sensor)

The fourth NODEPD symposium will address the most recent developments in nanoscale electronic and photonic devices, encompassing low dimensional novel devices, processing, device fabrication, reliability, and other related topics. Papers on both practical issues and fundamental studies are solicited. The symposium will consist of both invited and contributed papers.

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E8 Photovoltaics for the 21st Century 6
(Energy Technology / Industrial Electrochemistry and Electrochemical Engineering / Electrodeposition / Dielectric Science and Technology)

With the current global energy consumption at 15 terawatts (TW) and projected demand of 28 TW by 2050 and 46 TW by 2100, photovoltaic solar cells need to be deployed at tens of peak terawatts (TWp) or they will have no noticeable impact on our future energy mix. Many of the current solar cell technologies are not capable of TWp-scale deployment due to natural resource limitations. For example, the huge electricity input for fabricating wafer-silicon solar cells makes it difficult to deploy wafer-silicon solar cells at the TWp scale. These limitations have to be removed or new solar cell technologies which are suitable for TWp-scale deployment have to be developed, for solar electricity to become a significant source of energy in our society. On the other hand, the current installed capacity of solar cells is ~10 peak gigawatt. Compared to the tens of TWp required, both the potential and gap for solar cells are enormous.

Today's solar cell technologies for terrestrial applications are based on various forms of crystalline silicon wafers. These technologies, the result of innovative and breakthrough research 40 years ago, have enabled a 30-billion-dollar global industry. Thin-film technologies, considered the next generation to wafer-silicon solar cells, came into being 30 years ago as another consequence of breakthrough and innovative research. These technologies are based on metal chalcogenide

or amorphous/microcrystalline silicon. There is no reason to believe that photovoltaic innovation has gone as far as it can or that new viable photovoltaic technologies don't exist beyond the horizon of our present knowledge. Fundamental and applied research is needed to make breakthroughs in wafer-silicon technologies, thin-film technologies, as well as totally new photovoltaic concepts.

This symposium will focus on conventional and non-conventional technologies for solar-to-electric energy conversion that could be deployed on the TWp-scale in the 21st century. Contributed publications of both fundamental and applied nature leading to low cost and high efficiency solar-to-electric conversion are solicited. Topics of interest include but not limited to: (1.) solar-grade silicon: purification, ingot growth, wafering, defects, and energy-efficient processing; (2.) wafer-silicon cells: poly- and mono-crystalline cells, fabrication techniques, device structures, and surface and grain boundary passivation; (3.) thin-film silicon cells: high-throughput deposition, micro- and poly-crystalline films, layer transfer techniques, and cost-effective light trapping; (4.) chalcogenide cells: fabrication techniques, device structures, and alternatives for scarce materials; (5.) new materials that are abundant, low cost, and non-toxic: inorganic, nanoscale, biomimetic, organic, and composite materials; (6.) new structures or concepts that promise a much higher efficiency/cost ratio: 3-dimentional, nanostructured, and multijunction devices; and (7.) cross-cutting issues: substrates, antireflective coatings, and module and alternative packaging.

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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. Tao**, University of Texas at Arlington, e-mail: mtao@uta.edu; **P. Chang**, Northrop Grumman, e-mail: pablo.chang@ngc.com; **C. Claeys**, IMEC, e-mail: claeys@imec.be; **J. Fenton**, Florida Solar Energy Center, e-mail: jfenton@fsec.ucf.edu; **K. Kakimoto**, Kyushu University, e-mail: kakimoto@riam.kyushu-u.ac.jp; **K. Rajeshwar**, University of Texas at Arlington, e-mail: rajeshwar@uta.edu; and **M. Sunkara**, University of Louisville, e-mail: mahendra@louisville.edu.

E9 Processing, Materials, and Integration of Damascene and 3D Interconnects
(Electronics and Photonics / Dielectric Science and Technology)

This symposium focuses on issues pertinent to advances in traditional damascene interconnects and new materials and integration methods for 3D interconnects. An emerging technology or device architecture called 3D integration is based on the system performance gains that can be achieved by stacking and vertically interconnecting distinct device layers. The 3D concept of replacing long 2D interconnects with shorter vertical (3D) interconnects has the potential to alleviate the well-known interconnect (RC) delay problem facing the semiconductor industry today. Additional benefits of the 3D process include reduced die size and the ability to optimize distinct technologies (analog, logic, RF, etc.) on separate vertically interconnected layers. An application area where large performance gains can be obtained is high-density device/sensor arrays where processing power is placed within each individual device/sen The aim of this symposium is to discuss the proposed architectures and applications of 3D integration, and the various enabling materials and processes that are required to bring the technology into full commercialization. Broadly, the enabling process technologies include: wafer/die thinning, wafer/die bonding, and vertical interconnect fabrication. Each of these process technologies will leverage novel materials, and much of the emphasis of this symposium will be on the materials science of these 3D integration materials. Ideally, this symposium will bring together researchers to discuss the various merits of the presented 3D device architectures, materials, and fabrication methodologies.

Topics of interest include, but are not limited to: (1.) 3D process integration methodologies; (2.) 3D design and architectures; (3.) simulation and modeling of 3D integrated devices; (4.) materials and techniques for die and wafer bonding; (5.) processing and handling of thin wafers and dice; (6.) materials for temporary die and wafer bonding; (7.) vertical interconnect fabrication technology; (8.) materials for vertical interconnects: insulators, barriers, and metals; (9.) reliability of 3D interconnects; (10.) novel test and measurement of 3D integrated devices; (11.) thermal management in 3D integrated devices; (12.) epitaxial and recrystallization approaches to 3D integration; and (13.) 3D integration of heterogeneous materials.

Damascene copper interconnects, introduced at the 0.25 µm node, have spanned six technology nodes, and are expected to be used for the foreseeable future. Despite the history of success, there are several new challenges including: increases in effective resistivity, electromigration and stress migration resistance, and the integration of porous low-k dielectrics and air-gaps. This symposium topic will bring together researchers to discuss the challenges and solutions to extend damascene copper interconnects well beyond the 45 nm node.

Suggested topics in the area of interest include (but are not limited to): (1.) methods to reduce increases in effective resistivity; (2.) methods to mitigate electromigration and stress migration issues; (3.) advanced barrier /seed processes including ALD and electroless films; (4.) porous low-k ILDs and air gap processing (including deposition and etching); and (5.) novel electrodeposition and CMP processes.

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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. Ritzdorf**, Semitool, e-mail: tritzdorf@semitool.com; **J. Flake**, Louisiana State University, e-mail: johnflake@lsu.edu; **M. Koyanagi**, Tohoku University; e-mail: koyanagi@sd.mech.tohoku.ac.jp; **O. Leonte**, Lam Research Corporation, e-mail: odleonte@comcast.net; **G. S. Mathad**, S/C Technology Consulting, e-mail: swami_mathad@hotmail.com; **P. Ramm**, Fraunhofer Institute IZM Munich e-mail: peter.ramm@izm-m.fraunhofer.de; **H. S. Rathore**, IBM Microelectronics, e-mail: rathore@us.ibm.com; and **F. Roozeboom**, Dept. of Applied Physics, Eindhoven University of Technology, e-mail: f.roozeboom@tue.nl.

E10 Science and Technology of Dielectrics for Active and Passive Devices
(Dielectric Science and Technology)

This symposium will address the science and technology of dielectric films, ranging from the nanoscale up to the micrometer scale, with emphasis on applications in photonics. Research fields of interest are related but not necessarily limited to the following topics: (1.) dielectrics for passive photonics, such as deposition and patterning for optical waveguides, optical interconnects, and integrated photonic systems; (2.) dielectrics for active devices, such as light sources, switches, and modulators; (3.) devices for optical communications and computing; (4.) micro-opto-electro-mechanical systems (MOEMS); and (5.) integration of photonic devices with existing silicon-based electronic

platforms. Invited and contributed papers will discuss both the fundamental aspects underlying certain applications and the particular challenges regarding technology, fabrication processes, 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: **P. Mascher**, McMaster University, e-mail: mascher@mcmaster.ca; **K. Wörhoff**, University of Twente, e-mail: K.Worhoff@el.utwente.nl; and **D. Misra**, New Jersey Institute of Technology, e-mail: dmisra@njit.edu.

E11 Semiconductor Wafer Bonding 11: Science, Technology, and Applications - In Honor of Ulrich Gösele
(Electronics and Photonics)

Semiconductor wafer bonding continues to evolve as a crucial technology extending new integration schemes and disseminating new product architectures in such diverse areas as high quality silicon-on-insulator (SOI) materials for electronic device applications (high performance CMOS logic platforms, bipolar, BiCMOS, power), strained Si layers by process-induced methodologies as well as built in strain in the bonding wafer, Si-Ge, Germanium-on-Insulator (GeOI), three-dimensional (3D) device integration, Si on quartz and Si on glass for active matrix addressed thin film displays, compound semiconductor-on-Si heterostructures and Micro-Electro-Mechanical Systems (MEMS). During recent years layer transfer by wafer bonding and exfoliation techniques have sufficiently matured not only to make their mark on the commercial semiconductor substrate market but also to extend to 3D integration of various materials and devices. This symposium brings together materials, device and process engineers from these and related interdisciplinary areas.

The eleventh symposium solicits original theoretical and experimental papers that document new developments and cover the full range of basic science, process technologies, and product applications of semiconductor wafer bonding. Fundamental aspects of interest include the influence of surface treatments on bonding and wafer splitting, low temperature bonding, surface activation of bonding interfaces, molecular wafer bonding and bonding of novel materials composites to synthesize heterostructures. Presentations characterizing currently utilized materials and processes, as well as novel approaches to new materials systems and modeling and process simulations are encouraged. Practical aspects of interest include innovative developments in product architecture and new integration and processing schemes for microelectronics, photonics, MEMS, microtechnologies, nanotechnologies, and other relevant applications.

All papers will be grouped into topical sessions, which will be preceded by a selection of invited review papers. A poster session will be held as well as the normal oral sessions. Sessions will include the following topics: physics, chemistry, and mechanics of wafer bonding; characterization of bonding interfaces; bonding techniques and equipment; generalized bonding (heterostructures, bonding via deposited films, etc.); layer transfer and exfoliation methods; electronic device applications (bipolar, high voltage and power, CMOS, microwave, etc.); and 3D integration, packaging, photonic, micro-electro-mechanical, and other 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: **C. Colinge**, Tyndall National Institute, e-mail: cindy.colinge@tyndall.ie; **J. Bagdahn**, Fraunhofer-Center for Silicon Photovoltaics, e-mail: Joerg.Bagdahn@csp.fraunhofer.de; **H. Baumgart**, Old Dominion University, e-mail: hbaumgar@odu.edu; **K. Hobart,** Naval Research Laboratory; e-mail: karl.hobart@nrl.navy.mil; **H. Moriceau**, CEA Léti - Minatec, NaNoTechnologies Department, e-mail: hubert.moriceau@cea.fr; and **T. Suga**, University of Tokyo, email: suga@pe.t.u-tokyo.ac.jp.

E12 State-of-the-Art Program on Compound Semiconductors 52 (SOTAPOCS 52)
(Electronics and Photonics / Sensor)

Compound and wide bandgap semiconductors are a significant enabler of numerous optoelectronic, high-speed, power, and sensor electronic materials, devices, and systems. The SOTAPOCS 52 symposium will address the most recent developments in inorganic compound and wide bandgap semiconductor technology, including traditional III-V materials, III-nitrides, II-VI materials, silicon carbide, diamond, and other emerging materials. Papers on both practical and fundamental issues are solicited. The following areas are of particular interest: (1.) advances in bulk and epitaxial growth technologies; (2.) advances in device processing; (3.) novel electronic, optoelectronic, and sensor devices; (4.) Schottky and ohmic contact technology; (5.) dielectric properties and passivation; (6.) wafer bonding and packaging; (7.) *in situ* and *ex situ* process monitoring; (8.) material characterization and wafer level testing and mapping; (9.) process induced defects; and (10.) reliability and device degradation mechanisms.

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E13 Thin Film Transistors 10 (TFT 10)
(Electronics and Photonics)

The TFT 10 is celebrating its 20th year anniversary. This is the world's first and longest technical conference dedicated to the TFT technology. The invited speakers list includes some of the most famous scientists and engineers who have made major contributions to the progress on TFTs and related fields. The symposium will continue its tradition of providing a forum for the presentation and discussion of the latest developments in TFTs and related fields. The symposium is a forum for synergistic interactions among those working in TFTs, those working in related high-tech fields, and those applying TFTs to products or research areas. Papers dealing with all aspects of fabrication processes, materials, devices, structures, and applications are solicited. Topics to be addressed in this symposium are: (1.) new TFT structures; (2.) novel or new processes; (3.) organic, inorganic, oxide, nano, and thin film materials; (4.) device physics, modeling, characterization, and reliability; (5.) applications in LCDs, imagers, sensors,

biochips, memories, MEMS, circuits, etc.; and (6.) integration of TFTs to large area displays, VLSIC, and other complicated systems.

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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. Kuo**, Texas A&M Univ., e-mail: yuekuo@tamu.edu; **D. Ast**, Cornell Univ., e-mail: dast@ccmr.cornell.edu; **O. Bonnaud**, Univ. de Rennes 1, e-mail: bonnaud@univ-rennes1.fr; **S. Fonahs**, Pennsylvania State Univ., e-mail: sfonash@psu.edu; **H. Hamada**, Sanyo, e-maill: hiroki.hamada@sanyo.com; **M. Hatano**, Hitachi, e-mail: m-hatano@crl.hitachi.co.jp; **J. Jang**, Kyung Hee Univ., e-mail: jjang@khu.ac.kr; **W. Milne**, Cambridge University, e-mail: wim1@hermes.cam.ac.uk; **A. Nathan**, University College London, e-mail: anathan@ucl.ac.uk; and **M. Shur**, RPI, e-mail: shurm@rpi.edu.

E14 to E22 SiGe, Ge, and Related Compounds: Materials, Processing, and Devices 4
(Electronics and Photonics)

This symposium will provide a forum for reviewing and discussing all materials and device related aspects of SiGe, Ge, and related compounds (SiC, SiGeC, etc).

There are nine areas of interest for the symposium: (1.) heterojunction bipolar transistors: device physics, process technology, modeling issues, reliability, and circuit applications (analog, digital, and RF to mm-wave); (2.) FET technology: SSCMOS, SiGe FET structures, SiGe HEMTs, SiGe MODFETs, SiGe FET structures on SOI, RTD, Ge-FETs, low voltage and low power; (3.) optoelectronics: detectors, waveguides, quantum cascade structures, photovoltaic cells, photoluminescence, electroluminescence, integration with CMOS electronics, Ge buffers for III-V optoelectronics on Si, monolithic optoelectronic integrated circuits (OEICs); (4.) epitaxy: all aspects of surface preparation and growth of epitaxial Si, SiGe, SiGe:C, and Ge layers; novel growth techniques and tools; selective growth; high Ge content growth; novel in situ doping approaches; growth of SiC or III-V on SiGe layers or Ge; quantum wire/dot growth; (5.) processing: all aspects of processing including diffusion, oxidation, strain, thermal mixing, and defects; impurity diffusion and diffusion suppression, Si and Ge intermixing, oxidation and nitridation, cleaning and etching of SiGe, Ge, and SiGeC films; (6.) strain engineering: relaxed SiGe buffer layers, pseudomorphic SiGe, superlattices, embedded SiGe, Ge condensation, SSOI, SGOI substrates, global strain, local/process-induced strain, strain characterization, strain modeling and simulation, defects, manufacturing issues; (7.) surfaces and interfaces: high k interface, metal contact, interfacial electrical properties and its characterization; electro-mechanical properties of SiGe layers, MEMs, TFTs; (8.) germanium and related compounds: novel structures growth (Si:C, III-V on Ge/SiGe), strain, devices, defects, diffusion, dielectric deposition, surface effects; and (9.) emerging applications: nanostructured devices, quantum computing, THz devices, electro-mechanical properties of SiGe layers, MEMs, TFTs, and amorphous SiGe layer applications.

This symposium will also feature a special evening workshop on a key SiGe, Ge, and related compounds topic: a panel of experts will discuss issues related to a key topic, and an evening poster session. All posters will be part of an evening program with a three-minute short talk as well as the conference poster display session. There are two steps to submit a paper for this symposium.

Step 1. Abstract Paper Submission (abstract submission deadline: April 15, 2010): authors should submit an ECS abstract (using the ECS provided template) via the ECS website. For the SiGe, Ge, and Related Compounds Symposium, the website will be open for abstract submission from December 27, 2009 until the final abstract submission deadline of April 15, 2010. Please note that this deadline is earlier than the general ECS abstract submission deadline of May 7. All authors will receive a confirmation from ECS with the disposition of the paper in the symposium (invited 30 minute oral presentations, contributed 20 minute oral presentations, or poster three-minute short oral presentation). Note that each of the symposium topics above will be designated in the abstract submission system as if it were a separate symposium. Please submit your abstract to your intended topic designation.

Step 2. Proceedings Manuscript Submission (proceedings manuscript submission deadline: June 18, 2010**):** the symposium proceedings will be available at the time of the symposium and will serve as the digest of technical papers. All regular and invited paper authors must submit a full-length manuscript for review before July 18. Authors are required to follow detailed instructions and templates for the preparation of the manuscript which may be found at the ECS website.

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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. Harame**, General Chair, IBM Systems and Technology Group, Essex Junction, VT USA, e-mail: dharame@us.ibm.com; **J. Boquet**, Publications Chair, IBM Systems and Technology Group, Essex Junction, VT, USA, e-mail: boquet@us.ibm.com; **J. Cressler**, HBT Committee Chair, Georgia Institute of Technology; **A. Reznicek**, Related Compounds Committee Chair, IBM TJ Watson Research Center; **M. Caymax**, Epitaxy Committee Chair, SPDT/AMPS, IMEC; **Y. Yee Chia**, FET Committee Chair; **B. Tillack**, Processing Committee Chair, IHP; **G. Masini**, Optoelectronics Committee Chair, Luxtera, Inc; **S. Miyazaki**, Surfaces and Interfaces Committee Chair, Hiroshima University; and **S. Koester**, Workshop Committee Chair, IBM TJ Watson Research Center.

F — Electrochemical / Chemical Deposition and Etching

F1 Electroless Deposition Principles, Activation, and Applications
(Electrodeposition / Energy Technology)

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

The aim of this symposium is to bring together scientists, researchers and engineers in order to review and discuss the latest developments and to suggest the future directions in the field of electroless deposition. The papers of interest

include, but are not limited to: (1.) galvanic or displacement deposition; (2.) autocatalytic deposition; (3.) mechanistic aspects and kinetics of electroless deposition; (4.) surface activation for electroless deposition; (5.) metallization of non-conductive surfaces via electroless deposition; (6.) applications for electronics, energy device, aerospace, automotive etc. industries; (7.) deposition of semiconductors from chemical baths; and (8.) electroless deposition and nanotechnology. Materials of interest include thin or thick films and powders of metals, alloys, or compounds (e.g. oxides, salts, polymers).

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Abstracts should be submitted electronically to the ECS headquarters, and questions and inquiries should be sent to the symposium organizers: **S. Djokic**, Elchem Consulting Ltd., e-mail: sdjokic@telus.net; **L. Magagnin**, Politecnico di Milano, e-mail: luca.magagnin@polimi.it; **M. A. Ryan**, Jet Propulsion Laboratory, e-mail: Margaret.A.Ryan@jpl.nasa.gov; **J. L. Stickney**, University of Georgia, e-mail: stickney@chem.uga.edu; and **G. Zangari**, University of Virginia, e-mail: gz3e@virgi

F2 Electronics and 3D Packaging 4
(Electrodeposition)

This symposium will cover the scientific and technological advances in electrochemical technology as applied to electronics and 3D packaging. Recent progress in high speed ULSI triggered technological revolution of electronics packaging. Both electronics packaging and ULSI research topics are invited as abstracts. Since electrochemical processes are the ultimate solution to create smaller size and lower cost devices, both practical and fundamental aspects of electrochemical processes are highly demanded in this area. Special interests are shape evolution and additive chemistry of high-aspect ratio, mathematical modeling of deposition and etching, through-mask plating, nano-fablication and MEMS.

Some suggested topics include, but are not restricted to: (1.) advanced substrates and packaging; three-dimensional(3D) chip stacking, system in packaging(SIP), high speed and optical packaging, wireless and micro CSP; (2.) chip interconnect metallization; damascene plating, copper, copper-alloys, silver etc., seed/barrier layers, sputter seeding, metal migration and planarization; (3.) chip-package interconnection; flip-chip (C4) technology, Pb-free C4s, wire bonding, TAB, compliant chip-package interconnection and room temperature joint; (4.) surface treatment; conductor, dielectric, pad and Au/other plating; (5.) MEMS of micromechanics; transducers bio-sensors, and bio-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: **K. Kondo,** Chemical Engineering, Osaka Prefecture University, e-mail: kkondo@chemeng.osakafu-u.ac.jp; **R. Akolkar**, Intel Corporation Components Research Portland, OR, USA, e-mail: rohan.n.akolkar@intel.com; **D. P. Barkey**, University of New Hampshire, Department of Chemical Engineering, e-mail: dpb@cisunix.unh.edu; **M. Hayase**, Mechanical Engineering, Tokyo Science University, e-mail: mhayase@rs.noda.tus.ac.jp; and **T. Ritzdorf**, Semitool, e-mail; tritzdorf@semitool.com.

F3 Magnetic Materials, Processes, and Devices 11
(Electrodeposition)

Magnetic thin films play important roles in data recording systems, sensors, microelectromechanical systems (MEMS), and other devices. New knowledge continues to be acquired in magnetic film processing including: film nucleation and growth, structure of deposits, stress and micromagnetics of films, thermal and magnetic annealing, electrochemical and electroless plating systems, etching, process chemistry, tool design, process control, etc. Our understanding of the correlations between deposition parameters, film composition, structure, properties, and device performance also continues to improve.

The purpose of the symposium is to bring together electrochemists, physicists, engineers, and device designers who are working in the area of magnetic thin-film technology to review the present state of the field and to point out fruitful new areas for research. Materials of interest include Fe, Ni, Co, and their alloys, as well as laterally patterned, laminated, or compositionally modulated structures, including nanowires and self-organized films.

The symposium will further cover subjects specific to the fabrication of thin-film heads, microelectromechanical systems, micromotors, and other magnetic devices. The symposium will include invited review or tutorial papers and contributed papers.

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F4 Molecular Structure of the Solid-Liquid Interface and Its Relationship to Electrodeposition 7
(Electrodeposition)

New techniques for characterizing the solid-liquid interface at the molecular scale have the potential for guiding fundamental advances related to electrodeposition. Events at the molecular scale play a significant role in determining product quality in many technological processes. The goal of this symposium is to draw together the collective interests of scientists and engineers skilled in new experimental and computational methods involving electrodeposition applications.

The symposium will provide a forum for advances in understanding of key fundamental phenomena such as the role of defects, additives, solvent effects, nanoscale phenomena, surface films, mechanisms of lattice formation, and hydrodynamic phenomena. Papers are solicited on *in situ* and *ex situ* experimental methods, time- and frequency-domain modulation, surface microscopies, linear and nonlinear surface spectroscopies. Numerical simulations and mathematical methods of interest include continuum as well

as non-continuum scales, methods for predicting force fields associated with the interface including self-assembly, and numerical techniques for simulating system-wide behavior over multiple time- and distance-scales.

In addition, the symposium will provide non-electrodeposition scientists with a platform for presenting novel and non-traditional approaches to research on electrodeposition.

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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. C. Alkire**, University of Illinois, e-mail: r-alkire@uiuc.edu; and **D. M. Kolb**, University of Ulm, e-mail: dieter.kolb@uni-ulm.de.

G — Electrochemical Synthesis and Engineering

G1 Large-Scale Energy Storage for Smart Grid Applications

(Industrial Electrochemistry and Electrochemical Engineering / Energy Technology / Battery)

Large scale energy storage is a critical enabling technology for achieving the objectives of a "smart" electrical grid infrastructure. Energy storage is required for integration of variable generation from renewables (wind and solar), minimizing use of fossil-fueled power plants for load leveling, and for ensuring the quality of distributed electrical energy. Various types of power sources are under investigation by utilities include but are not limited to, redox-flow batteries, regenerative fuel cells, high-energy batteries, ultra-capacitors, flywheels and compressed gas storage. Papers are sought that address the technology challenges associated with deploying long-life, low-cost, and efficient energy storage systems.

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I — Physical and Analytical Electrochemistry

I1 Physical and Analytical Electrochemistry General Session

(Physical and Analytical Electrochemistry)

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

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

I2 Electrochemistry in Nanospaces

(Physical and Analytical Electrochemistry)

This symposium will provide an international and interdisciplinary forum for researchers to present their recent research on electrochemical studies involving nanospaces (nanopores, nanoholes) having controlled structures. Papers are invited in the following areas: electrochemical approaches to synthesize nanoporous materials, electrochemical studies on mass/electron/charge transport behavior within nanospaces, and applications of nanospaces for electroanalytical sensing and power sources.

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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. Ito**, Kansas State University, e-mail: ito@ksu.edu; and **L. Baker**, Indiana University, e-mail: lanbaker@indiana.edu.

I3 International Symposium on Molten Salts and Ionic Liquids 17

(Physical and Analytical Electrochemistry / High Temperature Materials / Electrodeposition / Energy Technology)

This symposium will provide an international and interdisciplinary forum to present the latest research on systems involving molten salts and ionic liquids. Papers on basic and applied research in all areas of chemistry, engineering, electrochemical systems, and physics related to molten salts and ionic liquids are solicited.

The topics will include: (1.) power and energy applications (*e.g.,* batteries, fuel cells, semiconductors, photovoltaics, and phase change energy storage); (2.) rare Earth and nuclear chemistry (*e.g.,* lanthanides, actinides, radioisotopes, nuclear reprocessing); (3.) electrodeposition (*e.g.*, deposition of alloys, characterization of electroactive species, and surface characterization); (4.) reactions (*e.g.*, catalysis, synthesis, oligomerizations, and polymerizations); (5.) separations (*e.g.*,

selective extractions and biphasic systems); (6.) corrosion phenomena (*e.g.*, corrosion protection and molten salt promoted corrosion); (7.) solute and solvent properties (*e.g.*, structural investigations, melting behavior, dynamics, and stability of molten salts); (8.) biochemical and biomedical applications (*e.g.*, dissolution of biopolymer, enzymatic reactions, and bioelectrocatalysis); and (9.) new ionic liquids and molten salt mixtures (*e.g.*, liquid clathrates, binary and ternary melts, and task specific ionic liquids).

Keynote lectures will be presented by invited speakers. A poster session will be planned. Student participation is highly encouraged, and it is anticipated that some funds will be available for student and young scientist support.

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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. M. Fox**, American University, e-mail: dfox@american.edu; **H. De Long**, AFRL/AFOSR, Directorate of Chemistry and Life Sciences, e-mail: hugh.delong@afosr.af.mil; **W. A. Henderson**, North Carolina State University, e-mail: whender@ncsu.edu; **R. A. Mantz**, Army Research Office, e-mail: Robert.a.mantz@us.army.mil; **M. Mizihata**, Kobe University, mizuhata@kobe-u.ac.jp; and **P. C. Trulove**, United States Naval Academy, e-mail: trulove@usna.edu.

I4 Oscillations and Pattern Formation in Electrochemical Systems
(Physical and Analytical Electrochemistry)

This symposium will be held to provide a forum for reviewing recent advances in application of nonlinear science to electrochemical systems. Papers are solicited on characterization of far-from-equilibrium phenomena including bistablity, oscillations, chaos, and pattern formation in electrocatalytic, electrodeposition, and metal dissolution systems. Special attention will be paid to the description of dynamical behavior of fuel cells and corrosion processes. Both experimental (*e.g.*, spatially resolved microscopic techniques, time series analysis, control problems) and theoretical (*e.g.*, numerical modeling, stability analysis, perturbation methods) approaches will be 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: **I. Z. Kiss**, Saint Louis University, e-mail: izkiss@slu.edu; and **H. Varela**, Universidad de São Paulo, e-mail: varela@iqsc.usp.br.

I5 Professor V. S. Bagotsky: 65 Years in Theoretical Electrochemistry, Electrocatalysis, and Applied Electrochemistry
(Physical and Analytical Electrochemistry / Energy Technology)

This symposium is being held to honor one of the most significant figures in the field of electrochemistry during the past 60+ years: Prof. Vladimir S. Bagotsky. Coincidentally, Prof. Bagotsky marks his 90th birthday in 2010, so there are several reasons to celebrate his achievements during that year. Prof. Bagotsky's career in electrochemistry began in the mid-1940s, and he has continued to actively contribute to the field until the present time. He was a colleague and co-worker of Prof. Alexander Frumkin from 1944 until Frumkin's death in 1976. His contributions to the understanding of direct-methanol fuel-cell reactions during the '60s and '70s are legendary. He was the first to prove that the dissociative-splitting mechanism was a crucial step in the adsorption and oxidation of methanol at noble-metal electrodes. This initial-stage reaction step is accepted to this day. He has also been actively engaged in research and development of the silver–zinc, and other, storage battery systems; indeed, the battery systems he developed were extensively used in the Russian Space Program of the late 1950s and early 1960s. Prof. Bagotsky took part in the launching of the first Russian Sputnik satellite in 1957, and the first flight of man in space (1961). In some respects, one could consider him as a living legend, and this symposium will honor his accomplishments and contributions to the field.

Contributions to this symposium are invited in the following research areas (based on the life and career of V. S. Bagotsky): (1.) chemical and electrochemical power systems for generation, conversion and storage; (2.) electrochemical reaction kinetics; (3.) electrocatalysis for fuel cell and related electrochemical reactions; (4.) the direct methanol fuel cell [DMFC] system, and its many machinations over the years; and (5.) open questions in electro-kinetics, catalysis and power systems, especially related to the research career of V. S. Bagotsky.

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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. MacDougall**, National Research Council of Canada, e-mail: barry.macdougall@nrc-cnrc.gc.ca; **C. Bock,** National Research Council of Canada, Institute for Chemical Processes and Environmental Technologies, e-mail: Christina.Bock@nrc-cnrc.gc.ca; **E. Shembel**, Enerize Corporation, e-mail: eshembel@enerize.com; and **K. Zaghib**, Institut de Recherche d'Hydro-Québec (IREQ), e-mail: zaghib.karim@ireq.ca.

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

J1 Chemical Sensors 9: Chemical and Biological Sensors and Analytical Systems
(Sensor)

This symposium will provide a forum for the discussion of the research and development in the field of chemical (gas, ion, bio, and other) sensors, including molecular recognition surface, transduction methods, and integrated, smart, and micro sensor systems. Topics of interest include: (1.) development of new selective molecular recognition surfaces and materials; (2.) sensors and analytical systems for safety and security; (3.) sensors for energy and environment; (4.) novel methods for signal amplification and detection; (5.) development and analysis of sensor arrays for the simultaneous detection of multiple analytes; and (6.) micro total analysis systems (m-TAS). All transduction methods are of interest for this symposium (*e.g.*, electrochemical, optical, acoustic, gravimetric, and thermal).

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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**, Ocean Nano Tech, 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; and **A. Simonian**, Auburn University, e-mail: als@eng.auburn.edu.

J2 Luminescence and Energy Efficiency
(Luminescence and Display Materials / Energy Technology)

This symposium will highlight the role of luminescent materials for energy reduction and renewable energy sources. Significant energy savings are being accomplished through the introduction of energy efficient lighting, and presentations will include experimental and theoretical work on white light LEDs, OLEDs, and fluorescent lighting. Examples for renewable energy sources include, but are not limited to, quantum cutting coatings for solar cells and related up/down conversion processes. Abstracts should be sent electronically to the ECS headquarters office.

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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. Happek**, The University of Georgia, e-mail: uhappek@physast.uga.edu; **A. Mannivannan**, NETL, e-mail: manivana@netl.doe.gov; **A. Setlur**, GE Global Research, e-mail: setlur@crd.ge.com; and **A. M. Srivastava,** GE Global Research, e-mail: e-mail: srivastava@crd.ge.com.

J3 Microfabricated and Nanofabricated Systems for MEMS/NEMS 9
(Sensor / Dielectric Science and Technology / Physical and Analytical Electrochemistry / Electronics and Photonics)

This symposium continues the series of symposia that focus on all aspects of MEMS/NEMS technology including micro/nanomachining, fabrication processes, packaging, and the application of these structures and processes to the miniaturization of chemical sensors, physical sensors, biosensors, miniature chemical analysis systems and other devices. Particular emphasis should be placed on processes and potential applications of these devices. The following is a partial list of topics to be solicited: (1.) fabrication and processing of nano/microsystems; (2.) nanomaterials for sensors and actuators; (3.) novel methods of processing at the nano/microscale; (4.) use of nano/microstructures applicable to environmental and biological studies; (5.) chemical, electrical and physical testing of devices; (6.) integrated microfabricated sensors into arrays; (7.) reliability of micro/nanomechanical structures; (8.) new materials for NEMS/MEMS including aluminum nitride and silicon carbide films.

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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. J. Hesketh**, Georgia Institute of Technology, e-mail: peter.hesketh@me.gatech.edu; **J. L. Davidson**, Vanderbilt University, e-mail: jim.davidson@vanderbilt.edu; **A. Longdergan,** Qualcom MEMS Technologies, e-mail: alonderg@qualcomm.com; **S. Shoji**, Waseda University, e-mail: shojis@waseda.jp; **P. Srinivasan,** Texas Instruments**,** purushothaman@ieee.org; and **P. Vanysek,** Northern Illinois University, e-mail: pvanysek@niu.edu.

J4 Physics and Chemistry of Luminescence and Display Materials
(Luminescence and Display Materials / Sensor)

This symposium will focus on physical and chemical aspects of luminescence, in both organic and inorganic solids, and will address current and emerging technical and scientific issues in luminescence. Presentations at this meeting will include photoluminescent materials for medical and biological applications, cathodoluminescent materials, electroluminescent materials, scintillators, persistent phosphors, lasers, and other optical devices.

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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. Happek**, The University of Georgia, e-mail: uhappek@physast.uga.edu; **Z. Aguilar**, Ocean Nanotech, e-mail: zaguilar@oceannanotech.com; and **K. Mishra**, Osram Sylvania, e-mail: kailash.mishra@sylvania.com.