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ECS<sup>®</sup>

**Call for Papers**

May 6-11, 2007 | 211th ECS Meeting | Hilton Chicago

**CHICAGO**



# CHICAGO

The 211<sup>th</sup> Meeting of The Electrochemical Society will be held from May 6-11, 2007. This major international conference offers a unique blend of electrochemical and solid-state science and technology; and serves as a major forum for the discussion of interdisciplinary research from around the world through a variety of formats, such as oral presentations, poster sessions, exhibits, and tutorial sessions.

## Abstract Submission and Deadlines

**Abstracts are due no later than January 3, 2007.**

Submit one original meeting abstract electronically via [www.electrochem.org](http://www.electrochem.org), no later than **January 3, 2007**. Faxed abstracts, late abstracts, and abstracts more than one page in length will not be accepted. In February 2007, 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.

**Note: Some abstracts are due earlier than January 3, 2006.** Please carefully check symposium listing for any alternate abstract submission deadlines. For complete details on abstract submission and symposium topics, please see [www.electrochem.org](http://www.electrochem.org).

Meeting abstracts should explicitly state objectives, new results, and conclusions or significance of the work. Abstracts **must** be properly formatted and no more than **one page in length**. Please use the preformatted template located at: [http://www.electrochem.org/meetings/guidelines/abst\\_temp\\_info.htm](http://www.electrochem.org/meetings/guidelines/abst_temp_info.htm). Programming for this meeting will occur in January and February of 2007, 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 February of 2007. Oral presentations must be in English. Only LCD projectors will be provided for oral presentations. **Presenting authors will be required to bring their own laptops to the meeting.** We strongly suggest that presenting authors verify laptop/projector compatibility in the speaker ready room prior to their

presentation at the meeting. Speakers requiring additional equipment must make written request to the ECS headquarters office at least one month prior to the meeting and appropriate arrangements will be worked out, subject to availability, and at the expense of the author. Poster presentations should be displayed in English, on a board approximately 4 feet high by 8 feet wide (1.22 meters high by 2.45 meters wide), corresponding to the abstract number and day of presentation in the final program.

## Manuscript Publication

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

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

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

Some symposia will publish their issue to be available "AFTER" the meeting. Even if an individual symposium listing does not specify publication of an ECST issue, all authors are still encouraged to submit their full papers. To determine acceptance in ECST, all submitted manuscripts will be reviewed, either by the symposium organizers or by the ECST Editorial Board. After the meeting, all accepted papers in ECST will be available for sale, either individually, or by issue.

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

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

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

## Financial Assistance

Financial assistance is very limited and generally governed by the symposium organizers. Individuals may inquire directly to the symposium organizers of the symposium in which they are presenting their paper to see if funding is available. Individuals requiring an official letter of invitation should write to the ECS headquarters office; such letters will not imply any financial responsibility of ECS. Students seeking financial assistance should consider awarded travel grants (see page 92 of this issue of *Interface*).

## Hotel Reservations

The 211<sup>th</sup> Meeting will be held at the Hilton Chicago, located at 720 S. Michigan Avenue, Chicago, Illinois 60605, USA.

Special rates have been reserved at the Hilton Chicago for participants attending this meeting. The reservation deadline is **April 6, 2007**; please refer to ECS website for rates and reservations.

## Meeting Registration

All participants, including authors and invited speakers of the 211<sup>th</sup> Meeting, are required to pay the appropriate registration fees. Hotel and meeting registration materials will be distributed in February of 2007 and will also be available on the ECS website ([www.electrochem.org](http://www.electrochem.org)). The deadline for advance registration is **April 6, 2007**.

## Short Courses

A number of short courses will be offered on Sunday, May 6, 2007 from 9:00 AM-4:30 PM. Short Courses require advance registration and may be cancelled if enrollments are too low. The following Short Courses are planned for the meeting: Basic Electrochemical Measurements, PEM Fuel Cells, Basics of Impedance Spectroscopy, Electrochemical Capacitors, Electrochemical Nanotechnology, Electrical Characterization and Characteristics of MOS Devices with Ultrathin High-k Gate Dielectrics, Lithium Ion Batteries, and Molecular Electronics. Please check the ECS website for the final list of offerings.

## Technical Exhibit

The 211<sup>th</sup> ECS Meeting will also include a Technical Exhibit, featuring presentations and displays by over 30 manufacturers of instruments, materials, systems, publications, and software of interest to meeting attendees. Full exhibit booths manned by company representatives cost \$1,800 and include one free meeting registration. Literature display tables (unmanned by company representatives; no meeting registration included) will also be available for \$850. Parties interested in exhibiting should contact Amir Zaman at the ECS headquarters office for more information. Coffee breaks are scheduled each day in the exhibit hall along with evening poster sessions to increase traffic.

## Sponsorship Opportunities

ECS biannual meetings are wonderful chances to market your company through sponsorship. Sponsors will be recognized by level in Interface, the Meeting Program, the Exhibit Guide, on registrant bags, and on the ECS website.

The Levels are: Platinum: \$5,000+, Gold: \$2,500+, Silver: \$1,000+, and Bronze: \$1,000.

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

## Contact Information

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

# SYMPOSIUM TOPICS

## A General Topics

- A1—General Student Poster Session
- A2—Tutorials in Nanotechnology: Focus on High Temperature Materials

## B Batteries, Fuel Cells, and Energy Conversion

- B1—Electrochemistry of Novel Electrode Materials for Energy Conversion and Storage
- B2—Characterization and Prevention of Failure Modes of Lithium Polymer and Lithium Ion Batteries in Transportation Applications
- B3—High Temperature Batteries
- B4—Hydrogen Production, Transport, and Storage 2
- B5—Medical Batteries
- B6—Power Sources for EV and HEV Applications

## C Biomedical Applications and Organic Electrochemistry

- C1—Organic and Biological Electrochemistry General Poster Session
- C2—Building Complexity into Electrodes and Electrode Processes
- C3—New Bioanalytical and Biomedical Methods
- C4—Organic and Biological Nanosystems

## D Corrosion, Passivation, and Anodic Films

- D1—Corrosion General Session

## E Dielectric and Semiconductor Materials, Devices, and Processing

- E1—Advanced Gate Stack, Source/Drain, and Channel Engineering for Si-Based CMOS: New Materials, Processes, and Equipment 3
- E2—Processes at the Semiconductor Solution Interface 2
- E3—Silicon Nitride, Silicon Dioxide Thin Insulating Films and Emerging Dielectrics 9
- E4—SOI Device Technology 13
- E5—State-of-the-Art Program on Compound Semiconductors (SOTAPCS 46)
- E6—Thin Film Materials, Processes, and Reliability

## F Electrochemical/Chemical Deposition and Etching

- F1—Electrochemical Processing in ULSI and MEMS 3

## G Electrochemical Synthesis and Engineering

- G1—Industrial Electrolysis and Electrochemical Engineering General Session
- G2—Design of Electrode Structures
- G3—Membranes for Electrochemical Applications
- G4—Multi-Scale Simulations of Electrochemical Systems

## H Fullerenes, Nanotubes, and Carbon Nanostructures

- H1—Electron Transfer and Applications of Fullerene and Nanostructured Materials, in Honor of David Schuster
- H2—Molecular and Supramolecular Chemistry of Fullerenes and Carbon Nanotubes
- H3—Carbon Nanotubes and Nanostructures: Fundamental Properties and Processes
- H4—Carbon Nanotubes and Nanostructures: Applications and Devices
- H5—Endofullerenes and Carbon Nanocapsules
- H6—Energetics and Structure
- H7—Solid-State Physics
- H8—Carbon Nanotubes and Nanostructures: Medicine and Biology
- H9—Porphyrins and Supramolecular Assemblies
- H10—Metallic and Semiconductor Nanoparticles

## I Physical and Analytical Electrochemistry

- I1—Physical and Analytical Electrochemistry General Session
- I2—Advance In-Situ Techniques for Analysis of Electrochemical Systems

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

- J1—Sensors, Actuators, and Microsystems General Session
- J2—Clinical and Diagnostic Sensors and Systems
- J3—Nanoporous Materials: Chemistry and Applications
- J4—Persistent Phosphors 3
- J5—Sensors Based on Nanotechnology 3

## Student Travel Grants

Several of the Society's Divisions offer travel assistance to students presenting papers at Society meetings. These travel grants are intended to aid students in attending the meeting. For additional information and online application form refer to the ECS website. To be eligible for a grant, applications must be scheduled to present a paper in a symposium or session sponsored or

cosponsored by the Division to which the application is made. For an up-to-date list of symposia and how to submit a paper, please visit [www.electrochem.org](http://www.electrochem.org). To apply for a travel grant use the application form below.

**Application Requirements**—All applications for the 211<sup>th</sup> meeting in Chicago, Illinois, May 6-11, 2007, **must be received no later than January 1, 2007**. To apply for travel support,

please complete the Student Travel Grant form below, return it with a letter of recommendation from a faculty advisor, and a copy of the meeting abstract. Travel grants range from \$250-\$750 depending on the student's estimated expenses and the funds available from Divisions. ■

## Travel Grant Application Chicago, Illinois

The Society's Corrosion, Electrodeposition, Electronics and Photonics, Energy Technology, High Temperature Materials (HTM), Industrial Electrolysis and Electrochemical Engineering (IEEE), Organic and Biological Electrochemistry (O&BE), Physical and Analytical Electrochemistry, and Sensor Divisions offer travel grants to students presenting papers at the Society's next meeting, in Chicago, Illinois, May 6-11, 2007. To apply, complete this application and send it along with a copy of your transcript and a letter from an involved faculty member attesting both to the quality of the student's work and financial needs, and a copy of the student's meeting abstract. For additional information please contact the Division contact below, as requirement might differ between Divisions.

Meeting Site: \_\_\_\_\_

Name: \_\_\_\_\_

School Address: \_\_\_\_\_

E-mail: \_\_\_\_\_ Phone #: \_\_\_\_\_

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

Major Subject: \_\_\_\_\_ Grade point average \_\_\_\_\_ out of possible \_\_\_\_\_  
(please provide a letter of recommendation from your faculty advisor and a copy of your transcript)

Symposium Title (#): \_\_\_\_\_

Title of paper to be presented at the meeting: \_\_\_\_\_

Are you an ECS Student Member of the Society?      ☐ yes      ☐ no  
(if not, please additionally submit the Awarded Student Membership application.)

Estimated meeting expenditures: \$ \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Check Division under which award is being applied for: (Applications made to multiple Divisions will be rejected)

- ☐ **Corrosion**—Send to: N. Missert, Sandia National Labs, MS 1415, P.O. Box 5800, Albuquerque, NM 87185-0100, USA. E-mail: [namisse@sandia.gov](mailto:namisse@sandia.gov)
- ☐ **Electrodeposition**—Send to: L. Deligianni, IBM T J Watson Research Center, 1101 Kitchawan, Yorktown Heights, NY 10598, USA. E-mail: [lili@us.ibm.com](mailto:lili@us.ibm.com)
- ☐ **Electronics and Photonics**—Send to: F. Ren, University of Florida, Dept. of Chem. Engr., Gainesville, FL 32611, USA. E-mail: [ren@che.ufl.edu](mailto:ren@che.ufl.edu)
- ☐ **Energy Technology**—Send to: S. Calabrese Barton, Dept. of Chem. Engr., Columbia University, 500 W. 120th Street, Room 812, New York, NY 10027-6623, USA. E-mail: [scb2001@columbia.edu](mailto:scb2001@columbia.edu)
- ☐ **HTM**—Send to: J. Fergus, Materials Research and Education Center, 275 Wilmore Laboratories, Auburn, AL 36849, USA. E-mail: [jwfergus@eng.auburn.edu](mailto:jwfergus@eng.auburn.edu)
- ☐ **IEEE**—Send to: G. Pillay, South Dakota School of Mines and Technology, 501 E. St. Joseph Street, Rapid City, SD 57701, USA. E-mail: [gautum.pillay@sdsmt.edu](mailto:gautum.pillay@sdsmt.edu)
- ☐ **O&BE**—Send to: J. F. Rusling, Univ. of Connecticut, Dept. of Chemistry, U-60, Storrs, CT 06268, USA. E-mail: [James.Rusling@uconn.edu](mailto:James.Rusling@uconn.edu)
- ☐ **Physical and Analytical Electrochemistry**—Send to: P. Trulove, U.S. Naval Academy, Chemistry Department, 582M Holloway Road, Stop 9B, Annapolis, MD 21402-5026, USA. E-mail: [trulove@usna.edu](mailto:trulove@usna.edu)
- ☐ **Sensor**—Send to: Y-L. Chang, Nanomix, Inc., 5980 Horton Street, Suite 600, Emeryville, CA 94608, USA. E-mail: [ychang@nano.com](mailto:ychang@nano.com)

**Applications for Travel Grants for the Chicago, Illinois meeting must be received no later than January 1, 2007.**



# Chicago Call for Papers | May 6-11, 2007

## A—GENERAL TOPICS

A1

### General Society 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. A cash prize of \$250 and a scroll will be awarded to the winning student authors. In the case of coauthors, a maximum award of \$750 per winning poster will be divided equally between student coauthors. The awards will be made without regard to gender, citizenship, race, or financial need.

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **H. Martin**, Case Western Reserve University, e-mail: hbm@po.cwru.edu; **P. Pintauro**, Case Western Reserve University, e-mail: pnp3@po.cwru.edu; and **V. Subramanian**, Tennessee Technical University, VSubramanian@tntech.edu.

A2

### Tutorials in Nanotechnology: Focus on High Temperature Materials

#### All Divisions

The emergence of nanotechnology as a major field of research has touched almost every scientific discipline. This tutorial symposium will focus on the role of nanoscale phenomena on processing, properties, and applications of high temperature materials. Topics include stability of nanostructured materials; sensors applications; nano-ionics; nanostructured thin films; nanocomposites and interfaces; nano-materials for SOFCs; and ferroelectrics and dielectrics. These tutorial lectures will discuss both fundamentals of nanoscience and state-of-the-art developments in nanotechnology. Papers will be by invitation only; abstracts will be submitted via the ECS website.

Comments and inquiries about the symposium may be sent to the organizers: **S. Adler**, University of Washington, Department of Chemical Engineering, Box 351750, Seattle, WA 98195-1750, USA, tel: 206.543.2131, e-mail: stuadler@u.washington.edu; **E. Traversa**, University of Rome Tor Vergata, e-mail: traversa@uniroma2.it; and **W. van Schalkwijk**, EnergyPlex Corp., e-mail: walter@energyplex.com.

## B—BATTERIES, FUEL CELLS, AND ENERGY CONVERSION

B1

### Electrochemistry of Novel Electrode Materials for Energy Conversion and Storage

#### Battery / Physical and Analytical Electrochemistry / 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 performances. This symposium provides a forum for recent advances in the electrochemistry of novel electrode materials for various energy storage and conversion devices including advanced batteries,

supercapacitors, and fuel cells. Of particular interest are common themes and relations among novel electrode materials for the various electrochemical energy devices. Topics to be covered include, but are not limited to, the design, modeling, synthesis, characterization, and application of (1) nanostructured anode and cathode materials for rechargeable lithium (lithium-ion) batteries; (2) nanostructured electrodes for electrochemical supercapacitors and hybrid capacitors; (3) nanostructured catalysts for proton exchange membrane fuel cells, direct methanol fuel cells, alkaline fuel cells, and metal/air fuel cells; (4) non-noble metal catalysts for the above fuel cells; and (5) electrode materials based on novel or unconventional concepts for the various energy storage and conversion devices.

**An issue of ECS Transactions is planned to be published "AFTER" the meeting. All authors accepted for presentation are obligated to submit their full text manuscript for the issue no later than June 1, 2007. All manuscripts will be submitted online, and must be in either MS Word or PDF format.**

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **J. Xu**, Department of Materials Science and Engineering, Rutgers, the State University of New Jersey, Piscataway, 607 Taylor Road, NJ 08854, USA, tel: 732.445.5606, fax: 732.445.3258, e-mail: johnxu@rci.rutgers.edu; **A. Manthiram**, The University of Texas at Austin, e-mail: rmanth@mail.utexas.edu; **P. Smith**, Naval Surface Warfare Center, e-mail: patricia.h.smith1@navy.mil; and **T. Zawodzinski**, Case Western Reserve University, e-mail: taz5@po.cwru.edu.

B2

### Characterization and Prevention of Failure Modes of Lithium Polymer and Lithium Ion Batteries in Transportation Applications

#### Energy Technology / Battery

The goals of this symposium are to assess recent progress and promising areas for R&D by identifying way to characterize the reactions that are occurring and ways to increase stability while maintaining performance of lithium ion and polymer systems. Papers are requested on the identification of electrochemical and thermochemical reactions that limit life and cause failure and methods to prevent cell ageing, increase in cell impedance, power fading, and capacity decay. Papers are requested on the description of surfaces and interfaces, how to identify reactive intermediates, and new ways to study reaction mechanisms. Papers describing methods to prevent ageing, structural changes during cycling, chemical decomposition/dissolution reactions and surface film modification are welcome. Also, papers are asked for on design and development of electrolytes, cathodes, anodes, separators, cells, and batteries that improve performance and life.

**An issue of ECS Transactions is planned to be published "AFTER" the meeting. All authors accepted for presentation are obligated to submit their full text manuscript for the issue no later than June 1, 2007. All manuscripts will be submitted online, and must be in either MS Word or PDF format.**

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **K. Zaghib**, Institut de recherche d'Hydro-Quebec (IREQ), 1800 Blvd. Lionel Boulet, Varennes, Canada J3X1S1, tel.: 450.652.8019, fax: 450.652.8424, e-mail: zaghib.karim@ireq.ca; **A. Landgrebe**, International Electrochemical Systems and Technologies, e-mail: albert@dmv.com; **T. Duong**, Office of Transportation Technologies, e-mail: tien.duong@hq.doe.gov; **K. Abraham**, E-KEM Sciences, e-mail:

## B3

### High Temperature Batteries

#### Battery / High Temperature Materials / Energy Technology

High temperature batteries play a vital role in many commercial, industrial, and military applications. Consequently, a symposium to present and discuss the most recent results is timely. Papers are solicited on both fundamental and applied aspects of aqueous, non aqueous, and solid-state high temperature batteries. Specific aspects to be covered include, but are not limited to (1) alternative and traditional anode and cathode active material design, preparation, characterization, and performance; (2) electrode processing and cell design; (3) studies of the interfaces; (4) design and characterization of electrolytes; (5) materials and cell modeling; and (6) performance, safety, and failure mechanisms of cells and batteries.

**An issue of ECS Transactions is planned to be published "AFTER" the meeting. All authors accepted for presentation are obligated to submit their full text manuscript for the issue no later than June 1, 2007. All manuscripts will be submitted online, and must be in either MS Word or PDF format.**

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **C. Richard Walk**, Secretary of the ECS Battery Division, 400 Madison St. Herndon, VA 20170, USA, tel: 703.709.8324, e-mail: dick.walk@gmail.com; **D. Radzykewycz**, BAE Systems, e-mail: dan.radzykewycz@baeystems.com; **S. Narayanan**, Jet Propulsion Laboratory, e-mail: s.r.narayanan@jpl.nasa.gov; and **J. Prakash**, Illinois Institute of Technology, e-mail: prakash@iit.edu.

## B4

### Hydrogen Production, Transport, and Storage 2

#### High Temperature Materials / Energy Technology / Industrial Electrolysis and Electrochemical Engineering / Battery / Physical and Analytical Electrochemistry

Hydrogen is the most abundant chemical-energy resource in the world, but unlike oil and natural gas it is an "energy carrier" not an "energy source." There are no H<sub>2</sub> "wells" available in the world. Further, we do not have a hydrogen infrastructure. The longest pipeline in the world is only 950 miles long. The largest plant operating today produces only 250 million standard cubic feet per day of H<sub>2</sub>. Therefore, the hydrogen infrastructure will have to be created and production will have to be increased an order of magnitude to meet DOE's 2015-18 projections.

The objective of this symposium is to bring together researchers working on developing the required hydrogen infrastructure. Papers are solicited in all areas of hydrogen production, transportation, and storage. Specific topics include the conversion of fossil fuels (FutureGen) and biomass to hydrogen, electrolysis, and thermo-chemical routes to hydrogen production; electrocatalysis, proton/hydrogen transport materials and processes; and hydrogen storage technology from adsorption media to metal hydrides.

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **E. Wachsman**, Department of Materials Science and Engineering, University of Florida, Gainesville, FL 32611-6400, USA, tel: 352.846.2991, fax: 352.392.7219, e-mail: ewach@mse.ufl.edu; **M. Williams**, National Energy Technology Lab, e-mail: mark.williams@netl.doe.gov; **M. Heben**, NREL, e-mail: Michael\_heben@nrel.gov and **A. Manivannan**, NETL, e-mail: manivana@netl.doe.

## B5

### Medical Batteries

#### Battery

Lithium batteries have powered medical devices since 1972. Implantable devices including pacemakers, drug pumps, ICDs, Left Ventricular Assist Devices, and neurostimulators are powered by lithium or lithium ion batteries. Papers are sought on all aspects of medical lithium and lithium ion batteries. Topics of interest include but are not limited to basic battery chemistry, cell design and process, field applications, safety characterization, modeling and long term data. Of particular interest are new systems and systems in development. Papers are solicited from developers of medical batteries, medical device designers, and clinical practitioners.

**An issue of ECS Transactions is planned to be published "AFTER" the meeting. All authors accepted for presentation are obligated to submit their full text manuscript for the issue no later than June 1, 2007. All manuscripts will be submitted online, and must be in either MS Word or PDF format.**

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **C. Holmes**, Greatbatch, Inc, 9645 Wehrle Drive, Clarence, NY 14031, USA, e-mail: cholmes@greatbatch.com; and **E. Takeuchi**, Greatbatch, Inc, e-mail: etakeuchi@greatbatch.com.

## B6

### Power Sources for EV and HEV Applications

#### Energy Technology / Battery

Internal-combustion engine/electric hybrid vehicles are achieving increasing market penetration and are performing with a high degree of efficiency and reliability today. The hybridization permits the ICE to run near optimal load and hence peak efficiency without compromising performance characteristics. Alternative power sources are being researched and developed to provide further advancements. To this end, papers that describe individual power sources such as batteries, fuel cells, super-capacitors etc. and hybrid systems comprising two or more of these power sources are solicited for this symposium. Topics can include (but are not limited to) advances in component materials such as fuel cell membranes, catalysts, battery electrodes, supercapacitor materials; evaluation and modeling of individual and hybrid power systems; lifetime, reliability, and performance studies with demonstration data.

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **H. Russell Kunz**, University of Connecticut, 44 Weaver Road, Unit 5233 Storrs, CT, 06269-5233, USA, tel: 860.486.5389, fax: 860.486.8378, e-mail: russkunz@engr.uconn.edu; **V. Ramani**, Illinois Institute of Technology, e-mail: ramani@iit.edu; and **K. Abraham**, E-Kem Sciences, e-mail: kmabraham@comcast.net.

# C-BIOMEDICAL APPLICATIONS AND ORGANIC ELECTROCHEMISTRY

## C1

### Organic and Biological Electrochemistry General Poster Session

#### Organic and Biological Electrochemistry

Submissions are solicited in all area of organic, organometallic, and biological electrochemistry. Areas of interest include synthetic and mechanistic electrochemistry as well as industrial and educational applications.

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizer: **A. Fry**, Chemistry Department, Wesleyan University, Middletown, CT 06459, USA, tel: 860.685.2622, fax: 860.685.2211, e-mail: afry@wesleyan.edu.

## C2

### Building Complexity into Electrodes and Electrode Processes

#### Organic and Biological Electrochemistry / Physical and Analytical Electrochemistry

About 25 years ago chemists found that the properties of electrode surfaces could be modified by attachment of prosthetic groups. The goal of this symposium is to ask to what extent we have moved past that paradigm in building complex electrodes. Arrays of electrodes will offer the opportunities for combinatorial electrochemistry. Incorporation of DNA into electrode arrays offers potential advantages of selectivity among biomolecules. What are the opportunities for affecting electrode surface reactions without attachment of prosthetic groups? There is recent evidence that electrode products can be influenced by the effects of ultrasound, gravitational effects, and other phenomena. In short, we are interested in any ways in which "complexity," broadly interpreted, can be created at the electrode surface. Specific topics, which are meant to serve only as examples, include: (1) arrays of electrodes of all kinds; (2) application of external forces to electrodes to affect their properties; and (3) new types of modified electrodes, new ways to attach functional groups to electrodes, and applications of both.

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **A. Fry**, Chemistry Department, Wesleyan University, Middletown, CT 06459, USA, tel: 860.685.2622, fax: 860.685.2211, e-mail: afry@wesleyan.edu; **J. Rusling**, University of Connecticut, e-mail: James.Rusling@uconn.edu; **T. Fuchigami**, Tokyo Institute of Technology, e-mail: fuchi@chem.titech.ac.jp; and **J. Leddy**, University of Iowa, e-mail: johna-leddy@uiowa.edu.

## C3

### New Bioanalytical and Biomedical Methods

#### Organic and Biological Electrochemistry / Physical and Analytical Electrochemistry / Sensor

The past decade has seen great advances of electrochemical methodology applied to bioanalytical and biomedical problems, with the development of new biomedical devices, biosensor arrays, and methods for fundamental studies of protein redox chemistry. For example, biosensor research is moving from single analyte detectors toward devices designed to detect many things at once. These multiplexed devices based on arrays of detection elements have applications in emerging areas such as genomics, early cancer detection, proteomics, metabolomics, drug discovery, toxicity, and environmental analysis. New thin film methods for protein redox studies have revolutionized

this important fundamental area. Auxiliary methods such as SECM, AFM, and spectroscopy coupled to thin film electrochemistry have provided valuable fundamental information on biomolecule redox processes. This symposium seeks invited and contributed papers in *new methodology* applied to bioanalytical and biomedical problems. We aim for as broad a range of topics as possible within this area. Possible topics include but are not limited to biomolecular recognition arrays, fundamental studies of proteins using novel methods, synergistic combinations of nanoscience with bioelectrochemistry, and new biomedical devices with electrochemical feedback. Please send comments or suggestions to one of the organizers listed below. Abstracts must be submitted through the ECS website.

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **J. Rusling**, University of Connecticut, Department of Chemistry, U-60, 55 N. Eagleville Rd., Storrs, CT 06269-3060, USA, tel.: 860.486.4909, e-mail: James.Rusling@uconn.edu, and **G. Brisard**, University of Sherbrooke, Gessie.Brisard@USherbrooke.ca; **I. Taniguchi**, Kumamoto University, e-mail: taniguch@gpo.kumamoto-u.ac.jp; **C. Bruckner-Lea**, Pacific Northwest Labs, e-mail: cindy.bruckner-lea@pnl.gov; and **A. Simonian**, Auburn University, e-mail: als@eng.auburn.edu.

## C4

### Organic and Biological Nanosystems

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

The aim of this symposium is to bring together scientists carrying out research in the area of generating, controlling, and exploiting nanosystems, with a view to the use of electrochemical methods in one aspect of the work. The focus shall be on fundamental science rather than on applied technology. Typical contributions could be in the areas of self-assembled monolayers, biomimetic membranes, nanoparticles, functionalized electrodes, and molecular electronics.

Abstracts should be submitted via the ECS website, with a copy to the symposium organizers. Comments and inquiries about the symposium may be sent to the organizers: **F. Maran**, Department of Chemistry, University of Padova, via Marzolo 1, 35131 Padova, Italy, tel: 39. 049.827.5147, fax: 39.049.827.5135, e-mail: flavio.maran@unipd.it; **M. Workentin**, The University of Western Ontario, e-mail: mworkent@uwo.ca; **S. Calabrese Barton**, Columbia University, e-mail: scb2001@columbia.edu; and **H. De Long**, U.S. Air Force, e-mail: hugh.delong@afosr.af.mil.

## D-CORROSION, PASSIVATION, AND ANODIC FILMS

## D1

### Corrosion General Session

#### Corrosion

Presentations concerning all aspects of corrosion and associated phenomena in liquid and gaseous phases not covered by topic areas of other specialized Corrosion Division symposia at this meeting 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. Note that this session will consist of oral and poster presentations.

Abstracts should be submitted via the ECS website, with a copy to the symposium organizers. Comments and inquiries about the symposium may be sent to the organizer: **A. Davenport**, University of Birmingham, Metallurgy & Materials, Edgbaston, Birmingham, B15-2TT, United Kingdom, tel: 1214145191, e-mail: a.davenport@bham.ac.uk.



# E-DIELECTRIC AND SEMICONDUCTOR MATERIALS, DEVICES, AND PROCESSING

**E1**

## Advanced Gate Stack, Source/Drain, and Channel Engineering for Si-Based CMOS: New Materials, Processes, and Equipment 3

### Electronics and Photonics / Dielectric Science and Technology / High Temperature Materials

This symposium will cover the latest developments in advanced processes and materials for CMOS front-end integration including gate stack, source/drain and channel engineering.

Researchers and technologists are encouraged to submit their abstracts on applications in the areas of: advanced channel engineering approaches including strained Si, Si-Ge, and Ge channels, strained silicon/SiGe on insulator, new high mobility channel materials including InSb, GaN and other compound semiconductors and their nanowires and carbon nanotubes; formation and/or deposition of ultra-thin gate dielectrics (including novel higher dielectric constant materials) and their gate electrodes (including metal and FUSI gates); advanced doping and annealing technologies to form ultra-shallow junctions; formation of low-resistivity contacts to such junctions; formation of MOS gate stacks, ultra-shallow junctions and low-resistivity contacts to new channel materials including compound semiconductors, nanowires and nanotubes.

Processing technologies of interest include but are not limited to advanced chemical vapor deposition processes (ALD, MOCVD, RTCVD, UHV-CVD and molecular beam epitaxy), rapid thermal, UV, plasma or laser-assisted processes.

Finally, new developments in advanced equipment for the above processes and inspection equipment to improve throughput, uniformity, in-situ monitoring, non-intrusive wafer inspection, process control and modeling are of special interest to this symposium.

**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 Feb. 1, 2007. All manuscripts will be submitted online, and must be in either MS Word or PDF format.**

The deadline for abstract submission is **Nov. 15, 2006**. As such, the hard deadline for full manuscript submission is **Feb. 1, 2007**. Instructions for preparing the manuscript will be sent out by the symposium organizers after official notification of acceptance.

Detailed information about the symposium including invited speakers, sponsors and manuscript preparation can be found at the symposium website: <http://www.ece.ncsu.edu/research/ecs-fep/>.

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **M. Öztürk**, North Carolina State University, Dept. of Electrical and Computer Engineering, Centennial Campus, 1010 Main Campus Drive, EGRC Building, Rm 339, Campus Box 7920, Raleigh, NC 27695-7920, USA, tel: 919.515.5245, fax 919.515.5055, e-mail: [mco@eos.ncsu.edu](mailto:mco@eos.ncsu.edu); **D.-L. Kwong**, University of Texas at Austin, e-mail: [dlkwong@mail.utexas.edu](mailto:dlkwong@mail.utexas.edu) and [kwongdl@ime.a-star.edu.sg](mailto:kwongdl@ime.a-star.edu.sg); **P. Timans**, Mattson Technology Inc., e-mail: [Paul.Timans@mattson.com](mailto:Paul.Timans@mattson.com); **E. Gusev**, Qualcomm MEMS Technologies, e-mail: [gusev@qualcomm.com](mailto:gusev@qualcomm.com); **F. Roozeboom**, Philips Research, e-mail: [Fred.Roozeboom@philips.com](mailto:Fred.Roozeboom@philips.com); and **H. Iwai**, Tokyo Institute of Technology, e-mail: [h.iwai@ieee.org](mailto:h.iwai@ieee.org).

**E2**

## Processes at the Semiconductor Solution Interface 2

### Electronics and Photonics

This symposium will address the most recent developments in processes at the semiconductor/solution interface including etching, oxidation, passivation, film growth, electrochemical and photoelectrochemical processes, electroluminescence, photoluminescence, and other related topics. It will include both invited and contributed papers on both fundamental and applied topics. The following areas are of particular interest: (1) chemical, electrochemical, and photoelectrochemical etching; (2) surface film growth and passivation; (3) porous semiconductor formation and photonic crystal structures; (4) electro-analytical measurements on both elemental and compound semiconductors including silicon, germanium, both bulk and epitaxial II-VI, III-V, IV-IV, and organic materials in aqueous and non-aqueous electrolytes; (5) electronic and optical processes at the semiconductor/solution interface; (6) electroluminescence at the semiconductor/solution interface; (7) photoluminescence spectroscopy including in situ potential-dependant measurements; (8) electrochemical impedance spectroscopy and investigations of flat-band potential; (9) combined electrochemical and surface analytical measurements such as XPS; (10) microscopic and surface analytical measurements on chemically and electrochemically modified semiconductor surfaces; (11) chemical, electrochemical, and photoelectrochemical techniques of device processing including etching, passivation, oxide growth, and metallization; and (12) electrochemical techniques of semiconductor characterization.

**A hard-cover joint *ECS Transactions* issue with SOTAPOCS XLVI is planned to be available "AT" the meeting. All authors accepted for presentation are obligated to submit their full text manuscript for the issue no later than February 1, 2007. All manuscripts will be submitted online, and must be in either MS Word or PDF format.**

**Abstracts are due** to the ECS headquarters office with a copy to one of the symposium organizers on or before **January 3, 2007**.

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **D. Noel Buckley**, Department of Physics, Materials and Surface Science Institute, University of Limerick, Limerick, Ireland, tel: 353.61.202902, fax: 353.61.202423, e-mail: [noel.buckley@ul.ie](mailto:noel.buckley@ul.ie); **A. Etcheberry**, IREM Institut Lavoisier, email: [etcheber@chimie.uvsq.fr](mailto:etcheber@chimie.uvsq.fr); and **C. O'Dwyer**, University of Limerick, e-mail: [colm.odwyer@ul.ie](mailto:colm.odwyer@ul.ie).

**E3**

## Silicon Nitride, Silicon Dioxide Thin Insulating Films and Emerging Dielectrics 9

### Dielectric Science and Technology

This symposium is a continuation of the highly successful "International Symposium on Silicon Nitride, Silicon Dioxide Thin Insulating Films," which has taken place eight times in the past. The objective is to link material studies and technological applications. The symposium will include both invited and contributed papers.

Specific topics of interest on silicon dioxide, silicon nitride and emerging dielectrics including high-k and low-k layers are, but not limited to: (1) growth and deposition (thermal CVD, PECVD, sputtering, ion implantation, thermal nitridation and oxidation, atomic layer deposition, MOCVD etc.); (2) film characterization (IR spectroscopy, RBS, NRA, SIMS, AES, XPS, AFM, TEM, EPR, NMR, ellipsometry, novel characterization and analytical techniques); (3) porosity, mechanical, electrical, chemical, physical, and optical properties; (4) plasma and non-plasma process-induced damage: mechanism, reduction, and recovery; (5) adhesion and substrate-film interactions; (6) degradation: NBTI, radiation, and hot-carriers; (7) dielectric breakdown, failure, and reliability related to process integration; (8) math-



emational, physical, and computational modeling; (9) strained layers and relaxed defect formation; (10) defect and charge carriers: passivation, charge transport, trapping and de-trapping, characteristic of traps, and tunneling; (11) strained layers and relaxed defect formation; (12) films for semiconductor memories, especially for gigabit generations; (13) insulating films for compound semiconductor devices (interlevel dielectric, topcoat, capacitor dielectric, surface passivation, interfaces, dielectrics dependent electrical and optical properties of devices); (14) dielectrics used for photonic applications; (15) multi-layer dielectric stacks; (16) plasma science and plasma processing technology for thin films; (17) novel isolation techniques including PBL, SEG, doped glasses, and (18) plasma etching and CMP of dielectrics.

A one page abstract (500 words maximum) must be submitted by **November 2, 2006** via the ECS website. A copy of the abstract must also be submitted to one of the symposium organizers, and be accompanied by a cover letter; this abstract should clearly indicate the purpose of the work, the approach, the manner and the degree to which the work advances the field, and specific results and their significance.

**A hard-cover issue of ECS Transactions is planned to be available "AT" the meeting. All authors accepted for presentation are obligated to submit their full text manuscript for the issue no later than February 1, 2007. All manuscripts will be submitted online, and must be in either MS Word or PDF format.** All papers will be peer-reviewed. Instructions for preparing the full manuscript may be obtained from the symposium organizers.

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **R. Ekwil Sah**, Fraunhofer Institute for Applied Solid State Physics, Tullastrasse 72, D-79108 Freiburg, Germany, tel: 761.515.9175, fax: 761.515.9400, e-mail: sah@iaf.fhg.de; **M. Deen**, McMaster University, e-mail: jamal@mcmaster.ca; **J. Zhang**, Liverpool John Moores University, e-mail: j.f.zhang@livjm.ac.uk; **J. Yota**, Skyworks Solutions, Inc., e-mail: jiro.yota@skyworksinc.com; and **Y. Kamakura**, Quantum Devices Lab, e-mail: kamakura@eie.eng.osaka-u.ac.jp.

## E4

### SOI Device Technology 13

#### Electronics and Photonics

SOI technology is penetrating the commercial market and has been included in the CMOS roadmap as the most realistic solution for the ultimate stages of microelectronics. The symposium covers recent significant advances in SOI technologies. It will be of interest to materials and device scientists, as well as to process and applications oriented engineers. Theoretical and experimental contributions are solicited. Specific topics will include, but are not limited to: (1) Synthesis of advanced SOI wafers, including strained layers on insulator and SOI-like heterostructures formed by bonding, implantation, and epitaxy; (2) Materials evaluation: wafer screening, electrical properties, defect and stress identification, interface quality, properties of ultra-thin films and buried oxides, tools for quality control; (3) SOI MOSFETs: advanced process steps, characterization, and modeling of typical mechanisms (floating body, coupling, self-heating, fringing fields, transient, and history effects), parameter extraction, reliability issues (hot carriers, irradiation, ESD, tunneling, etc); (4) High performance CMOS and bipolar devices: process integration, low power/voltage and RF circuits, memories, high power/voltage devices, high/low temperature devices, photonic SOI devices, sensors and MEMS; (5) Innovative devices: ultra-thin-body FD-SOI MOSFETs, FinFETs and other multiple-gate devices, quantum and tunneling transistors, etc.

Each session will be introduced by keynote speakers. Abstracts must be submitted electronically to the ECS Headquarters Office, with a copy to the Symposium Chair, by December 15, 2006. Abstracts submitted beyond this date will not be accepted (note: the Symposium deadline is differ-

ent than the general meeting deadline). Authors will receive electronic notification of acceptance or rejection no later than January 5, 2007. **A hard-cover issue of ECS Transactions is planned to be available "AT" the meeting. All authors accepted for presentation are obligated to submit their full text manuscript for the issue no later than February 1, 2007. All manuscripts will be submitted online, and must be in either MS Word or PDF format.**

Detailed information is available on the web site (<http://www.electrochem.org>) and at the Symposium Chair's office: **G. Celler**, Soitec/USA, e-mail: george.celler@soitec.com; Symposium co-organizers: **S. Cristoloveanu**, IMEP, ENSERG, e-mail: sorin@enserg.fr; **S. Bedell**, IBM T.J. Watson Research Center, e-mail: bedells@us.ibm.com; **F. Gámiz**, University of Granada, e-mail: fgamiz@ugr.es; **B.-Y. Nguyen**, Freescale Semiconductor, e-mail: Bich-yen.Nguyen@freescale.com; **Y. Omura**, Kansai University, e-mail: omuray@ipcku.kansai-u.ac.jp.

## E5

### State-of-the-Art Program Compound Semiconductors (SOTAPOCS 46)

#### Electronics and Photonics

The 46th SOTAPOCS symposium will address the most recent developments in compound semiconductors encompassing advanced devices, materials growth, characterization, 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. **Abstracts have to be submitted at the ECS website due on or before December 17, 2006. A hard-cover ECS Transactions issue jointly published with Processes at the Semiconductor Solution Interface II symposium is planned to be available "AT" the meeting. All authors accepted for presentation are obligated to submit their full text manuscript for the issue no later than February 1, 2007. All manuscripts will be submitted online, and must be in either MS Word or PDF format.** Instructions for preparing the manuscript will be sent out by symposium organizers after acceptance of the abstracts.

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **L.-J. Chou**, Department of Materials Science & Engineering, National Tsing-Hua University, Shinchu, Taiwan, 300, ROC, tel: 886.3.571-6490, fax: 886.3.572.2366, e-mail: ljchou@mx.nthu.edu.tw; website: [www.mse.nthu.edu.tw/www/index.html](http://www.mse.nthu.edu.tw/www/index.html); **M. Yoshimoto**, Kyoto Institute of Technology, e-mail: yoshimot@dj.kit.ac.jp; **Y. Luo**, Tsinghua University, e-mail: luoy@tsinghua.edu.cn; **S. Overberg**, Sandia National Laboratories, e-mail: meoverb@sandia.gov; and **P.-C. Chang**, Northrop Grumman Space Technologies, e-mail: pablo.chang@ngc.com.

## E6

### Thin Film Materials, Processes, and Reliability

#### Dielectric Science and Technology

This symposium is aimed at bringing together the technical community working and interested in: (1) plasma etching of thin films for the fabrication of < 100 nm devices; and (2) development and practice of multi-level-metal (MLM) interconnections using copper and low-k dielectric films and other advanced interconnect systems.

Suggested topics include (1) new reactor technologies and plasma sources; (2) processes for etching high- and low- k films including reactor contamination management; (3) plasma patterning of noble metals for FeRAMs, MDRAMs, and TMR elements for nonvolatile memories; (4) plasma surface modifica-

tion and mechanisms of k-value degradation; (5) mechanisms, measurement, and control of damage from HDP plasmas in etching and deposition; (6) new developments in processes/equipment for copper deposition: electrolytic and electro-less plating, CVD, ionized and collimated PVD; (7) scaling of ultra-thin barrier, seed layer, and adhesive films in copper wiring; (8) new contact metals; (9) chemical-mechanical polishing of damascene structures, slurry composition and performance, and, process control; (10) reactors/processes for plasma etching copper patterns and dual damascene low-k structures, poisoning issues, CD control; (11) low-k, inorganic and organic materials such as CVD fluorinated oxides, spin-on-glasses and polymers, aero-gels, nano-foams, and air-gaps; (12) methods for low-k film deposition and integration issues with copper; (13) reliability, electro-migration, and migration resistance of copper/alloys; (14) reliability of low-k materials such as stability, hot carrier and k-value degradation, resistance to copper diffusion; (15) stress migration, mechanical and thermal stressing in MLM wiring with copper/alloys and low-k ILD films; and (16) advanced interconnects: 3-D packaging and integration, system-on-chip architecture & integration, chip scale, and wafer scale packaging.

**An issue of *ECS Transactions* is planned to be published "AFTER" the meeting. All authors accepted for presentation are obligated to submit their full text manuscript for the issue no later than June 1, 2007. All manuscripts will be submitted online, and must be in either MS Word or PDF format.**

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **G. Mathad**, S/C Technology Consulting, 5 Spurway, Poughkeepsie, NY 12603, USA, tel/fax: 845.462.6312, e-mail: swami\_mathad@hotmail.com; **M. Engelhardt**, Infineon Technologies, e-mail: manfred.engelhardt@infineon.com; **K. Kondo**, Okayama University, e-mail: kkondo@cc.okayama-u.ac.jp; and **H. Rathore**, IBM, e-mail: rathore@us.ibm.com.

## F-ELECTROCHEMICAL/CHEMICAL DEPOSITION AND ETCHING

**F1**

### Electrochemical Processing in ULSI and MEMS 3

#### Electrodeposition

This symposium will focus on fundamental and practical aspects of electrochemical processing related to the fabrication of microelectronics and microelectromechanical devices. It is well known that electrochemical copper deposition is now a widespread process used for interconnect fabrication. This technology faces new challenges due to the shrinking interconnect size that requires thinner seed and barrier layers. Consequently, there is a strong impetus to develop technology for direct electrodeposition on barriers. Another emerging wet process in front-end application is electroless plating of metals and metal alloys primarily to prevent copper diffusion and improve electromigration resistance or to form interconnect structures by electroless copper plating. Further technologies of high commercial impact are solder deposition for flip-chip interconnects, and copper electrodeposition for packaging application. Many other electrochemical processes and techniques, at various stages of emergence and development in the electronics and related industries include the direct electrodeposition of compound semiconductors, chemical-bath deposition, electrochemical formation of heterojunctions, superlattices, nanostructures and metal-semiconductor contacts, deposition of magnetic multilayers and nanowires, wet etching, chemical mechanical polishing, electrolytic and electroless deposition of patterned structures, formation of metal films on semiconductors using self-assembled monolayers, and scanning-probe patterning.

Presentations characterizing currently utilized materials and processes as well as exploratory modification and novel

approaches are encouraged. Electrodeposition, electroless deposition and removal (CMP, electropolishing, and etching) of high conductivity, low melting (solder), or magnetic metals/alloys and related films of interest to ULSI and MEMS manufacture are encouraged.

Practical aspects of interest include the design/modeling of electroplating and planarization equipment; thickness uniformity and terminal effects; factors influencing the shape evolution and filling of high-aspect-ratio cavities; bath-composition monitoring and control; electroless plating of high conductivity metals and barriers, integration of the electrochemical process with electrochemical and non-electrochemical processes, and electrochemical process related device failure modes and reliability.

Fundamental aspects of interest include: nucleation and growth on dielectrics, on barrier films, thin seed layers, the influence of surface pretreatment on nucleation and adhesion; the action of additive molecules on microscopic current distribution and grain growth, and novel conductors applications and on-barrier deposition techniques. Reports on physical and chemical measurements related to deposit microstructure and morphology using in-situ or ex-situ surface analytical techniques are also encouraged.

**An issue of *ECS Transactions* is planned to be published "AFTER" the meeting. All authors accepted for presentation are obligated to submit their full text manuscript for the issue no later than June 1, 2007. All manuscripts will be submitted online, and must be in either MS Word or PDF format.**

Abstracts should be submitted via the ECS website, with a copy to the symposium organizers. Comments and inquiries about the symposium may be sent to the organizers: **H. (Lili) Deligianni**, IBM T. J. Watson Research Center, P.O. Box 218, Yorktown Heights, NY 10598-0218, USA, e-mail: lili@us.ibm.com; **J. Dukovic**, Applied Materials, Inc., e-mail: john\_dukovic@amat.com; **T. Moffat**, NIST, e-mail: thomas.moffat@nist.gov; and **J. Stickney**, University of Georgia, e-mail: stickney@chem.uga.edu.

## G-ELECTROCHEMICAL SYNTHESIS AND ENGINEERING

**G1**

### Industrial Electrolysis and Electrochemical Engineering General Session

#### Industrial Electrolysis and Electrochemical Engineering

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

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **G. Pillay**, South Dakota School of Mines and Technology, 501 E. St. Joseph St., Rapid City, SD 57701, USA, tel: 605.394.2493, fax: 605.394.5360, e-mail: gautam.pillay@sdsmt.edu; **V. Ramani**, Illinois Institute of Technology, e-mail: ramani@iit.edu; and **J. Fenton**, University of Central Florida, e-mail: jfenton@fsec.ucf.edu.



### Industrial Electrolysis and Electrochemical Engineering / Energy Technology

This symposium focuses on the practice, the art and the science behind the design of electrodes structures used in an array of applications ranging from electrosynthesis of inorganic and organic chemicals to power generation and storage in fuel cells and batteries, also the design of electrode structure for sensors and to monitor and mitigate corrosion may be considered. The emphasis is on how to design the electrode structure to meet the needs of the end user while technically satisfying a myriad of physical and chemical transport issues and then ultimately being made affordable to the end user. How do you achieve an electrode architecture involving electronic, ionic, and chemical pathways that must all intersect with a minimum of congestion so that the highest utilization of the electrode active area is realized? The chemical pathways are becoming increasingly complex due to multiphase reactant and product species environments involving liquids, gases and solids. The electrode structures may employ planar, porous, fluidized-bed and/or other novel concepts. The applications may include aqueous, nonaqueous, molten salt, or ionic liquid electrolyte systems.

Often the goal of the design of electrode structures is to maximize the current density and reduce the active area (capital investment) while minimizing the overpotentials (operating costs) that can occur due to kinetic, ohmic and mass transport effects. The end result is usually an economic tradeoff. The current design of electrode structures seem to start with the somewhat, well-characterized basic building blocks of electrocatalysts, catalyst substrates, and ionic conductors and void space; however, the practical electrode architecture ranges from taking the building blocks and then "shake and bake" to various attempts to layout and build structure within the electrode itself. Where do you begin, what has been accomplished, and what limits us from pursuing an order of magnitude increase in electrode structure productivity?

In practice, electrochemists and electrochemical engineers have formed the core team to tackle the design of electrode structures; however, increasingly a multidisciplinary team approach is undertaken that includes materials scientists and engineers, physical and analytical chemists, mechanical, chemical and electrical engineers, mathematical modelers, production and industrial engineers and others. Topics of interest may include case histories, tutorials, design guidelines and methodologies, and the identification of areas for future research.

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **D. Mah**, DuPont Engineering Research & Technology (DuET), DuPont Company, 1007 Market Street B8400, Wilmington, DE 19898, USA, tel: 302.774.4264, fax: 302.774.2457, e-mail: doctor\_electro@msn.com; **E. DeCastro**, PEMEAS Fuel Cell Technologies, e-mail: e.decastro@etek-inc.com; and **L. Lipp**, FuelCell Energy, Inc. e-mail: llipp@fce.com.

### Industrial Electrolysis and Electrochemical Engineering / Energy Technology / Battery

This session will focus on current research, development, and applications of membrane separators and membrane materials to industrial electrochemical processes and systems. Papers that describe methods for synthesis or characterization of membrane materials, transport properties, and other physicochemical phenomena associated with these membrane materials are encouraged. Papers are also solicited in areas focused on the development of membranes that provide unique industrial benefits and the application of membrane materials to existing or new industrial-scale processes. Papers may contain both theoretical and experimental work, and papers dealing with

either area will be considered. Contributed papers will be programmed in some related order, depending on the titles and content of the abstracts.

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **J. Fenton**, University of Central Florida, Florida Solar Energy Center, 1679 Clearlake Road, Cocoa, Florida 32922-5703, USA, tel: 321.638.1002, fax: 321.638.1010, e-mail: jfenton@fsec.ucf.edu; **W. van Schalkwijk**, EnergyPlex Corporation, e-mail: walter@energyplex.com; and **B. Pivovar**, Los Alamos National Laboratory, e-mail: pivovar@lanl.gov.

### Industrial Electrolysis and Electrochemical Engineering / Energy Technology / Electrodeposition / Physical and Analytical Electrochemistry

Electrochemical systems involve phenomena that extend over large time and length scales. It is not possible to accurately describe these systems using a single approach such as continuum modeling. Usually the surface chemistry in such systems is described by approaches such as dynamic Monte-Carlo simulations, while the bulk phenomena are represented by continuum models. Papers describing innovative approaches to describe complex electrochemical systems are solicited. The systems studied can include fuel cells and batteries, electrodeposition, electroless deposition, electrochemical capacitors and hybrid systems. Nano-macro and micro-macro scale coupled simulations and stability issues during coupling across time-length scales are also of interest.

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **V. Ramani**, Department of Chemical and Environmental Engineering, Illinois Institute of Technology, Chicago, IL 60616, USA, tel: 312.567.3064, fax: 312.567.8874, e-mail: ramani@iit.edu; **V. Subramanian**, Tennessee Tech University, e-mail: vsubramanian@tntech.edu; **R. Alkire**, University of Illinois, e-mail: r-alkire@uiuc.edu; and **S. Paddison**, University of Alabama, e-mail: paddison@matsci.uah.edu.

## H-FULLERENES, NANOTUBES, AND CARBON NANOSTRUCTURES

### Fullerenes, Nanotubes, and Carbon Nanostructures

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

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **F. D'Souza**, Department of Chemistry, Wichita State University, 1845 Fairmount, Wichita, KS 67260-0051, USA, tel: 316.978.7380, fax: 316.978.3431, e-mail: Francis.DSouza@wichita.edu; and **D. M. Guldi**, Friedrich-Alexander-Universität Erlangen-Nürnberg, e-mail: dirk.guldi@chemie.uni-erlangen.de. Abstracts, suggestions, and inquiries should be sent electronically to the ECS headquarters office and to the organizers of the corresponding symposium listed below.

## H1

### Electron Transfer and Applications of Fullerene and Nanostructured Materials, in Honor of David Schuster

#### Fullerenes, Nanotubes, and Carbon Nanostructures

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

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **F. D'Souza**, Department of Chemistry, Wichita State University, 1845 Fairmount, Wichita, KS 67260-0051 USA, tel: 316.978.7380, fax: 316.978.3431, e-mail: Francis.DSouza@wichita.edu; **S. Fukuzumi**, Osaka University, e-mail: fukuzumi@chem.eng.osaka-u.ac.jp; **D. M. Guldi**, Friedrich-Alexander-Universität Erlangen-Nürnberg, e-mail: dirk.guldi@chemie.uni-erlangen.de; and **O. Ito**, Institute of Multidisciplinary Research for Advanced Materials, e-mail: ito@tagen.tohoku.ac.jp.

## H2

### Molecular and Supramolecular Chemistry of Fullerenes and Carbon Nanotubes

#### Fullerenes, Nanotubes, and Carbon Nanostructures

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

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **N. Martin**, Department of Organic Chemistry, Faculty of Chemistry, Complutense University E-28040 Madrid, Spain, tel: 34.91.394.4227, fax: 34.91.394.4103, e-mail: nazmar@quim.ucm.es; and **J. F. Nierengarten**, Groupe de Chimie des Fullérènes et des Systèmes Conjugués, e-mail: jfnierengarten@lcc-toulouse.fr.

## H3

### Carbon Nanotubes and Nanostructures: Fundamental Properties and Processes

#### Fullerenes, Nanotubes, and Carbon Nanostructures

This is one of two related symposia on carbon nanotubes and related materials. This symposium will be focused on fundamental properties and processes in physics, chemistry, and materials science. Topics may include methods for sample preparation and characterization; mechanical, thermal, optical, and electronic properties; chemical and electrochemical behavior; and theoretical studies.

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **R. Weisman**, Department of Chemistry, MS-60, Rice University, 6100 Main Street, Houston, TX 77005 USA, tel: 713.348.3709, fax: 713.348.5155, e-mail: weisman@rice.edu; and **S. Subramoney**, E. I. DuPont de Nemours & Company, e-mail: shekhar.subramoney@usa.dupont.com.

## H4

### Carbon Nanotubes and Nanostructures: Applications and Devices

#### Fullerenes, Nanotubes, and Carbon Nanostructures / Sensor

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

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **S. Rotkin**, Physics Department, Lehigh University, 16 Memorial Drive East, Bethlehem, PA 18015, USA, tel: 610.758.3930, fax: 610.758.5730, e-mail: rotkin@lehigh.edu; and **M. Heben**, NREL, e-mail: michael\_heben@nrel.gov.

## H5

### Endofullerenes and Carbon Nanocapsules

#### Fullerenes, Nanotubes, and Carbon Nanostructures

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

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **H. Shinohara**, Nagoya University, Department of Chemistry, Nagoya 464.8602, Japan, tel: 81.52.789.2482, fax: 81.52.789.2962, e-mail: noris@cc.nagoya-u.ac.jp; **T. Akasaka**, University of Tsukuba, e-mail: akasaka@tara.tsukuba.ac.jp; and **A. Balch**, University of California, e-mail: albalch@ucdavis.edu.

## H6

### Energetics and Structure

#### Fullerenes, Nanotubes, and Carbon Nanostructures

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

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **Z. Slanina**, Institute of Chemistry, Academia Sinica, Taipei 11529, Taiwan, ROC tel: 81.532.44.6880, fax: 81.532.48.5588, e-mail: slanina@cochem2.tutkie.tut.ac.jp; and **O. Boltalina**, Colorado State University, e-mail: ovbolt@lamar.colostate.edu.

## H7

### Solid-State Physics

#### Fullerenes, Nanotubes, and Carbon Nanostructures

The symposium focuses on the topic of solid-state physics, structure, and properties of fullerene compounds. The topics include chemical reactivity, superconductivity, surface studies, thin films, diffraction studies, thermal, and electronic properties.

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to



the organizers: **Y. Iwasa**, Tohoku University, Institute Material Research, Aoba Ku, 2-1-1 Katahira, Sendai, Miyagi 9808577 Japan, e-mail: iwasa@imr.tohoku.ac.jp; and **P. Rudolf**, University of Groningen, e-mail: p.rudolf@rug.nl.

**H8**

## Carbon Nanotubes and Nanostructures: Medicine and Biology

### Fullerenes, Nanotubes, and Carbon Nanostructures / Nanotechnology Subcommittee

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

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **L. Wilson**, Department of Chemistry, MS-60, Rice University, 6100 Main Street, Houston, TX 77005, USA, tel: 713.348.3268, fax: 713.348.5155 e-mail: durango@ruf.rice.edu; **T. Da Ros**, Università di Trieste, e-mail: daros@univ.trieste.it; and **K. Decker**, University of Washington, e-mail: drkdecker@aol.com.

**H9**

## Porphyrins and Supramolecular Assemblies

### Fullerenes, Nanotubes, and Carbon Nanostructures

The purpose of this symposium is to highlight recent advances in porphyrin chemistry. Through this symposium, we intend to cover a wide range of topics in order to generate discussions between interdisciplinary participants and favor the exchange of new ideas. We are thus soliciting high-quality contributions in areas ranging from the synthesis of challenging porphyrinic devices to the characterization of electrochemical and physico-chemical behavior of new porphyrinic materials.

Submission of papers is encouraged in the following topics: (1) new challenging multi-porphyrinic devices; (2) electronic properties of porphyrinic arrays; (3) photoinduced processes in molecular and supra-molecular porphyrinic assemblies; and (4) novel porphyrin modified electrodes.

Abstracts should be submitted via the ECS website, with a copy to the symposium organizers. Comments and inquiries about the symposium may be sent to the organizers: **N. Solla**, Nathalie Solla-Groupe de Synthèse de Systèmes Porphyriniques (G2SP), Laboratoire de Chimie de Coordination du CNRS, 205 route de Narbonne, 31077 Toulouse Cedex 4, France, tel: 6 16 46 80 89, fax: 5 61 55 30 03, e-mail: solla@lcc-toulouse.fr; and **K. Kadish**, University of Houston, e-mail: kkadish@uh.edu.

**H10**

## Metallic and Semiconductor Nanoparticles

### Fullerenes, Nanotubes, and Carbon Nanostructures

Metal and semiconductor nanoparticles play an important role in fuel cells, solar energy conversion, catalysis and hydrogen production. The recent advances in the area of nanostructured materials has led to new understanding of the catalytic properties of these nanomaterials and composites. Papers are invited in the following areas: synthesis and characterization of metal nanoparticles, bimetallic particles, and semiconductor-metal composites, size and shape dependent catalytic properties, hydrogen evolution reactions, photocatalysis, and electron transfer processes that are relevant to energy conversion.

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **P. Kamat**, Notre Dame Radiation Laboratory, Notre Dame, IN 46556-0579, USA, tel: 574.631.5411, fax: 574.631.8068, e-mail: pkamat@nd.edu.

# I-PHYSICAL AND ANALYTICAL ELECTROCHEMISTRY

**I1**

## Physical and Analytical Electrochemistry General Session

### Physical and Analytical Electrochemistry

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

Abstracts should be submitted via the ECS website, with a copy to the symposium organizers. Comments and inquiries about the symposium may be sent to the organizers: **H. De Long**, AFOSR/NL, 875 N. Randolph St., Suite 325, Rm. 3112, Arlington, VA, 22203-1768, USA, tel: 703.696.7722, fax: 703.696.8449, e-mail: hugh.delong@afosr.af.mil.

**I2**

## Advance In Situ Techniques for Analysis of Electrochemical Systems

### Physical and Analytical Electrochemistry / Corrosion / Energy Technology / Sensor / Battery

This symposium is aimed to serve as a forum for discussion on fundamentals and applied aspects of in-situ electrochemical techniques for real-time analysis of electrochemical systems. The major focus of the symposium will be on application of combined analytical techniques with electrochemical systems to understand the nature of electrified interfaces and electrochemical reactions in practical devices, including but not limited to, batteries and fuel cells, corrosion and passivation, electrochromic and display devices, sensors and actuators, as well as bioelectrochemical systems. This symposium will also cover new concepts and challenges in real-time studies of the electrochemical systems.

Specific areas to be covered include: fundamentals of electrified interfaces; in-situ spectroelectrochemical techniques covering vibrational and electronic spectroscopy; real-time x-ray and neutron diffraction techniques; in-situ x-ray absorption and extended x-ray absorption fine structure; in-situ Mossbauer spectroscopy; real-time NMR spectroscopy under applied electric field; real-time scanning and transmission electron microscopy; ultrasonic and microwave spectroscopy of electrochemical systems; atomic force microscopy; recent development, real-time bio-detection and analysis; and new advances in electrochemical techniques.

**An issue of ECS Transactions is planned to be published "AFTER" the meeting. All authors accepted for presentation are obligated to submit their full text manuscript for the issue no later than June 1, 2007. All manuscripts will be submitted online, and must be in either MS Word or PDF format.** Authors must submit a copy of the full manuscript to the symposium chair by start of meeting. Instructions for preparing the manuscript can be found on the ECS website.

Abstracts should be submitted via the ECS website, with a copy to the symposium organizers. Comments and inquiries about the symposium may be sent to the organizers: **G. Nazri**, General Motors Research & Development and Planning Center, MC: 480-102-RCCL, 30500 Mound Road, Warren, Michigan 48090-9055, USA, tel: 586.986.0737, fax: 586.986.2244, e-mail: g.nazri@gm.com; **C. Korzeniewski**, Texas Tech University, e-mail: carol.korzeniewski@ttu.edu; **F. Mansfeld**, University of Southern California, e-mail: mansfeld@usc.edu; and **V. Ramani**, Illinois Institute of Technology, e-mail: ramani@iit.edu.

# J-SENSORS AND DISPLAYS: PRINCIPLES, MATERIALS, AND PROCESSING

## J1

### Sensors, Actuators, and Microsystems General Session

#### Sensor

This symposium will address all aspects of sensor, actuator, and microsystems research and development. The inclusion of sensors and actuators into a range of application environments has been significantly increasing in order to provide improved system capabilities such as increased performance, decreased environmental impact, or higher efficiency. Sensors and actuators are often integrated into "smart" microsystems: microfabricated sensors and/or actuators combined with electronics which enable, for example, signal conditioning and data processing. The need for multifunctional, smart technologies, which depend on sensors, actuators, and electronics, is expected to increase in the coming years as further demands and expectations are placed on systems and devices. This general session welcomes papers on all aspects of sensors, actuators, and microsystems not covered in other sessions.

This symposium intends to bring together a range of interdisciplinary topics and covers all materials aspects of sensors, actuators, and microsystems. Primary emphasis will be placed upon applied aspects of the materials, synthesis, evaluation, and development strategies of novel materials/device configurations for sensing and actuating functions as well as integrated microsystems. High temperature as well as low temperature applications will be discussed. Papers are solicited in, but not limited to, the following areas: (1) physics and chemistry of sensor and actuator materials, fabrication and characterization of novel compositions; novel routes for the synthesis of materials with grain (pore) size control and distributions; (2) novel sensor and actuator concepts, design, modeling, and verification; (3) sensing systems that include sampling systems and actuators like sensor arrays, electronic noses and tongues; (4) physical, chemical, and biological sensors and actuators, such as gas, humidity, ion or molecular sensors, their system integration and actuating functions; (6) optical, RF, and wireless sensors and actuators, such as fiber optic sensors, microwave sensors, optical and wireless integrations; (7) emerging technologies and applications; and (8) novel techniques to expand and insure sensor stability and reliability.

Abstracts should be submitted via the ECS website, with a copy to the symposium organizers. Comments and inquiries about the symposium may be sent to the organizers: **G. Hunter**, NASA Glenn Research Center, 21000 Brookpark Rd., Mailstop 77-1, Cleveland, OH 44235, USA, tel: 216.433.6459, fax: 216.433.8643; e-mail: ghunter@grc.nasa.gov; **R. Mukundan**, Los Alamos National Lab, e-mail: mukundan@lanl.gov; and **S. Bhansali**, University of South Florida, e-mail: bhansali@eng.usf.edu.

## J2

### Clinical and Diagnostic Sensors and Systems

#### Sensor

Point of care and clinical diagnosis require advanced biosensors to be effective and efficient. Recent advances in lab-on-a-chip technology as well as biologically addressable nanostructures result in new capability for medical instrumentation detectors. This symposium will bring to light the needed advances in the development of new biosensors and medical products that analyze samples of breath, blood, saliva, urine, or other body fluids for important medical or health purposes. Advances in interfaces to the body, requires microfluidic integration with sensing technology, and the integration of electrochemically based detection technology using biologically derived samples is of interest. For clinical diagnostics, the sample matrix poses

the first challenge to reproducible detection of the target analyte. Strategies for sampling as well as microfluidic treatment, reaction, or separation are important topics. Multiplexing and reagent delivery challenges in the development of cutting-edge diagnostic devices falls within this call.

Often the measurement of multiple analytes simultaneously is desired, so that an initial sample of 100 to 500  $\mu\text{L}$  may be split up to 64 ways. Accomplishing these feats in a footprint no larger than a microtiter plate relies on the robust implementation of microfluidic circuits with on-board valves and reagent reservoirs as well as embedded sensor arrays. Add to this the desire to manufacture at costs competitive with current diagnostic disposables and a unique set of challenges in development and manufacturing are presented. Solutions to these challenges require integration of various manufacturing methods, including injection molding, laminates, embossed and micro machined structures. Each fabrication method has its strengths, weaknesses and preferred materials, thus integration into a functional device that is compatible with bioassays also requires the development of surfaces that can impart critical function into the successful performance of the diagnostic device. Enumeration of the difficulties is enough to make one realize that the diagnostic device enterprise is not for those of weak conviction, and requires a multidisciplinary team across many areas of expertise to accomplish. We envision a lively discussion of biosensors, microfluidics, plastic and silicon MEMS fabrication, and related science and technology will provide for advances in field capability for clinical and point of care diagnostic sensors and systems.

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **L. Levine**, ALine Inc., tel: 310.707.8575, llevine@alineinc.com; **J. Stetter**, SRI International, joseph.stetter@sri.com; **Z. Aguilar**, Vegrandis, LLC, zora.aida.aguilar@vegrandis.com; **D. VerLee**, MicroFluidic Systems Research, verleed@worldnet.att.net; and **M. Tabib-Azar**, Case Western Reserve University, tabib-azar@case.edu.

## J3

### Nanoporous Materials: Chemistry and Applications

#### Nanotechnology / High Temperature Materials / Sensor / Fullerenes, Nanotubes, and Carbon Nanostructures

New materials with nanoscale porosity are now being created as a result of developments in synthetic chemistry and materials science. These include metal organic frameworks, aluminum and anodized aluminum oxide, carbon nanotubes, block copolymers, zeolites, and sol-gel derived materials. These materials have pores ranging in size from a few angstroms to tens of nanometers and exhibit many interesting properties: extremely high surface area; low density; gas storage capacity; selective molecular binding; remarkable high-temperature stability; luminosity; and ferro- or antiferromagnetism. Methods to control pore size are improving and the application of high-level quantum chemistry methods are beginning to reveal the mechanisms behind some of their unusual properties. As a result, there is growing interest in a host of applications, including gas storage, separations, catalysis, drug delivery, and sensing.

This symposium will highlight the latest developments in the field of nanoporous materials, particularly their chemical aspects, but also critical issues in materials science required for their development. Papers in the following areas are solicited: (1) synthetic and reaction chemistry of nanoporous materials, including metal organic frameworks or coordination polymers, anodized aluminum oxide, carbon nanotubes, block copolymers, as well as more traditional nanoporous materials such as zeolites; (2) formation of nanoporous films or material hybrids on substrates or supports to enable gas- or liquid-phase separations and high-temperature applications such as catalysis; (3) modeling and theory to predict and optimize the pore environment; (4) measurements and characterization, including gas sorption, diffusion, catalysis, and electro-optical properties; (5) development of devices such as molecular sensors, separation membranes, and fuel cells; and (6) novel applications such as targeted drug delivery.



Abstracts should be submitted via the ECS website, with a copy to the symposium organizers. Comments and inquiries about the symposium may be sent to the organizers: **M. Allendorf**, Sandia National Laboratories, MS9291, Livermore, CA 94551-0969, USA, tel: 925.294.2895, fax 925.294.3282, e-mail: mdallen@sandia.gov; **T. Armstrong**, Oak Ridge National Laboratories, e-mail: armstrongt@ornl.gov; **S. Bhansali**, University of South Florida, e-mail, bhansali@eng.usf.edu; and **P. Kamat**, University of Notre Dame, e-mail: pkamat@nd.edu.

## J3

### Persistent Phosphors 3

#### Luminescence & Display Materials

This symposium is a sequel to the inaugural symposium held in spring of 2006, dedicated to the subject of persistent phosphor materials and their physical and optical properties. That symposium was deemed to be a success and was decided to reconvene another session with the view of establishing a continuing series on this topic. With this call, we are soliciting papers dealing with any relevant property of materials that evince persistent luminescence or phosphorescence (afterglow). Of particular relevance would be papers addressed to the synthesis of new materials, which show these properties, and on ways via which persistence may be prolonged or altered in old or new materials. The symposium will focus, as well, on the physical mechanisms that lead to phosphorescence, trying to resolve some of the controversies existing in current models. Papers on applications of this genre of phosphor and display materials are welcomed. A number of overview invited talks by principals in the evolution of the persistent phosphor field are being planned.

Abstracts should be submitted via the ECS website. Comments and inquiries about the symposium may be sent to the organizers: **W. Yen**, Department of Physics, University of Georgia, Athens, GA 30602-2451, USA, tel: 706.542.2491, e-mail: wyen@physast.uga.edu.

## J5

### Sensors Based on Nanotechnology 3

#### Sensor / Organic and Biological Electrochemistry / Electronics and Photonics / High Temperature Materials / Dielectric Science and Technology

This symposium continues the series of symposia that focus on Nanotechnology based sensors with all aspects of nanoscale sensor materials, devices, and systems. The use of sensor materials with a structure in nanometer scale can lead to unique physiochemical properties to enhance the sensor performance. Sensors based on nanotechnology offer new opportunities for chemical and biological detection in various application arenas. The research areas of interest include the development and evaluation of new nanostructured materials, such as nanotubes, nanowires, nanoparticles and quantum dots for sensing, the application of these structures and processes to the miniaturization of chemical sensors, physical sensors, biosensors, miniature chemical analysis systems and other devices, micro/nanomachining, fabrication processes, packaging. The following is a partial list of topics to be solicited: (1) nanomaterials for sensors and actuators including synthesis, characterization, manipulation, and assembly; (2) sensing mechanism studies including modeling and simulation of sensors and sensor arrays; (4) novel methods of processing and assembling sensors and sensor arrays at nano/micro scale; (5) chemical, electrical, and physical testing devices; (6) sensors used in defense, medical, environmental, and industry applications; (7) reliability of micro/nanomechanical structures; and (8) integration and packaging of nano/microsystems.

Abstracts should be submitted via the ECS website, with a copy to the symposium organizers. Comments and inquiries about the symposium may be sent to the organizers:

**J. Li**, NASA Ames Research Center, e-mail, jingli@mail.arc.nasa.gov; **M. Deen**, McMaster University, jamal@mcmaster.ca; **J. Ruzyllo**, Pennsylvania State University, jruzylo@psu.edu; **J. Rusling**, University of Connecticut, James.Rusling@uconn.edu; and **E. Traversa**, University of Roma, traversa@uniroma2.it.