
PHYSICAL AND ANALYTICAL ELECTROCHEMISTRY DIVISION (PAED) NEWSLETTER

May 2007

Division Website: www.electrochem.org/ecs/tia/paed/paed.htm

Division Officers (2005-2007)

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Recent Activities

Symposia

The division was a very active sponsor and co-sponsor of symposia during 2006. At the spring 2006 meeting in Denver the division sponsored or co-sponsored 11 symposia, and this total was equaled at the fall 2006 Joint International Meeting in Cancun. The division also provided financial support to many of the symposia it sponsored or co-sponsored in 2006. All in all, a total of \$10,500 in PAED funds were used by organizers to assist in the travel of speakers. At the current meeting the division is sponsoring or co-sponsoring 7 symposia. A list of these symposia appears later in this newsletter. The PAED also has an impressive slate of symposia for the next few meetings, and a list of these also appears at later in this newsletter.

Individuals wishing to submit symposia topics for future meetings should contact Paul Trulove, trulove@usna.edu.

Student Travel Awards

Chicago, May 2007

Four students received travel awards for the 2007 spring meeting in Chicago. These four students will be recognized at the Annual Luncheon and Business Meeting on Monday 7th. The awardees and their University affiliations are:

- Sadagopan Krishnan – University of Connecticut, Storrs, CT, USA
- Germarie Sanchez-Pomales – University of Puerto Rico, San Juan, Puerto Rico
- Elise Switzer – University of New Mexico, Albuquerque, NM, USA
- Zhiyong Wang – University of Minnesota, Minneapolis, MN, USA

Cancun, May 2006

Five students received travel awards through PAED at the 2006 fall meeting in Cancun. Four of these students received travel awards directly from PAED, and one received a travel grant via an NSF grant to the ECS. Pictures of the awardees, the names and University affiliations are:



Dogo Miquel Franco
Dos Santos – Instituto
Superioro Tecnico,
Lisbon, Portugal



Minhua Shao –
SUNY Stony Brook,
Stony Brook, NY,
USA



Greg Moakes – Georgia
Institute of Technology,
Atlanta, USA



Jeffrey Halpern –
Case Western,
Cleveland, OH, USA

Not shown:

- Francios Laforge – CUNY – Queens College, New York, NY, USA

In addition to the PAED student travel awards, **The Fifteenth International Symposium on Molten Salts in Honor of Robert A. Osteryoung** (a PAED sponsored symposia) funded 12 student travel grants. These students and their University affiliations are

- Corey Hines – University of Alabama, Tuscaloosa, AL, USA
- Lars-Erik Owe – The Norwegian University of Science and Technology, Trondheim Norway
- Rodica Nita – National Institute for Research and Development in Energy, Bucharest, Romania
- Ole Kongstein – The Norwegian University of Science and Technology, Trondheim Norway
- Blanka Kubikova – Institute of Inorganic Chemistry SAS, Bratislava, Slovakia
- Chia-Cheng Tai – National Cheng Kung University, Tainan, Taiwan
- Espen Sandnes – The Norwegian University of Science and Technology, Trondheim Norway
- Kristin Vasshaug – The Norwegian University of Science and Technology, Trondheim Norway
- Hong-min Kan – Northeastern University, Shenyang, China
- M. Garrett Hanley – U.S. Naval Academy, Annapolis, MD, USA
- Jane Holly Poplin – University of Alabama, Tuscaloosa, AL, USA
- Marcin Smiglak – University of Alabama, Tuscaloosa, AL, USA

Denver, May 2006

Five students received travel awards for the 2006 spring meeting in Denver. Four of these students received travel awards directly from PAED, and one received a travel grant via a PAED sponsored symposium. These five students were recognized at the Annual Luncheon and Business Meeting. The awardees and their University affiliations are:

- Shelly Brown – KTH Chemical Engineering and Technology, Stockholm, Sweden
- Jodie L. Lutkenhaus – Massachusetts Institute of Technology, Cambridge, MA, USA
- Jaak Nerut – University of Tartu, Tartu
- Erin Patrick – University of Florida, Gainesville, FL, USA
- Peterson M. Guto – University of Connecticut, Storrs, CT, USA



The Chair of the Division, Gessie Brisard (second from the right), with the Student travel Awardees from the Denver Meeting (from left to right) Jaak Nerut, Peterson M. Guto, Erin Patrick, Shelly Brown, and Jodie L. Lutkenhaus

Recognition of Past Division Chair Johna Leddy at 2006 Annual PAED Luncheon



Current division chair Gessie Brisard presented Johna Leddy a long overdue certificate from the society recognizing her exceptional service as chair of the division.

The 2006 Max Bredig Winner



PROFESSOR JOHN S. WILKES was presented with the Max Bredig award at the Fall 2006 meeting in Cancun. He is currently a professor of chemistry at the U.S. Air Force Academy in Colorado Springs, CO. He is also the Director of the Chemistry Research Center there, which he founded in 1995. Previously he was at the Frank J. Seiler Research Laboratory, also at the Air Force Academy. From 1978 to 1995 Dr. Wilkes held positions as a research chemist, technical director, and eventually laboratory director at the Seiler Research Lab. His research there concentrated mainly in the synthesis, properties, and applications of room temperature molten salts, an area now called ionic liquids. Previous to his long tenure at the Air Force Academy, Dr. Wilkes served on active duty in the U.S. Air Force, and on the faculty of the University of Colorado at Denver. He has a BA in chemistry from the University at Buffalo, and a PhD in chemistry from Northwestern University. His current research interests include ionic liquids, hydrogen storage materials, and power sources for unmanned aerial vehicles.

The Max Bredig award was established in 1984 to "recognize excellence in molten salt chemistry research." It is awarded biannually and is sponsored by ARCO Metals Company and the Aluminum Company of America. The award winner is presented with a scroll and a check for \$1500. A lecture is given in the International Molten Salt symposium, sponsored by the PAED.

The 2007 David C. Grahame Award Winner



PROFESSOR JOSEPH HUPP will be presented the *2007 David C. Grahame Award for Physical Electrochemistry* at the Spring meeting in Chicago. This prestigious award has been given to Prof. Hupp for his research in supramolecular chemistry and molecular materials chemistry, electrochemistry, and photochemistry. Prof. Hupp will present an award address Monday the 7th at the beginning of the PAED General Session, and there will be an Award reception that evening.

Prof. Hupp is a native of rural western New York. He was introduced to electrochemical research as an undergraduate student at Houghton College, evaluating candidate electrode materials for heart pacers. He completed a BS degree in 1979. Subsequently he was a student of the late Mike Weaver at Michigan State and Purdue, completing his PhD in 1983. He was a postdoc with T. J. Meyer at the University of North Carolina. He moved to Northwestern University in 1986 where he is currently a Morrison Professor of Chemistry. Prof. Hupp's research centers on supramolecular chemistry and molecular materials chemistry, electrochemistry, and photochemistry, with an emphasis on energy conversion. He has published roughly 230 peer-reviewed papers and served as research advisor for 36 PhD graduates.

The David C. Grahame award was established in 1981 to "*encourage excellence in physical electrochemistry research.*" It is sponsored by General Electric and the Ford Foundation. The award winner is presented with a scroll and a check for \$1500.

CHICAGO SPONSORED SYMPOSIA

PAED Sponsored or Co-Sponsored Symposia

I1- Physical and Analytical Electrochemistry General Session

(Physical and Analytical Electrochemistry)

Organizers: H. DeLong

I2 - Advance In-Situ Techniques for Analysis of Electrochemical Systems

(Physical and Analytical Electrochemistry / Corrosion / Energy Technology / Sensor/Battery)

Organizers: V. Ramani, C. Korzeniewski and F. Mansfeld

B1 - Electrochemistry of Novel Electrode Materials for Energy Conversion and Storage

(Battery / Physical and Analytical Electrochemistry / Energy Technology)

Organizers: J. Xu, A. Manthiram, P. Smith, K. Zaghbi and T. Zawodzinski

B4 – Hydrogen Production, Transport, and Storage 2

(Energy Technology / Industrial Electrolysis and Electrochemical Engineering / Battery / Physical and Analytical Electrochemistry)

Organizers: Wachsman, M. Heben, A. Manivannan, P. Maupin, V. Ramani and M. Williams

C2 – Building Complexity into Electrodes and Electrode Processes

(Organic and Biological Electrochemistry / Physical and Analytical Electrochemistry)

Organizers: A. J. Fry, T. Fuchigami, J. Leddy and J. Rusling

C3 – New Bioanalytical and Biomedical Methods

(Organic and Biological Electrochemistry / Physical and Analytical Electrochemistry)

Organizers: J. Rusling, G. Brisard, C. Bruckner-Lea, A. Simonian and I. Taniguchi

G4 – Multi-Scale Simulations of Electrochemical Systems

(Industrial Electrolysis and Electrochemical Engineering / Energy Technology / Electrodeposition / Physical & Analytical Electrochemistry)

Organizers: V. Ramani, R. Alkire, S. J. Paddison and V. Subramanian

UPCOMING SYMPOSIA

**212th Meeting - Washington DC
October 7 – 12, 2007**

The Executive committee of the Physical and Analytical Electrochemistry Division cordially invites you to participate at the fall 2007 Meeting, which will be held October 7 – November 12 in Washington. There will be six symposia where the Physical Division is either the organizer or the lead co-organizer and six symposia, on which the Physical Electrochemistry Division participates as a co-organizer.

PAED Sponsored and Co-Sponsored Symposia

B7 Nanomaterials for Energy Conversion and Storage

Battery / Energy technology / Physical and Analytical Electrochemistry / Fullerenes, Nanotubes, and Carbon Nanostructures

Nanomaterials and nanotechnology offer tremendous potential to advance critically important energy storage and conversion devices that could replace conventional energy technologies and have a significant environmental impact. This symposium will address the challenges facing this new frontier with respect to: (1.) developing enabling and affordable materials and processes, and (2.) fabricating and demonstrating devices. Papers are solicited on both fundamental and applied aspects of nanomaterials and nanotechnology for energy conversion and storage. Specific areas to be covered include, but, are not limited to: (a.) lithium ion battery electrodes, (b.) double layer and supercapacitor electrodes and interfaces, (c.) electrocatalysts e.g., proton exchange membrane, direct methanol, and solid oxide fuel cells, (d.) solid electrolyte materials, (e.) quantum effects and nanostructures in photovoltaics, and (f.) other related energy storage and conversion technologies.

Organizers: **G. Amatucci**, Rutgers, The State University of New Jersey, e-mail: gamatucc@rci.rutgers.edu; **A. Manthiram**, The University of Texas at Austin, e-mail: rmanth@mail.utexas.edu; **W. Van Schalkwijk**, EnergyPlex Corporation, e-mail: walter@energyplex.com; **R. Mantz**, Army Research Office, e-mail: robert.a.mantz@us.army.mil; **C. Bock**, National research Council of Canada, e-mail: christina.bock@nrc.ca; and **V. Ramani**, Illinois Institute of Technology; e-mail: ramani@iit.edu.

B8 Next Generation Photovoltaics

Energy Technology / Physical and Analytical Electrochemistry

Today's photovoltaic technologies for terrestrial applications are based on various forms of crystalline silicon. These technologies, the result of innovative, breakthrough research conducted 30 to 40 years ago, have enabled dozens of companies throughout the world to establish a 10-billion-dollar industry marketing primarily to non-grid-connected applications. Marketing in grid-connected applications, however, requires, substantial cost reductions, the Holy Grail of all PV R&D efforts. Thin film technologies, considered the next generation to crystalline silicon technologies, came into being some 25 years ago or more as another consequence of breakthrough, innovative R&D. These technologies, based on non-silicon or amorphous/polycrystalline silicon materials, are today's focus on tens of millions of dollars annually for their development.

There is no reason to believe that photovoltaic innovation has gone as far as it can go or that new viable PV technologies don't exist beyond the horizon of our present knowledge. Fundamental and exploratory research is needed to see what can be next. Further, breakthroughs can happen for silicon-based technologies, the thin film technologies considered successors to silicon, as well as in the identification of totally new PV concepts. Interestingly, the PV patent literature is replete with innovative non-conventional PV technologies that weren't developed because supporting or enabling technologies did not exist. The problems then that prevented the demonstration of the concepts can perhaps be overcome today.

This symposium will focus on non-conventional technologies that have not been used in the PV industry but could be used commonly in the 21st century. Contributed publications of both fundamental and applied nature leading to maximum, cost-effective, utilization of solar energy for electric power generation are solicited. Some of the suggested general areas of interest are: (1.) new devices and structures using thin film materials such as thin film silicon, microcrystalline/amorphous silicon, polycrystalline metal chalcogenides and oxides, nanocrystalline materials, biomimetic concepts, organic materials, photoelectrochemical cells, dye-sensitized materials, or any combination of these materials and devices; (2.) materials and concepts suitable for very high efficiency epitaxial solar cells, including multijunction III-V materials and devices, lift-off techniques, solid-state epitaxy, or other concepts for incorporating single crystal thin film materials onto low-cost substrates; (3.) material synthesis and processing concepts; (4.) device modeling; (5.) efficient and low-cost manufacturing techniques; (6.) manufacturing processes and controls with special emphasis on recycling of materials and minimal waste; (7.) materials and device characterization including interface and contact studies; (8.) hybrid concepts such as PV-generated hydrogen, PV-powered electrochromics, or PV-storage combinations; and (9.) environmental issues such as recycling.

Organizers: **R. D. McConnell**, National Renewable Energy Laboratory (assigned to DOE HQ), e-mail: bob.mcconnell@ee.doe.gov; **B. Marsan**, Université du Québec à Montréal, e-mail: marsan.benoit@uqam.ca; **M. Tao**, University of Texas at Arlington, e-mail: mtao@uta.edu; and **K. Rajeshwar**, University of Texas at Arlington, e-mail: rajeshwar@uta.edu.

B9 Nickel-Metal Hydride Batteries

Battery / Physical and Analytical Electrochemistry

Nickel metal hydride batteries play a vital roll in many commercial, industrial and military applications. Consequently, a symposium to present and discuss the most recent technology is timely. Papers are solicited on both fundamental and applied aspects of Nickel Metal Hydride (NMH) cells and batteries. Specific aspects to be covered, but not limited to (1.) alternate 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 the electrolyte; (5.) materials and cell modeling; (6.) performance, safety, and failure mechanisms; and (7.) charging technology.

Organizers: **D. Scherson**, Case Western Reserve University, e-mail: a dxs16@po.cwru.edu; and **C. Richard Walk**, BAE Systems Applied Technologies, e-mail: dick.walk@gmail.com.

B10 Proton Exchange Membrane Fuel Cells (PEMFC 7)

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

This international symposium is devoted to all aspects of research, development, and engineering of proton exchange membrane (PEM) fuel cells and stacks, as well as direct methanol fuel cells or other low-temperature direct-fuel cells. 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 coordinated by means of three different sections (A, B, and C) as outlined below.

B10/Section A: Durability

Organizers: T. Fuller, H. A. Gasteiger, and S. Cleghorn

Presentations that discuss: (1.) fundamental degradation mechanisms of fuel-cell materials (e.g., materials corrosion, decomposition, and contamination); (2.) the durability of complex fuel cell components (e.g., voltage degradation mechanisms in electrolyte/electrode-assemblies); (3.) the impact of transient operating conditions on fuel cell durability/reliability; and (4.) the reliability of fuel cell systems for power generation (e.g., maintenance, and reliability of ancillary components).

Section A Organizers: **T. Fuller**, Georgia Institute of Technology, e-mail: tom.fuller@gtri.gatech.edu; **H. A. Gasteiger**, General Motors Corp., e-mail: hubert.gasteiger@gm.com; and **S. Cleghorn**, W. L. Gore & Associates, Inc., e-mail: scelghorn@wlgore.com.

B10/Section B: Fuel Cell Systems, Cell Stack, and Component Hardware

Organizers: V. Ramani, T. Zhao, and T. V. Nguyen

Presentations that discuss: (1.) new cell and stack structures, including new types of bipolar plates and flow fields; (2.) novel gas diffusion medium substrates and micro-porous layer designs; (3.) modeling and diagnostic methods to characterize mass- and heat-transport related phenomena (e.g., water flooding); and (4.) design and specifics of complete power systems in the context of transportation and stationary power generation applications as well as for micro-fuel cell systems.

Section B Organizers: **V. Ramani**, Illinois Institute of Technology, e-mail: ramani@iit.edu; **T. Zhao**, Hong Kong University of Science & Technology, e-mail: metzhao@ust.hk; **T. V. Nguyen**, Univ. of Kansas, e-mail: cptvn@ku.edu; and **A. Haug**, UTC Fuel Cells, e-mail: andrew.haug@utcpower.com.

B10/Section C: New Materials and Electrode Processes

Organizers: C. Bock, C. Lamy, K. Ota, and P. Pintauro

Presentations that discuss: (1.) electrocatalysis of fuel cell reactions, particularly at the catalyst/ionomer interface and methods to increase anode and cathode performance; (2.) computational approaches and experiments with idealized model surfaces used toward the design of novel catalysts and/or catalyst supports; (3.) ionomeric membrane thermodynamics and transport characteristics; and (4.) new ionomeric membrane development, especially for high temperature operation as well as improved resistance to fuel crossover.

Section C Organizers: **C. Bock**, National Research Council of Canada, e-mail: christina.bock@nrc.ca; **C. Lamy**, Université de Poitiers, CNRS, e-mail: claude.lamy@univ-poitiers.fr; **K. Ota**, Yokohama National University, e-mail: ken-ota@ynu.ac.jp; and **P. Pintauro**, Case Western Reserve University, e-mail: ppp3@case.edu.

B12 Solid-State Ionic Devices 5

High Temperature Materials / Sensor / Energy Technology / Physical and Analytical Electrochemistry

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 5th in the series of international symposia, emphasis will be given to electrocatalytic phenomena and effect on electrode performance. Papers on interfacial and electrocatalytic phenomena, mechanistic studies of activity and selectivity that incorporate heterogeneous catalysis techniques, spectroscopic characterization of adsorbed species, and the effect of electrode microstructure 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, and nanostructured materials or devices; the effect of nanostructures on ionic transport and catalytic activity; permeation studies; materials characterization and crystallographic investigations; extreme engineering applications (e.g., aerospace), and the design, and performance of solid state ionic devices: fuel cells, thermal energy convertors, solid-state batteries and microbatteries, chemical sensors, supercapacitors, membranes, and electrochromic devices.

Organizers: **E. D. Wachsman**, University of Florida, e-mail: ewach@mse.ufl.edu; **F. H. Garzon**, Los Alamos National Laboratory, e-mail: garzon@lanl.gov; **E. Traversa**, University of Rome "Tor Vergata," e-mail: traversa@uniroma2.it; **R. Mukundan**, Los Alamos National Laboratory, e-mail: mukundan@lanl.gov; and **A. Manivannan**, U.S. DOE National Energy Technology Lab, e-mail: manivana@netl.doe.gov.

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.

Organizer: **H. De Long**, AFOSR/NL, e-mail: hugh.delong@afosr.af.mil.

I2 Electrochemical Scanning Probe Microscopy: From Theory to Real-World Applications

Physical and Analytical Electrochemistry / Sensor

Electrochemical scanning probe techniques and in particular Scanning Electrochemical Microscopy (SECM) along with

novel hybrid techniques have matured from a fundamental developing stage into versatile systems gaining spatially and temporally resolved information of important processes ranging from applications in cell biology to corrosion science and fuel cell development. SECM plays an ambiguous role in understanding a large variety of heterogeneous reactions at solid-liquid and liquid/liquid interface. Hence, within the last decade significant developments in electrochemical scanning probe techniques could provide insight in fundamental processes including “hot topics” such as fuel cell research and life cell imaging.

This symposium is intended to bring together scientists working at the forefront of chemistry, physics, biology and materials science to focus on recent developments and new application of electrochemical scanning probe techniques.

Topics of special interest include: (1.) new instrumental developments; (2.) microelectrochemistry in nano- and microtechnology; (3.) corrosion science; (4.) biomedical and life science applications; (5.) imaging sensors; (6.) novel modi in electrochemical imaging; (7.) theory and mathematical modeling of SECM experiments; and (8.) nano- and micro-structuring of surfaces.

Organizers: W. Schuhmann, Ruhr-Universität Bochum; e-mail: Wolfgang.Schuhmann@ruhr-uni-bochum.de; and C. Kranz, Georgia Institute of Technology, e-mail: Christine.kranz@chemistry.gatech.edu.

I3 Hyphenated Methods in Electroanalytical Chemistry

Physical and Analytical Electrochemistry

The focus of this symposium is on the recent advances brought by hyphenated techniques involving electroanalytical chemistry. It will include both invited and contributed papers on both fundamental and applied topics. The following areas are of particular interest: electrochemical methods coupled with spectroscopic techniques which are making new contributions in materials science in materials characterization through imaging including that of catalytic surfaces; electrochemical methods coupled with mass spectrometry allowing characterization of redox processes in real time including in situ characterization of catalytic surfaces and biological reactivity; additionally, in bioanalytical chemistry, electrochemical methods coupled with microcolumn separations are advancing characterization of biological materials at the cellular level and in vivo; and most recently electrochemical detection coupled to microchip based analytical systems can yield portable clinical devices capable of fast and/ or high throughput analysis. All papers including combined electrochemical and surface analytical measurements are welcome.

Organizers: **G. Brisard** e-mail: gessie.brisard@usherbrooke.ca; and **C. Henry** e-mail: cshenry@lamar.colostate.edu.

I4 Microfluidics for Electrochemical Systems

Physical and Analytical Electrochemistry / Sensor

The organizers of this symposium are soliciting papers in all areas of microfluidics and nanofluidics for electrochemical systems, including areas of electroanalytical systems, bioanalysis, batteries, and fuel cells. Topics could include (but are not limited to): amperometric and voltammetric detection for capillary electrophoresis and microchip electrophoresis; laminar flow-based batteries and fuel cells; C-MEMS; electrochemical measurements on lab-on-a-chip devices; microchip electroporation; and microchip biosensing and bioanalysis.

Organizers: **S. D. Minteer**, Saint Louis University, e-mail: minteers@slu.edu; and **P. Hesketh**, Georgia Institute of Technology, e-mail: peter.hesketh@me.gatech.edu.

I5 Multifunctional Carbon Materials for Electrochemical and Electronic Applications 2

Physical and Analytical Electrochemistry / Fullerenes, Nanotubes, and Carbon Nanostructures / Dielectric Science & Technology / Energy Technology / Industrial Electrochemistry & Electrochemical Engineering

Carbon materials are employed in numerous electrochemical and electronic technologies, and there are a wide range of microstructures utilized by researchers, such as diamond, diamond-like carbon, graphite, amorphous carbon, carbon fiber, glassy carbon, nanotubes and fullerenes. In order for these carbons to function properly and optimally, one needs to

understand how factors, such as the surface chemistry, microstructure, and electronic properties, affect the electrical and electrochemical behavior. The objective of this symposium is to provide a forum for the presentation and discussion of recent developments in the science, technology, and application of carbon materials including: diamond and diamond-like carbons; nanotubes and fullerenes; and amorphous and graphitic carbons.

Papers are also sought in the following areas: (1.) carbon materials in electroanalysis; (2.) carbon materials in energy storage and conversion devices; (3.) activated carbons, carbon fibers and conducting diamond for use in the electrochemical treatment (remediation and disinfection) of water; (4.) carbon materials as platforms for chemical and biological sensing, and molecular electronics; and (5.) carbon materials for electronic devices and electron emission.

Papers describing both basic and applied research are desired but the authors should place emphasis on addressing the processing and fabrication of the carbon, the control of the surface microstructure, chemistry and electrical properties, and their effect on the material properties and performance. Both oral and poster presentations are welcome.

Organizers: **G. M. Swain**, Michigan State University, e-mail: swain@chemistry.msu.edu; **M. D. Porter**, Iowa State University, e-mail: mporter@porter1.ameslab.gov; **R. L. McCreery**, The Ohio State University, e-mail: mcreery@chemistry.ohio-state.edu; **D. Scherson**, Case Western Reserve University, e-mail: daniel.scherson@case.edu; **J. L. Davidson**, Vanderbilt University, e-mail: jim.davidson@vanderbilt.edu; **P. V. Kamat**, University of Notre Dame, e-mail: pkamat@nd.edu; and **A. Wieckowski**, University of Illinois, e-mail: andrzej@scs.uiuc.edu.

I6 Photoelectrochemistry

Physical and Analytical Electrochemistry

With the recent surge of interest in renewable energy, there is a need to renew discussion of fundamental processes relevant to these technologies. This symposium focuses on a discussion of photo-electrochemical principles, systems, materials and applications with special emphasis on energy conversion. Contributions are sought in all relevant areas including: (1.) photovoltaic conversion processes; (2.) photoelectrocatalysis; (3.) photoelectrochemical hydrogen or fuel production; (4.) photoelectrochemical device design and construction; and (5.) biological or bio-mimicking systems.

Organizers: **T. Zawodzinski**, Case Western Reserve University, e-mail: taz5@case.edu; and **J. Turner**, National Renewable Energy Lab, e-mail: john.turner@nrel.gov.

J1 Impedance and Capacitive Based Sensors

Sensors / Industrial Electrochemistry & Electrochemical Engineering / Physical and Analytical Electrochemistry

The purpose of this symposium is to bring together leading experts with a variety of different experimental and theoretical skills working in areas of electrochemical impedance and capacitive-based sensors and analytical systems. Capacitive sensors can directly sense a variety of variables such as motion, chemical composition or electric field and, indirectly, sense many other variables that can be converted into motion or permittivity, such as pressure, acceleration, fluid level, and fluid composition. The capacitive transducer is interrogated by methods of impedance spectroscopy. Impedance spectroscopy-based on-line in situ measurements, capacitive or otherwise, represent a rich multi-discipline area of science that has been applied to a large number of important areas of research, such as: (1.) corrosion studies and corrosion control; (2.) monitoring of properties of electronic and ionic conducting polymers and coatings; (3.) measurements in energy storage, batteries, and fuel cells-related systems; (4.) mechanical measurements; (5.) biological, biocellular, and biomedical sensors; (6.) measurements in semiconductors, solid electrolytes, and electronic conductors; and (7.) studies of electrochemical kinetics, reactions and processes and their control.

The aim is to show the power of electrochemical impedance spectroscopy for understanding electrochemical systems: characterizing homogeneous and heterogeneous materials by their charge transport and dielectric properties, recognizing effects and signatures of surface layers, studying space charge regions at the interfaces or in the bulk solution, determining kinetics of electrochemical and chemical reactions. The symposium also welcomes papers dedicated to fundamental research in electrochemical impedance devices and recent advances in the impedance instrumentation, data collection and processing,

and process monitoring where it relates to electrochemistry.

Organizers: **V. Lvovich**, Lubrizol Corp., e-mail: vlv@lubrizol.com; **P. Vanysek**, Northern Illinois University, e-mail: pvanysek@niu.edu; and **M. E. Orazem**, University of Florida, e-mail: meo@che.ufl.edu.

214th Meeting – Phoenix AZ May 18 – 23, 2008

The Executive committee of the Physical and Analytical Electrochemistry Division cordially invites you to participate at the 214th Meeting of the Electrochemical Society, which will be held May 18 – 23, in Phoenix. There are currently eight symposia where the Physical Division is either the organizer or co-organizer.

- **Characterization of Porous Materials**
(Industrial Electrochemistry and Electrochemical Engineering / Physical and Analytical Electrochemistry) *Organizer: G. Brisard*
- **Proton Transfer and Transport in Fuel Cells**
(Physical and Analytical Electrochemistry) *Organizer: T. Zawodzinski*
- **Electrochemistry in Biological Analysis**
(Organic and Biological Electrochemistry / Physical and Analytical Electrochemistry) *Organizer: I. Taniguchi*
- **Electrochemotherapy**
(Physical and Analytical Electrochemistry) *Organizer: H. C. De Long, R. Contolini*
- **Physical and Analytical Electrochemistry General Session**
(Physical and Analytical Electrochemistry) *Organizer: P. Trulove*
- **Environmental Electrochemistry**
(Physical and Analytical Electrochemistry / Industrial Electrochemistry & Electrochemical Engineering) *Organizers: D. Russell and D. Mah*
- **Exploiting Magnets and Magnetic Fields in Electrochemical Systems and Devices**
(Physical and Analytical Electrochemistry / Sensor) *Organizers: I. Fritsch and S. Minteer*
- **Electrochemical Nano/Biosensors**
(Sensor / Organic and Biological Electrochemistry / Physical and Analytical Electrochemistry / New Technology Subcommittee) *Organizers: A. Simonian, P. Z. Aguilar, P. Hesketh, M. Bayachou, and H. De Long*

Future Meeting Dates

Fall 2008	Oct 12 – 17	Honolulu
Spring 2009	May 24 – 29	San Francisco
Fall 2009	Oct 4 – 9	Vienna Austria

**NEW OFFICERS FOR THE DIVISION
2007 - 2009**

**The following Officers were elected at the 2007 Annual PAED Luncheon in
Chicago**

Chair: Hugh De Long, hugh.delong@afosr.af.mil

Vice-chair: Paul Trulove, trulove@usna.edu

Secretary/treasurer: Shelley Minter, Minteers@slu.edu

Members at large

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