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Call for Papers

Georgia

Workshop on Electrochemistry, MEMS, and Nanotechnology

The Georgia Section is looking for paper submissions to its "Workshop on Electrochemistry, MEMS, and Nanotechnology," to be held Friday, September 23, 2005. The workshop will be held at the MARC Building Auditorium, at the Georgia Institute of Technology in Atlanta, Georgia.

This workshop will focus on all aspects of electrochemical applications of MEMS technology in devices and nanodevices that involve electrochemical measurements. Topics such as micromachining, fabrication processes, fuel cells, sensors, new materials, cantilever probes, and the application of these structures and processes to the miniaturization of chemical and physical sensors, biosensors, miniature chemical analysis systems, and others will be presented at the symposium. The plenary lecture will be given by Petr Vanysek, of Northern Illinois University, and will focus on nanoelectrochemistry at liquid-liquid interfaces.

The half day symposium will include presentations and a poster session. When submitting your abstract, please indicate your preference for oral or poster presentation. The deadline for submission of the camera-ready, one-page abstract is **September 9, 2005**.

Abstracts, suggestions, and inquiries should be sent electronically to the organizers: P. J. Hesketh, Georgia Institute of Technology, George W. Woodruff School of Mechanical Engineering, 800 Ferst Drive, Atlanta, GA 30332-0405, USA; tel: 404.385.1358, fax: 404.894.8496, e-mail: peter.hesketh@me.gatech.edu; or C. Kranz, Georgia Institute of Technology, School of Chemistry and Biochemistry, Environmental Science & Technology Building (ES&T), 311 Ferst Drive, Atlanta, GA 30332, USA, tel: 404.385.1794, fax: 404.894.7452, e-mail: christine.kranz@chemistry.gatech.edu.

Brazil

In March 2005, the Brazilian Section was host to Andrzej Lasia, of the Université de Sherbrooke (Sherbrooke, Québec, Canada), who gave a two-week course on electrochemical impedance. The course was held at the Instituto de Química de São Carlos and it was attended by 25 graduate students from São Carlos city and the region. During his two-week stay in Brazil, Prof. Lasia also dedicated some time to discussions with graduate students. He also visited the Instituto de Química de Araraquara, where he lectured on impedance of porous electrodes. The Section thanks Suely Vilela, Vice-Chancellor for Graduate Studies of the University of São Paulo, for her efforts to get the financial help that made Prof. Lasia's visit possible, and for her help in enabling the Section to offer a high level course to graduate students.

Georgia

The Georgia Section met this past March in Atlanta, Georgia. The keynote speaker was ECS Vice-President Mark Allendorf, from Sandia National Laboratories.

The featured presentation was entitled "ChemLab: A Hand-Portable Microfluidic Instrument for BioAnalysis." Dr. Allendorf described miniaturized electrophoretic separation capable of analyzing nanoliter sample volumes at sub-nanomolar sensitivities in approximately five minutes. He also presented an overview of other microfluidics work at Sandia, including work on bio-micro fuel cells, micropropulsion, and particle separation/concentration. This was followed by eight talks from faculty and students at Georgia Tech, Clemson University, and the University of Georgia on a diverse range of topics including fuel cells, chemical sensors, and novel materials for electrochemistry.

New England

The New England Section held its eighth dinner meeting of the 2004-2005 season at Northeastern University, in Boston, MA, this past May. The featured speaker was Trent M. Molter of the Connecticut Global Fuel Cell Center of the University of Connecticut.

The featured presentation was "Entrepreneurism in Electrochemistry." The presentation was based on the speaker's own first-hand experience in generating and maturing an idea for a successful new business having underpinnings in electrochemistry. This practical case study touched on a variety of technical, business, psychological, and sociological issues related to the process of starting and building a new business. The presentation highlighted the personal characteristics and interpersonal relations needed to build a cohesive and functional team.

Molter described in detail the fascinating story of raising capital, the use of the knowledge, and the experiences people encountered. The importance of real business knowledge and experience on board was stressed. Realistic assessment of one's own and one's partner's strengths and weaknesses was essential, but above all was commitment to the provision of the goods and/or services planned.

San Francisco

The Cubicciotti Student Award honors the memory of Dr. Daniel Cubicciotti for his contribution in the application of electrochemistry to materials issues in nuclear power plants. The objective of the award is to assist a deserving student in northern California to pursue a career in the physical sciences or engineering. The award is presented to a student selected for academic excellence and personal characteristics that reflect Daniel Cubicciotti's integrity and joie de vivre. Each year, a winner is selected by a panel appointed by the selection chair.

This year, the winner is Daniel Steingart, PhD candidate in the Department of Materials Science and Engineering at the University of California, Berkeley. Steingart received his BSc from Brown University in 2000. Working with Professors Jim Evans and Paul Wright, his current research focus is the

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design and fabrication of an on-chip battery with novel electrode systems.

In addition to his experimental research, Steingart started a team of Berkeley engineers on the File Information Relay Equipment (FIRE) project in conjunction with the Chicago Fire Department and the Berkeley Fire Department.

This past April at "Student Night," Steingart was presented a plaque and a $2,000 check by a representative from Structural Integrity Associates, sponsors of the award. Steingart also spoke about his research, "Design of Direct Write Microbatteries for Wireless Sensor Networks." Developments in processing and materials have opened up opportunities for "thick film" on-chip batteries. The simulation of a battery designed around an ambigel V205 cathode was presented. Direct-write technologies for making microbatteries, such as screen-printing or laser forward transfer, were also discussed.

At the "Student Night," two other students presented their research. Cyrus Wadia of the University of California, Berkeley presented "Advancing Hybrid Solar Technology by New Materials Investigations." The objective of the speaker's research is to investigate novel materials and processing techniques that will increase solar photovoltaic efficiency and drive down costs. The foundation of this project is new materials engineering, namely synthetic methods for growing a one-dimensional blend of a bulk conductive polymer and nanowires of a semiconductor material.

"The Electrochemical Decomposition of Nitrate Ion in Low Conductivity Aqueous Solutions" was presented by Xhavin Sinha of San Jose State University. In this research, electrochemical reduction was used as a method of removing nitrate from waste water. The effects of solution pH, electrode material, nitrate concentration, current density, and other ions are studied.

In May, the Section held a meeting in Newark, California. The featured speaker was Peidong Yang of the University of California, Berkeley. The topic was "One-Dimensional Nanostructures as Subwavelength Optical Elements for Photonics Integration." The manipulation of light in structures smaller than the wavelength is critical to integrated photonics. Nanowires of some semiconductor materials can be made by vapor-liquid-solid CVD process on a suitable substrate. The key to success is finding a suitable metal catalyst that forms a liquid droplet at processing temperature. The vapor of the semiconductor deposits on top of the droplet, and the crystal grows below the droplet, extend to a highly facetted single crystal nanowire about 100 nm in diameter.

The nanowires exhibit wave-guiding behavior. They are suitable for on-chip optical routing because they can be bent to a radius of 1 micrometer without loss. Another application of the nanowire is optical measurement in very small volume of liquid. A droplet (picoliters) deposited on the filament is effectively sampled by the light wave and absorption or fluorescence spectra can be obtained.

In addition to wave guide applications, nanowires of some materials exhibit optical emission behavior when illuminated with UV light. Optical mixing can also be achieved with nanowires of a non-linear optical material. Nanowire light sources, wave guides, and detectors are all elements toward building nanowire photonic circuitries.

Twin Cities

The Twin Cities Section held two technical seminars during the 2004-2005 season. Andrew Herring of Colorado School of Mines gave a presentation on "The Thermochemical Conversion of Biomass to Carbonaceous Materials, Fuels, or Hydrogen." ECS Secretary, Petr Vanysek, of Northern Illinois University delivered a lecture on "Electrochemistry Without Redox: Interfaces Between Immiscible Electrodes." As part of this annual ECS officer visit, Professor Vanysek also briefed the Section on the state of The Electrochemical Society.

The Section also has joined the Minnesota Technical Symposium Consortium. The consortium consists of Twin Cities sections and chapters of nine professional societies, and sponsors the annual technical symposium to foster interaction of Minnesota technical professionals.

The Section has also started a pilot program to sponsor a section officer and student member to attend the ECS biannual meetings. ■