

## Chicago

On January 25, the Section held a meeting at the University of Illinois at Chicago, featuring National Speaker Dr. Carl Osburn from North Carolina State University. Dr. Osburn described the importance of electrochemical and solid-state science in semiconductors; and how some of the materials and processing science have facilitated advances in thin gate insulators, metal silicides, chemical vapor deposition, ion implantation, and diffusion.

The Section held a dinner meeting on February 16 where Dr. Milan Mrksich of the University of Chicago's Chemistry Department, spoke on "Electroactive Self-Assembled Monolayers for Controlling the Interactions of Mammalian Cells with Model Substrates." Dr. Mrksich uses synthetic organic ligands constructed on self-assembled monolayers to study the adhesion properties of cultured mammalian cells. These interfaces can be patterned for selectively locating cells on surfaces. Some ligands can be turned "on" and "off" electrochemically so that cell adhesion will occur only when desired. Others can be used to study the detailed chemistry and kinetics of the adhesion reaction. Dr. Mrksich's presentation prompted a lively discussion.

The speaker for the March 23 meeting was Dr. Timothy Henning from Abbott Laboratories. Dr. Henning presented a talk on "Interference Free Biosensors" which centered on useful devices for monitoring glucose. The effect of interferents such as vitamin C or tylenol, species often found in the blood, was discussed, together with an indicated route of shielding off their effect.

On April 9, the Section held a symposium that took place in Milwaukee, WI. Held jointly with the Southern Wisconsin Local Section, the symposium is an annual activity, and this one featured twelve papers presented by undergraduate and graduate students from around the area. Johnson Controls in Milwaukee, Rayovac in Madison, and S. C. Johnson Wax in Racine sponsored the event.

## Cleveland

On April 21, the Section held a dinner meeting which featured speakers from

Energizer, Cleveland, OH. Dr. Weiwei Huang began with a talk on "Ionic Association and Ion-Polymer Interactions in Polyether Electrolytes - Vibrational Spectroscopic and Ab Initio Quantum Mechanical Studies." Michael F. Mansuetto followed with "Manganese Oxides as Cathodes for Rechargeable Lithium Batteries" in which synthetic details, structural analysis including X-ray and neutron diffraction, and electrochemical cycling results were discussed.

## Detroit

The Section held a meeting on March 25. Phil Gow, Manager of Battery Pack Development, Electric Vehicle (EV) Battery Systems at Ovonic Battery Company presented an overview on state of charge (SOC) determination and strategies for the Ovonic NiMH battery.

EV users need accurate knowledge of SOC to predict remaining range and charge time. A practical SOC determination strategy for EV and Hybrid Electric Vehicles (HEV), based on actual data generated from vehicle testing, was then discussed.

## National Capital

The Section held a meeting which occurred on April 13 at the University of Virginia, Charlottesville, VA. Dr. Jeff Wolfenstine of the U.S. Army Research Laboratory, Sensors and Electron Devices Directorate, spoke on "Investigation of Mass Transport in a Solid Oxide Fuel Cell Cathode using High-Temperature Mechanical Behavior." His presentation covered the investigation of the high-temperature mechanical properties of  $(\text{La},\text{Sr})\text{MnO}_3$  as this material is considered to be one of the most promising cathode materials for use in high-temperature solid oxide fuels cells (SOFC).

## New England

The Section held its first dinner meeting of 1999 on January 12 in Lexington, Massachusetts. The featured speaker was Dr. Carlton M. Osburn, Vice-President of The Electrochemical Society and Professor of Electrical and Computer Engineering at North Carolina State University, Raleigh, NC. Dr. Osburn brought the members up to date on the electronic publishing plans and accomplishments of the

Society, as well as various facets of the international cooperation between the Society and allied bodies. He then presented "Electrochemical and Solid-State Science and Technology in ULSI Technology" which focused on the challenges and problems to be overcome if the development of semiconductor technology is to proceed at its extraordinary pace.

The Section held its February 9 Meeting in Lexington, MA where Dr. Stephen D. Senturia, presently the Barton L. Wheeler Professor of Electrical Engineering at the Massachusetts Institute of Technology, presented "Microelectromechanical Systems, Past Successes and Future Challenges." The presentation was a survey of specialized microfabrication techniques (including electrochemical techniques) collectively called "micromachining." Practical fabricated devices include sensors, actuators, ink jet printer nozzles, accelerometers for air bag deployment, gas flow meters, electroosmotic pumps, and IR imaging devices.

On March 9, the Section held a dinner meeting in Boston, MA. The featured speakers were Professor Terry Baker and Professor Nelly Rodriguez of the Chemistry Department of Northeastern University. The two-part presentation focused on the growth of Graphical NanoFibers, (GNF), and the utilization of same for hydrogen storage.

The Section held a meeting on April 13 in Lexington, MA. The scheduled speaker, Dr. Michael Rubner was called out of town and was substituted by Dr. Erica Abbas, a member of Dr. Rubner's research group. The scheduled topic was "Designing solid-state light emitting devices based upon Electrogenerated Chemiluminescence."

## Philadelphia

The Section held a dinner meeting on April 21 on the Villanova University campus's Center for Engineering Education and Research (CEER). Dr. Dennis Evans of the University of Delaware presented "Electrochemical Organic Synthesis: Has its time come 'again'?" A number of examples was presented along with an assessment of the future in this area of electrochemistry.

## Council of Local Section Officers



**Peter G. Bruce**, Chairman of the Council, graduated from the University of Aberdeen (Scotland), where he remained following graduation to carry out his doctoral studies under the direction of Professor A. R. West. His thesis work concerned the synthesis and characterization of new solid electrolytes with a high lithium ion conductivity.

Dr. Bruce then spent several years at the University of Oxford working with Professor J. B. Goodenough on the solid-state chemistry and electrochemistry of intercalation compounds. He took his first tenured academic position at Heriot-Watt University in Edinburgh, moving from there six years ago to take a teaching position at St. Andrews University, where he is now Head of Department.

Dr. Bruce's research interests have centered on solid-state chemistry and electrochemistry in ionically conducting solids. During this work he was involved in the discovery of the spinel electrode  $\text{LiMn}_2\text{O}_4$ , which is now used in commercial rechargeable lithium ion batteries. Recently, he has developed a new method for solving crystal structures using only powder diffraction data. This technique is now being applied to pioneering structural studies of polymer electrolytes.



**Gessie Brisard**, Vice-Chairman of the Council, received her BSc degree in Chemistry from the University of Sherbrooke (Sherbrooke, Québec) in 1984, and then pursued her research interests in electrochemistry with her work on the kinetics of metal deposition in non-aqueous solvents under the direction of Prof. A. Lasia; this led to her receiving a PhD degree from the University of Sherbrooke in 1990. She worked for one-and-a-half years as a Post-Doctoral Research Fellow in the Environmental Energy Technologies Division of the Lawrence Berkeley National Laboratory

(Berkeley, California) in Prof. Elton Cairns's group.

Gessie Brisard was appointed Assistant Professor in the University of Sherbrooke in 1992, where she has developed an active research program into the kinetics and dynamics of the metal-on-metal underpotential deposition process using single crystal surfaces (Cu, Ag, Au), the development of new electrolytes for the lithium battery systems and characterization of the Li/electrolyte interface, and the spectroscopic characterization of functionalized-metallic interfaces under potentiostatic control. This work has led to her advancement to her present rank of Associate Professor in 1997. Her collaboration with the Lawrence National Laboratory continues to this day with Dr. Phillip Ross's group on the spectroscopic characterization of electrochemical interfaces, and the application of surface analytical techniques (LEED, Auger electron spectroscopy) to the atomic-scale understanding of the structure and composition of the systems.

Gessie Brisard has been involved with the Executive Committee of the Canadian Section of the Society since 1993. She was the Section's chairperson in 1997-1998 and the chairperson of the host committee of the Montréal meeting in May 1997. Since April 1998, she has been the immediate past-chairperson and the vice-chairperson of Membership. Over the year, she has also been co-organizer of the Surface Canada Meeting (Sherbrooke, May 1997) and the New Materials for Fuel Cells and Batteries Symposia (Montréal, 1995 and 1997).



**Walter A. van Schalkwijk**, Secretary of the Council, received his B.S. in Chemistry from the Lowell Technological Institute (now the University of Massachusetts at Lowell) and his Ph.D. in Electrochemistry from the University of Ottawa where he worked under the direction of Brian Conway.

Dr. van Schalkwijk has been in the battery industry for 20 years and is Director of Research for SelfCHARGE Inc. of Redmond, WA. He joined SelfCHARGE when its operations merged with Power Sciences Inc. Prior to moving to Seattle, he was Research and Product Development Manager at Moli Energy Ltd., in British Columbia.

His research interests include advanced algorithms for battery charging and the use of magnetic fields for non-invasive monitoring of battery state-of-charge, state-of-health and other chemical and electrochemical reactions. He also works with Advanced Renal Technologies of Seattle on new kidney dialysis formulations and monitoring methods.

Over the past few years, Dr. van Schalkwijk has been active in the Pacific Northwest section serving as Vice-Chairman and most recently as Chairman. He recently completed terms as Division Advisor to the Luminescence and Display Materials and Energy Technology divisions. He is presently the Chairman of the New Technology Subcommittee and is organizing the First International Symposium of Electrochemistry and Solid-State Science in Medicine for Phoenix in 2000. Dr. van Schalkwijk is a past winner of the Student Research Award of the Battery Division.

## Pittsburgh

The Section held a dinner meeting on May 20 in Monroeville, PA. Dr. Subhash Singhal of Siemens Westinghouse Power Corporation, presented "Solid Oxide fuel cells for clean and efficient Power Generation." The functional requirements of the various cell components was reviewed, and the materials and fabrication processes selected for each cell component was discussed.

## San Francisco ES&T

Dr. Jan Talbot of the University of California, San Diego, was the guest speaker of the Section's February 17 meeting held at the National Semiconductor University in Sunnyvale, CA. Dr. Talbot began her presentation titled "Electrophoretic Deposition (EPD) of Phosphors in the Processing of Displays" with a brief introduction to the market, configurations, and internal workings of modern displays. A discussion followed on the issues confronting the commercialization of the EPD process.

## San Francisco SSS&T

The Section met on January 27 to hear a presentation on "Interconnect Technology Changes and the Impact on Equipment Markets" given by Ron Dornseif, a Principal Analyst for Dataques's semiconductor equipment, manufacturing, and materials service in the semiconductors group. The presentation summarized the likely interconnect solutions and their impact on the equipment and materials market.

The Section met again on March 23 to hear a presentation by Professor Simon Wong of Stanford University, entitled "Copper Interconnect Technology." In his talk, Professor Wong reviewed the status and challenges of copper interconnect.

On May 19 the Section held a dinner meeting in Sunnyvale, CA. Drs. Vladimir I. Kolobov, Anantha Krishnan, and Vladimir Kudriavtsev, all of the CFD Research Corporation in Los Altos, CA, presented "Simulation of the Plasma Reactor Chambers for Semiconductor Processing." The presentation summarized current state-of-the-art technology in plasma simulation and described the process of plasma generation in the reactor chamber, governing parameters and parametric relationships. Wafer heating, deformation and wafer chuck interactions was also discussed and a

concept of Virtual Equipment Simulators (VReactors) was introduced.

### South Texas

The Section held a meeting on January 23 in Round Top, Texas which began with welcoming remarks by Professor Arumugan Manthiram, the Section's chairman. Following were five presentations; the first, "Modeling and Experimental Investigations Pertaining to the Long-term Performance of High-Level Nuclear Waste Container Materials" was given by Dr. Gustavo Cragolino; the second "Investigation of Corrosion Under Alternate Wet-Dry Conditions using Raman and Electrochemical Independence Spectroscopy" given by Dr. Darrell S. Dunn; the third "Salt Film Formation and Localized Corrosion in Ni-Fe-Cr-Mo Alloys" by Dr. Narasi Sridhar; and the fourth, was "Modeling the Evolution of Chemistry under Disbonded Coating on Steel" also by Dr. Narasi Sridhar. Graduate student Ramanan Chebiam presented "Failure Mechanisms of LiCoO<sub>2</sub> Cathodes in Lithium-Ion Cells," and the meeting concluded with closing remarks by the local section treasurer, Dr. Zoran Minevski.

The Section held another meeting on April 17 at the Joe C. Thompson Conference Center at the University of Texas at Austin. Session I began with a presentation titled "Electrophoretic Deposition in the Processing of Information Displays" by Dr. Jan Talbot of the University of California, San Diego which was followed by "Micromachined Array-based Multi-analyte Chemical Sensors: Toward the Fabrication of an Electronic Tongue" by Professor Dean Neikirk of the University of Texas at Austin.

Session II began with "Biochemical Sensors based on Nanometer Scale Thin Films" by Professor Michael Pishko, Texas A&M University; "Electrochemical Preparation and Applications of Alkali Metal Ferrates" by Dr. Adrian Denvir, Lynntech, Inc.; and finally "Applications of High-k Materials as Alternative Gate Dielectrics for Ultra Large Scale Integrated Circuits" by Wen-Jie Qi, Renee Nieh, Byoung Hun Lee, Laegu Kang, Yongjoo Jean, Aaron Lucas, and Jack C. Lee of the University of Texas at Austin.

### Southern Wisconsin

The Section held a dinner meeting on February 3 in Milwaukee, WI. Dr. Ben-

jamin Feinberg of the University of Wisconsin, Milwaukee, presented "Voltammetry as Probe into Redox Driven Rearrangements of a Heme Protein." In his talk, Dr. Feinberg discussed how heme proteins and enzymes play key roles in biological electron transfer reactions. He showed how direct squarewave and cyclic voltammetry of this variant at a chemically modified gold electrode provides a graphic and informative view of the unexpected redox driven intramolecular changes in axial coordination.

The Section held their May 10 meeting in Milwaukee, WI. The featured topic was "Electrodeposition of Metallic Multilayers" given by Thomas P. Moffat of the Electrochemical Processing Group in the Material Science and Engineering Laboratory at the National Institute of Standards and Technology (NIST). An over view of the electrochemical deposition of strained-layer superlattices of Cu/(Fe, Co, Ni) was discussed.

### Twin Cities

The Section held a meeting on February 4 in Minneapolis, MN where Professor Jeff Dahn of Dalhousie University and NSERC/3M Industrial Chair in Materials for Advanced Batteries presented "Doubling the Energy of the Li-ion Battery." Professor Dahn described the recent work being done at his laboratory and at 3M, and how this work suggests it will be possible to double the energy density of these cells by changing the negative electrode material from carbon to Sn-alloy based materials. ■

### Local Section Events

*Interface is always looking for news of your upcoming Section events to publish.*

*Send your announcements to Interface, 10 South Main Street, Pennington, NJ 08534 or e-mail us at: [membership@electrochem.org](mailto:membership@electrochem.org).*