

Detroit

The Section held a dinner meeting on March 15 in Warren, MI. Dr. JoAnn Milliken of the U.S. Department of Energy Office of Advanced Automotive Technologies presented an overview of programs under the Partnership for a New Generation of Vehicles to develop PEMFC technology. Dr. Milliken defined the technical challenges that need to be addressed to increase total system efficiency from 35% to 47%. Six specific technical challenges were described: platinum usage, air systems, durability, start-up, fuel infrastructure, and cost. She presented an overview of DOE programs addressing these challenges at the system level as well as the fuel processor and stack/components level. The trade-offs between reformed fuel processing and hydrogen storage and distribution were outlined. The present PNGV strategy focuses on emerging PEMFC propulsion systems based on reformed gasoline, with longer term goals of on-

board hydrogen storage. Several additional interesting challenges were discussed, including non-noble metal catalysts, exposure of the cathode catalysts to impurities in the air, and battery technology to manage start-up.

National Capital

On February 22, Dale Hall, ECS President and Deputy Director of the Materials Science and Engineering Laboratory at the National Institute of Standards and Technology (NIST) addressed a joint luncheon gathering of the section and NACE Baltimore-Washington Section in Annapolis, MD. His informative presentation, "Trends and Directions in Materials Research," was well-received by the 31 members and guests present from local universities, industry, and national laboratories.

Dr. Hall emphasized the crucial role played by the development and application of advanced materials with superior properties in the continued growth of

new and powerful information technologies. Microelectronics, wireless communications, magnetic storage, and other technologies are major forces that influence the course of materials research and engineering. His talk focussed on NIST materials research that supports the development of key information age industries and technologies; providing a quick introduction to NIST's programs, with a particular focus on materials research for the information technology industries. Several examples of NIST work that contributes directly to industrial progress in information technologies, such as the development of lead-free solder and dielectric ceramics for the wireless communications industry, were described. Other examples included microscale strain and tensile strength measurements, on-chip metallization, magnetic materials, solder interconnects, the prediction of corrosion behavior, computational science for materials modeling, and the role of neutron measurement methods. Overall, the

Council of Local Section Officers



Gessie Brisard, 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.

Brisard was appointed an assistant professor at 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.

Dr. 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, vice-chairman of the Council, received his BS in chemistry from the Lowell Technological Institute (now the University of Massachusetts at Lowell) and his PhD 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, 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.



Petr Vanysek, secretary of the Council, was born and educated in Czechoslovakia, where he received his MS in physical chemistry from Charles University in Prague in 1996. He received his PhD while working on electrochemistry of liquid/liquid interfaces under the leadership of Prof. J. Koryta, at the Czechoslovak Academy of Sciences in 1982. His post-doctoral experience included an 18-month research at the University of North Carolina and a year as a faculty-in-residence at the University of New Hampshire. He has been a regular faculty at the Department of Chemistry and Biochemistry at Northern Illinois University since 1985.

Dr. Vanysek's research interests are in the physical and electroanalytical aspects of interfaces between immiscible solutions, studies of corrosion and development of (mostly electrochemical) sensors. He is focused on detailed understanding of interpretation of impedance. His publication list includes about 90 papers in electrochemistry.

development of new measurement standards is a key and defining function of NIST in assisting emergent technologies and industries.

The section held a dinner meeting on March 13 in Alexandria, VA. Featured was a presentation by Geoffrey Prentice of the National Science Foundation entitled "Simulation of Cathodic Protection Systems."

Cathodic protection is used extensively to prevent or reduce the corrosion rate of metal structures such as buried pipelines, oil drilling platforms, and heat exchangers. Protection is accomplished by reducing the potential of the material to a point near the reversible potential of the oxidation reaction. Although the theoretical basis for protecting structures is well established, until recently design calculations were based on simple empiricisms. Complexities arise from accounting for the effects of interactions between different electrode surfaces. Galvanically-coupled metals, multiple electrode reactions, and time-varying polarization behavior further complicate the analysis. Dr. Prentice explained how he and his co-workers have used finite-difference and finite-element analysis to determine the detailed current and potential distributions of several galvanically-coupled systems. From these simulations they are able to optimize anode placement and determine whether hydrogen evolution, which might lead to embrittlement, is present.

On April 11, thirteen Section members met for lunch and a tour at the National Institute of Standards and Technology in Gaithersburg, MD. Dale Hall, Deputy Director, Materials Science and Engineering Laboratory, and current ECS president, welcomed the group to the NIST campus. The tour consisted of visits to three laboratories: (1) NIST Center for Neutron Research, hosted by J. Michael Rowe, Director, NIST Center for Neutron Research, Materials Science and Engineering Laboratory which produces more neutrons for research than any other facility in the country; (2) Electron Beam Ion Trap, hosted by John Gillaspay, leader of the Plasma Radiation Group, Atomic Physics Division, Physics Laboratory; and (3) Semiconductor Metrology, hosted by Thomas Shaffner, Leader of the Materials Technology Group Semiconductor Electronics Division, Electronics and Electrical Engineering Laboratory. There the group met the newest member in the arsenal of tools for surface analysis: the "scanning capacitance microscope," which can distinguish different regions

of surface atoms in a semiconductor junction.

The Section presented the 21st William Blum Award to William E. O'Grady at its annual awards meeting on May 9, held in Alexandria, VA. Also honored were eighteen local area 2000 Science Fair Award recipients. Present to receive their awards (a Certificate of Achievement from The Electrochemistry Society and a check from the Section for \$25) were: Nick Scheer, Spotsylvania High School, "pH Level and Corrosion of Copper"; Christopher Bond, Lake Braddock Secondary, "Batteries at the Bar"; and Elizabeth Schemm, River Hill High School, "Development of a Sol-Gel Thin Film for CO₂ Sensing Applications."

In his talk, "X-Rays at Electrochemical Interfaces," Dr. O'Grady reviewed the use of X-rays to probe the *in situ* geometric and electronic structure of electrochemical interfaces.

Pittsburgh

On March 16, the Section held a joint meeting with The American Electroplaters and Surface Finishers Society and NACE International in Pittsburgh, PA.

Michael G. Vucich presented "Evaluation of Container Materials by Chemical and Electrochemical Techniques." The purpose of the presentation was to demonstrate, through the evaluation of container materials, how electrochemical techniques may be used to evaluate other materials.

San Francisco ES&T

On March 22, the Section held a meeting in Berkeley, CA, which featured a presentation by Kathryn Striebel of the Lawrence Berkeley National Laboratory. Dr. Striebel spoke on "Thin Film Studies of Battery Materials." The objective of the presentation was to illustrate various aspects of film preparation, characterization, electrochemical and *in situ* analytical measurements.

San Francisco SSS&T

The Section held a dinner meeting on February 29 in Sunnyvale, CA. Wade Zawalski, of Applied Materials, presented "Langmuir Probes in Material Processing Plasmas" in which a brief introduction to the basic ideas of Langmuir (electrostatic) probes were given. An overview of

the effects of RF noise on an uncompensated probe was presented along with experimental strategies to minimize RF induced distortion. The basics of filtering, passive compensation, and active compensation were discussed and the concepts supported with experimental data from the speaker as well as published works.

Twin Cities

The Section held its April 5 meeting in Minneapolis, MN, where Andrzej Wieckowski, of the University of Illinois in Urbana-Champaign presented "Anion Adsorption on Metal Electrode Surfaces: Experiment, Theory, and Application to Electrocatalysis."

On May 10, the Section held a meeting in Minneapolis, MN. The featured speaker was Steven Theis of the 3M Science Research Center. Dr. Theis gave a lecture entitled "Silicon on Flexible Substrates." The lecture focused on two of the leading edge efforts to develop current electronic technologies for use in the area of a-Si:H transistors on thin metal foils and poly-Si transistors on plastic substrates. ■