

## ECS Sponsors Symposium at AAAS Meeting in February

by Robert P. Frankenthal

"New Frontiers in Electrochemical and Solid-State Science and Technology," an ECS-sponsored symposium, will be part of the 1998 American Association for the Advancement of Science (AAAS) Annual Meeting and Science Innovation Exposition in Philadelphia (AMSIE), February 12-17. This meeting is the first major event in AAAS's celebration of the 150th anniversary of its founding in Philadelphia. This half-day symposium was proposed, and is being organized, by Jerome Kruger and the author of this article.

The symposium is centered around the AMSIE '98 theme track, "Emerging Science: Transforming the Next Generation," and describes some of the exciting new fields of electrochemical and solid-state science and technology that are the foundation of ECS. The session topics will present fields that have the potential for transforming industry and science as we approach the new century in areas such as new materials, energy sources, communications and electronics, and medicine.

In the area of electrochemical science and technology, the session will report on recent advances and future directions in nanoscale electrochemistry, such as imaging and studying single atoms or molecules, and the latest scientific and engineering breakthroughs that are driving the development of new energy sources, such as batteries and fuel cells. To illustrate the exciting developments and future directions of solid-state science and technology, the session will highlight the novel opportunities that promise to arise from research in solid-state nanoscale science and the development of devices from recent advances, such as quantum dots and single-electron transistors, that are likely to transform communications and other electronic technologies. The chemistry and physics of new solid-state materials that show great promise for promoting all these fields will be discussed. Finally, the promising powerful biological and medical applications that are being generated by innovative developments in sensors that bridge the electrochemical and solid-state disciplines will be addressed.

Five speakers are currently scheduled for the symposium. Allen J. Bard, the Norman Hackerman Professor of Chemistry in the Department of Chemistry at the University of Texas (Austin), will give a talk entitled, "Nanoscale Electrochemistry: New Understanding and Applications." The availability of scanning probe instrumentation and nanometer scale electrodes have made possible high resolution spatial characterization of the electrode/solution interface. Even the electrochemical response of single molecules trapped between a probe tip and an electrode can be recorded. Professor Bard's talk will provide an overview of this field and a discussion of new and projected experiments that will extend the frontiers in this area.

Kathleen C. Taylor is Head of the Physics and Chemistry Department for General Motors Research and Development Center in Warren, Michigan. She will give a talk on "New Power

Sources for the 21st Century: From Batteries to Fuel Cells." Promised substantial benefits for air quality and fuel efficiency are the motivation for the application of electrochemical-based power sources for transportation. Advanced batteries and fuel cell systems currently under development are the enabling technologies for growing market penetration of electric and hybrid vehicles throughout the 21st century.

Federico Capasso is Head of the Quantum Phenomena and Device Research Department at Bell Laboratories, Lucent Technologies in Murray Hill, New Jersey. His talk will be on "Nanoscale Solid-State Science and Technology: New Understanding and Devices." The energy levels, wave functions, optical matrix elements, and scattering rates of electrons can be tailored using semiconductor nanostructures as building blocks. This allows the design and realization of new artificial materials and devices with interesting optical and transport properties. This approach will be illustrated with recent examples such as resonant tunneling through double barriers, quantum interference phenomena in transport and optical absorption, bound states in the continuum, quantum well "pseudomolecules" with giant nonlinear optical susceptibilities, and quantum cascade lasers.

Robert A. Laudise, Adjunct Chemical Director for Bell Laboratories, Lucent Technologies in Murray Hill, New Jersey, will speak about "New Materials for Solid-State Science and Technology." Progress in solid-state science and technology has, from the days of germanium and silicon, been paced by the availability of materials exhibiting vastly improved or new properties. New materials and new structures including magnetics, piezoelectrics, ferroelectrics, and organic semiconductors and their prospects for applications will be discussed. The progress toward environmentally benign materials will be discussed, and old materials in new forms like sol-gel prepared fibers, optical amplifiers, and molecular beam epitaxy (MBE) semiconductors will be reviewed.

Richard P. Buck, a Professor of Chemistry and Adjunct Professor of Biomedical Engineering in the Department of Chemistry at the University of North Carolina (Chapel Hill), will speak on "Electrochemical Sensors: Biological and Medical Applications." Sensors for ions and neutral species in biological and medical systems use all of the interfacial processes and most of the bulk processes that are the topics of electrochemical science. Sensors and sensor-containing electrochemical cells are now available in "nanoscale" devices. Their medical applications run from head to toe, with special emphasis in this presentation on brains, hearts, and applications to diagnosis and neonatology.

ECS is pleased to be a part of the AAAS's 150th anniversary celebration, which will include a leadership forum, special noon-time topical lectures, and other special events. For more information about the meeting, contact the AAAS in Washington, DC, at (202) 326-6450, or visit their Web site at: <http://www.aaas.org> ■

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