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Newsletter

Volume 7 Number 3 October 1983

BELL AND TOBIAS TO RECEIVE AIChE AWARDS AT ANNUAL MEETING

MMRD Faculty Senior Scientists ALEXIS BELL and CHARLES TOBIAS, Professors of Chemical Engineering at UCB, will receive awards at the annual meeting of the American Institute of Chemical Engineers (AIChE) this fall.

Bell, Chairman of the Chemical Engineering Department, earned the Professional Progress Award for Outstanding Progress in Chemical Engineering. Sponsored by the Celanese Chemical Company, the award consists of a certificate and an honorarium. It is given to researchers below the age of 45 who have contributed significantly to

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MILLER AND SESSLER ARE ELECTED FELLOWS OF AAAS

WILLIAM H. MILLER, Professor of Chemistry at UCB and Faculty Senior Scientist at MMRD, and ANDREW SESSLER, former LBL Director, and a researcher in the Accelerator and Fusion Research Division, were elected Fellows of the American Association for the Advancement of Science in recognition of their "efforts on behalf of the advancement of science or its application (which) are scientifically or socially distinguished." They were among the 296 individuals named fellows this year during the AAAS meeting in Detroit.

NCEM DEDICATED; TWO OF MOST POWERFUL EMs IN THE WORLD

Two of the most powerful electron microscopes in the world are the key instruments in the National Center for Electron Microscopy (NCEM), dedicated at LBL on September 30. The ceremony was attended by scientists from several universities, industry, and government. NCEM is for all qualified scientists with specific needs for its unique capabilities. The Center, constructed at a cost of approximately \$8 million, is funded by the U.S. Department of Energy.

The two instruments--a 1.0 MeV Atomic Resolution Microscope (ARM) and a 1.5 MeV High-Voltage Electron

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PITZER NAMED INTERIM DIRECTOR OF CENTER FOR ADVANCED MATERIALS

KENNETH S. PITZER, Professor of Chemistry at UCB and MMRD Faculty Senior Scientist, will serve in an interim capacity as Associate Director and Division Head for the Center for Advanced Materials (formerly designated NCAM), until a permanent head of the new LBL division is selected. The appointment of Professor Pitzer was made by LBL Director DAVID A. SHIRLEY on the recommendation of the Interim Program Advisory Committee (IPAC), established early in September by Shirley.

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PITZER NAMED INTERIM CAM HEAD
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"I am delighted," said Shirley, "that Ken Pitzer has agreed to accept the very important task of heading up the Center during this formative period. . . his major responsibility will be to formulate and implement scientific programs in close collaboration with advisory groups composed of representatives from industry and universities. The search for a permanent director is proceeding apace, but the need for a seasoned scientific leader and administrator right now is obvious. We are fortunate to have scientists like Ken to fill the need on such occasions."

Professor Pitzer is preeminent in the field of quantum chemistry and is an acknowledged leader in the scientific community. His professional activities have included serving as President of Rice University and of Stanford University. He has received numerous awards and honors, including the National Medal of Science, and election to the National Academy of Sciences and the American Academy of Arts and Sciences.

Members of the IPAC for the Center for Advanced Materials (CAM) are ALEXIS T. BELL, LEO FALICOV, C. BRADLEY MOORE, ANDREW NEUREUTHER, and ALAN W. SEARCY (Chairman), Division Head of MMRD. Searcy, Bell, Falicov, and Moore are Faculty Senior Scientists in MMRD, and Neureuther is a Professor in the Department of Electrical Engineering and Computer Sciences, UBC. The Committee has recommended that programs be established in advanced structural materials, catalysis, electronic materials, and surface and interface science.

Construction work on the first CAM building, the Surface Science and

Catalysis Laboratory, is scheduled to begin next spring. It will be located adjacent to Building 62, the main MMRD building.

BELL AND TOBIAS TO RECEIVE
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the field of chemical engineering in either theoretical or applied research or in distinguished service.

He was singled out for his catalytic work, particularly his research on Lewis acid catalysis and Fischer-Tropsch synthesis. His other principal areas of research are plasma chemistry, heterogeneous catalysis, and selective hydrogenation of coal and the synthesis of hydrocarbons from carbon monoxide and hydrogen.

Professor Tobias received the Alpha Chi Sigma Award for Chemical Engineering Research, which is an honor bestowed by the fraternity for outstanding accomplishments in either fundamental or applied research during the past ten years.

Tobias was cited especially for his many contributions to the field of electrochemical engineering. He is a pioneer in electrochemical research and helped establish it as a major discipline. At present, he does basic research in ionic mass transport in electrolytic gas evolution, conductance of heterogeneous systems, and dynamic behavior of partially- and fully-flooded porous electrodes. He was recently elected to the National Academy of Engineers (see June Newsletter).

THREE MMRD SCIENTISTS WIN
DOE LAB COMPETITION

Three MMRD researchers were among the ten winners of the U.S. Department of Energy's 1983 Materials Science Research Competition (for

work completed in 1982), as announced in an August letter from LOUIS C. IANNIELLO, Director, Division of Materials Sciences, Office of Basic Energy Sciences, DOE, to ALAN SEARCY, Head of MMRD.

Y. RON SHEN, Professor of Physics (UCB), was chosen in the Solid State Physics--Outstanding Scientific Accomplishment category for his work in "Nonlinear Optics as a Novel Surface Probe;" ALEXANDER PINES, Professor of Chemistry (UCB), was selected in the Materials Chemistry--Outstanding Scientific Accomplishment category for his "Multiple Quantum Spectroscopy," and DONALD R. OLANDER, Professor of Nuclear Engineering (UCB), was selected in the Materials Chemistry --Sustained Outstanding Research category for his "Research on High-Temperature Behavior of Nuclear Fuel Element Materials." All three winners are Faculty Senior Scientists in MMRD.

Purpose of the competition is to provide DOE recognition of individual National Laboratory scientists who have achieved outstanding research results. Competition judges were scientists from the various DOE Laboratories. In his letter to Searcy, Ianniello remarked that constructive comments from the labs are helpful in improving the competition, which is expected to be repeated in future years.

MMRD PEOPLE

Please join us in welcoming MEREDITH MONTGOMERY to the MMRD Staff as our new Personnel Administrator. She replaces PATTI PALADINI who has left to raise a family (a son, David Joseph, born October 5). Meredith has a BA from Tulane University, plus several years of personnel, payroll, and contract administration experience in the UC Berkeley Chemistry Department.

AWARDS

HAROLD S. JOHNSTON, Professor of Chemistry at UCB and MMRD Faculty Senior Scientist, has been awarded a Certificate of Commendation by the Federal Aviation Administration for his research that led to a "better understanding of the effects of aircraft exhaust emissions on the upper atmosphere."

MMRD VISITING SCIENTIST INJURED IN CHEMISTRY LAB ACCIDENT

Explosion of a shock-sensitive compound he had prepared caused the loss of the right eye and two fingers of the left hand of JEAN-RENE HAMON on August 10. He also sustained injuries to the left eye and face while removing the last of an adduct of neodymium perchlorate and acetonitrile from a glass flask, during research in a Latimer Hall laboratory.

A visitor from Rennes, France, Hamon is a member of KENNETH RAYMOND's research group; Raymond is Professor of Chemistry at UCB and an Associated Faculty Scientist in MMRD.

Immediately after the explosion, emergency first aid was given by graduate students Larry Lewis and Gwen Freeman. Paramedical treatment was administered by Management Service Officer Gary Matteson; Hamon was able to tell him precisely what the compound was and to assist him generally.

Surgeons at Merritt Hospital, Oakland, where Hamon was taken, worked on his eyes and left hand for more than eight hours but the right eye had to be removed and attempts to reattach the little and ring fingers of the left hand were unsuccessful. The amount of sight he will have in his left eye was still unknown as this issue went to press. (Please turn the page)

Hamon, 27, arrived in the U.S. last June with his wife, Michelle, and their four-year-old daughter. Many College of Chemistry and other UCB personnel have joined in helping the family. Dr. Hamon hopes to complete his work here before it is time to return to France. He is a staff scientist at the Universite de Rennes, where his research is supported by the Centre National de la Recherche Scientifique (CNRS), the French equivalent of the United States' National Laboratories.

SEABORG RECEIVES SMYTH NUCLEAR STATESMAN AWARD BY AIF, ANS

Associate Director of LBL GLENN SEABORG, UCB Professor and MMRD Faculty Senior Scientist, received the Henry DeWolf Smyth Nuclear Statesman Award at a Washington, D.C. banquet in June. Presented by both the Atomic Industrial Forum and the American Nuclear Society, the award recognizes outstanding service in guiding and developing the uses of atomic energy in constructive channels. Seaborg is internationally known for his work in atomic chemistry, which earned him the Nobel Prize. He also served under three presidents as Chairman of the Atomic Energy Commission and is a strong advocate of a nuclear test ban treaty.

KEYNOTE LECTURE BY PRAUSNITZ

JOHN PRAUSNITZ, Professor of Chemical Engineering at UCB and MMRD Faculty Senior Scientist, gave the keynote lecture at the Third International Conference on Fluid Properties and Phase Equilibria for Chemical Process Design, held at Callaway Gardens, Georgia, in April. His lecture, "Phase Equilibria in Complex Systems," discussed progress in the use of semi-theoretical equations of state for asymmetric fluid mixtures, including the use of distribution functions (to replace discrete composition variables) for describing heavy fossil-fuel mixtures that contain a very large number of components.

TEMPLETON ELECTED V.P. OF AMERICAN CRYSTALLOGRAPHIC ASSOCIATION

Professor DAVID TEMPLETON, Professor of Nuclear Chemistry at UCB and MMRD Faculty Senior Scientist, has been elected Vice President of the American Crystallographic Association for 1983. His present fields include scattering effects in crystals using synchrotron radiation, and nuclear reactions within crystals.

LAMPERT TO YUGOSLAVIA FOR SOLAR ENERGY LECTURES, LAB TOURS

CARL M. LAMPERT, staff scientist in MMRD, has been given a Fulbright senior scholarship to lecture in Yugoslavia on solar energy conversion coatings at a conference on "The Scientific Aspects of Solar Energy Conversion," to be held in HVAR, Yugoslavia, September 26-30. He will present a series of three lectures on materials aspects of selective surfaces: absorbers, heat mirrors, and specialized solar energy conversion materials and coatings.

Prior to the conference, he will spend a week visiting various Yugoslavian universities, conferring on research.

After the conference, Lampert will visit several institutions and other organizations, including the Fraunhofer Institute, Ecole Polytechnique Institute, Battelle-Geneva, University of Provence, and Schott Glassworks, discussing international research in the field of materials for solar energy conversion.

PASK, A. EVANS LEADERS AT U.S. CHINA CERAMIC SEMINAR

JOSEPH A. PASK, Professor Emeritus of Ceramic Engineering and MMRD Faculty Senior Scientist, and ANTHONY G. EVANS, Professor of Materials Science and MMRD Associ-

ated Faculty Scientist, served as chairman and vice-chairman, respectively, of the American group participating in the first U.S.-China Seminar on Basic Science of Ceramic Materials, held in Shanghai, People's Republic of China, May 17-21. The seminar was sponsored by the National Science Foundation. The group also visited laboratories, universities, and ceramic factories, as well as archeological sites, in Shanghai, Luoyang, Xian, and Beijing.

NCEM DEDICATED

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Microscope (HVEM)--will enable materials scientists and biologists from throughout the nation to observe individual atoms in even the densest metallic and ceramic structures, and to study their atomic organization under the most realistic conditions. A major thrust of these investigations will be the identification and analysis of the minute flaws and misalignments in atomic structure that give rise to nearly all material failures.

DAVID A. SHIRLEY, LBL Director, Professor of Chemistry at UCB, and MMRD Faculty Senior Scientist, was master of ceremonies for the dedication. In brief remarks, UCB Chancellor IRA M. HEYMAN said that the NCEM will be of significant importance in the University's continuing leadership in science, which was a hallmark of UCB during its first 50 years (beginning with the 1873 founding of the permanent campus), and that its science programs have produced great scientific strides during the second half century. (At present, the University of California faculty includes 10 Nobel Laureates and more than 85 members of the National Academy of Sciences).

Notables in attendance were introduced by ALAN W. SEARCY, Head of MMRD. Among these was RICHARD H. KROPSCHOT, Associate Director for Basic Energy Sciences, Office of

Energy Sciences, DOE, who said that DOE's strong endorsement of the new Center stems from its dedication to maintaining and furthering levels of scientific research through its vital programs of training students and developing strong user programs.

In presenting keynote speakers, GARETH THOMAS, NCEM Scientific Director, Professor of Metallurgy at UCB, and Faculty Senior Scientist, credited the help and encouragement from industry, government, and academia with making NCEM a reality.

Thomas reported that the recently installed ARM during its final acceptance test achieved a resolution of 1.6 Angstroms at one million electron volts (an Angstrom is one hundred-millionth of a centimeter, the approximate diameter of a hydrogen atom), making it by far the most sophisticated instrument of its type currently in existence.

"The limit heretofore on the effective resolution of transmission electron microscopes has been two Angstroms," Thomas said. "At 1.6 Angstroms, the ARM will make possible for the first time the imaging of individual atoms in any solid material." He added that future modifications and improvements in the ARM's electronics configuration may lead to even higher resolution.

Thomas introduced Professor J. A. COWLEY, Galvin Professor of Physics and Director, Facility for High Resolution Electron Microscopy, Arizona State University. Speaking on "High Resolution Electron Microscopy in America," Cowley cited the ability to observe interactions and spacing between atoms of substances studied in the several scientific disciplines as facilitating and "making possible the development of optimum products and processes."

Using colorful CRT images of

LAMPERT TO YUGOSLAVIA FOR SOLAR
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interactions recorded in the sample chamber of an HVEM in Japan, Professor H. HASHIMOTO, Osaka University, Japan, and President, International Federation of Societies for Electron Microscopy, spoke on the "Impact of Electron Microscopy on Materials Science." Hashimoto commented on the similarities and differences of various physical and biological processes, predicting that man's ability to study them at the atomic level will produce many new discoveries.

Representative from JEOL, the Japanese firm that built the ARM for NCEM, were on hand for the dedication. The microscope was delivered in Berkeley late last December.

The other major instrument at the Center, the HVEM, is the most powerful microscope of its kind in the U.S. Although its resolution is only about half that of the ARM, the exceptionally high penetrating ability of 1.5 MeV electrons makes it possible to visualize structural properties within bulk materials.

Equally important are the unique sample chambers built into the

HVEM. With them, scientists will be able to observe the changing structural properties of materials occurring under a variety of critical conditions, such as high heat and pressure, crystal formation, and during chemical reactions.

The HVEM was manufactured in England by Kratos and was delivered last year.

The facilities managers of the ARM and the HVEM are Dr. RONALD GRONSKY, Staff Scientist and Dr. KENNETH H. WESTMACOTT, Staff Senior Scientist, respectively.

The HVEM, which has been operational for nearly a year, is currently scheduled for full-time use by LBL and visiting scientists for the next several months. Proposals for use of the ARM are now being received and evaluated.

OUR APOLOGY

Please credit KARLA JENNINGS, editor of the UCB College of Chemistry's newsletter, Dimensions, for the interesting feature story on Professor LEO BREWER's Hume-Rothery Award acceptance address, reprinted in the MMRD Newsletter, June '83, p 7. This story was written by Karla and appeared in Dimensions (April 25).

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