according to their simulations, trapping of different numbers of molecules occurs with different probabilities. The researchers discuss this fact in terms of the geometry of the tip. According to their modeling conditions, the most energetically preferred configurations of molecules around the tip correspond to either five particles—a tetragonal pyramid—or eight particles in which six form a hexagon in the plane of the tip and two are out of plane. The researchers said that the configurations and the number of particles are determined by the radius of the tip, molecule conformation, and the tip geometry among other factors.

The research team concluded that changing the pulling velocity enables control of the number of molecules transferred from the surface layer to the tip and vice versa.

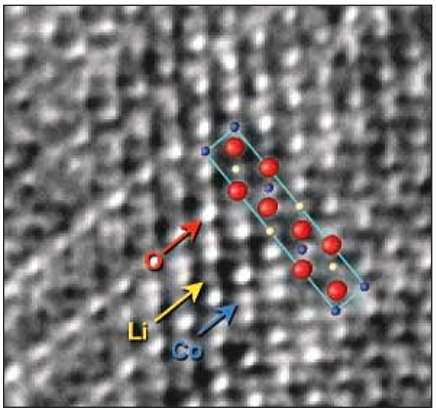
ANDREI A. ELISEEV

Focal Reconstruction Produces TEM Images of Individual Lithium Atoms

In work that could aid the development of batteries for products from laptop computers to electric cars, an international team of researchers has taken images of individual atoms of lithium, a key element in state-of-the-art rechargeable batteries.

"The atomic resolution imaging of lithium atoms is a novel and significant achievement, with implications for better understanding not only of lithium-ion battery materials but of many other electroceramic materials as well," said Yang Shao-Horn, an assistant professor at the Massachusetts Institute of Technology.

Shao-Horn and colleagues M.A. O'Keefe and E.C. Nelson from Lawrence Berkeley National Laboratory used a specially modified transmission electron microscope to simultaneously resolve columns of lithium, cobalt, and oxygen atoms in the lithium battery material lithium cobalt oxide ($LiCoO_2$). They accomplished this through focal-series reconstruction of the electron wave at the specimen exit surface (see figure).



Experimental image of lithium atoms reconstructed from 20 component images obtained over a range of focus. The image shows the arrangement of lithium ions among cobalt and oxygen atoms in the battery material lithium cobalt oxide—strong white peaks occur at the positions of oxygen atom columns, strong fuzzy peaks at cobalt sites, and the weak white peaks show lithium positions. Reproduced with permission from Nature Materials ***2*** *(7) (July 2003), p. 464; © 2003 Nature Publishing Group.*

As reported in the July issue of *Nature Materials*, the researchers obtained series of 20 differently focused images of individual crystals from a $LiCoO_2$ powder sample synthesized and characterized by conventional x-ray diffraction in collaboration with colleagues L. Croguennec and C. Delmas from CNRS and the University of Bordeaux I. Using a reconstruction program and their measurements of the microscope parameters, the researchers worked backwards to assemble the focal series of images into one image that is a representation of the electron wave leaving the exit surface of the specimen. At the thin edge of a $LiCoO_2$ crystal, this reconstructed experimental image matched the image previously predicted by a simulation program.

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News of MRS Members/Materials Researchers

Reza Abbaschian, Vladimir A. Grodsky Professor of Materials Science and Engineering at the University of Florida, has received the **Donald E. Marlowe** Award from the American Society for Engineering Education in recognition of his extraordinary vision and leadership in administration, education, and research, and for significant ongoing contributions to engineering education.

Kenneth T. Barry has been named President of Unaxis Semiconductors. Barry brings with him more than 15 years of global semiconductor experience.

Stephen P. Ellis, laboratory manager at Ecolochem, Inc., has been awarded a **2003 ASTM International Award of Merit** for his technical contributions to the objectives of ASTM Committee D19 on Water.

Helen Garnett, presently chief executive of the Australian Nuclear Science and Technology Organisation (ANSTO) and a representative to the United Nations International Atomic Energy Agency, has

Jeff Wadsworth Named Director of Oak Ridge National Laboratory

UT-Battelle has announced the selection of Jeff Wadsworth as director of the U.S. Department of Energy (DOE) Oak Ridge National Laboratory (ORNL). He succeeds Bill Madia, who has joined Battelle as Executive Vice President of Laboratory Operations. Wadsworth, who began his new duties on August 1, joins ORNL after years of distinguished service as a senior leader at Lawrence Livermore National Laboratory, as well as service at Battelle's world headquarters in Columbus, Ohio as a senior executive in areas such as DOE science programs, technology transfer, and homeland security.

"Jeff [Wadsworth] is an internationally respected scientist, outstanding leader, and innovator in such fields as materials science and homeland security," said Raymond L. Orbach, director of DOE's Office of Science.

Wadsworth holds BS, PhD, and DMet degrees in metallurgy from Sheffield University. In 1987, he was elected a Fellow of the American Society for Metals, and in 2000 a Fellow of The Minerals, Metals, and Materials Society. Most recently, in 2003, he was elected a Fellow of the American Association for the Advancement of Science for "distinguished contributions in developing advanced materials and superplasticity, and in determining the history and origins of Damascus and other steels, and for broad scientific leadership supporting national security."

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