Actinide Spectroscopy Workshop

Actinide materials present an extreme scientific challenge to the materials research community. The complex electronic structures of actinide materials result in many unusual and unique properties that have yet to be fully understood. The difficulties in handling, preparing, and characterizing actinide materials has frequently precluded investigations and has the limited the detailed understanding of these relevant, complex materials. However, modern experiments with actinide materials have the potential to provide key, fundamental information about many long-standing issues concerning actinide materials. This workshop focused on the scientific and technical challenges posed by actinide materials and the potential that synchrotron radiation approaches available at the ALS can contribute to improving the fundamental understanding of actinides materials. Fundamental experimental approaches and results, as well as theoretical modeling and computational simulations, were part of the workshop program.

The presentations began with Dave Shuh of Lawrence Berkeley National Lab providing an "Overview of Actinide Spectroscopy at the ALS." This was followed by a talk given by Kevin Moore [1] of Lawrence Livermore National Lab concerning "The Failure of Russell-Saunders Coupling in the 5f States of Plutonium." Gerrit van der Laan of Daresbury Lab in the UK then described his recent work [2], the "Applicability of the spin-orbit sum rule for the actinide 5f states." Subsequently, Per Soderlind [3] of Lawrence Livermore National Lab described his "Calculation of the electronic structure of Pu." After lunch, Jim Allen [4] of the University of Michigan talked about "Photoelectron spectroscopy of uranium compounds," followed by John Joyce [5] of Los Alamos National Lab, who described the "Electronic Structure of Uranium and Plutonium Compounds." Changing topics slightly, Sung Woo Yu of Lawrence Livermore National Lab described "Spin resolved resonant photoemission from polycrystalline Ce using circularly polarized x-rays" and possible applications of this approach to Pu. After a brief break, Joe Wong [6] of Lawrence Livermore National Lab, described his measurements of the "Phonon Dispersion of delta-Pu." Gabriel Kotliar [7] of Rutgers University finished up by discussing the "Mott transition across the actinide series: Plutonium and Americium." The program co-chairs were David Shuh of LBNL and Jim Tobin of LLNL. The Actinide Spectrosopy Workshop was held at the User's Meeting of the Advanced Light Source, Berkeley, CA, USA in October 2004.

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Figure 1
Joe Wong is shown discussing his determination of the phonon dispersion in Pu.

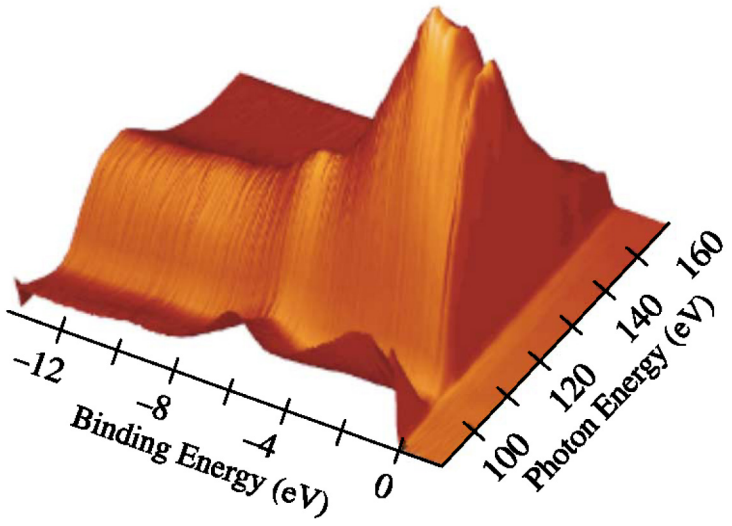

Figure 2
Resonant Photoemission of Pu, collected at the Advanced Light Source in Berkeley, CA, USA. [8]