

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Eu L₃-edge Resonant Inelastic X-ray Scattering on EuB₆

JUNGHO KIM, D. ELLIS, University of Toronto, Canada, B.K. CHO, K-JIST, Korea, E.J. CHOI, University of Seoul, Korea, A. SAID, Y. SHVYDKO, Argonne National Laboratory, USA, YOUNG-JUNE KIM, University of Toronto, Canada — We present the first Eu L₃-edge resonant inelastic x-ray scattering (RIXS) spectra on the cubic EuB₆ using vertical and horizontal scattering geometries. EuB₆ is an undistorted cubic compound being free from complications like lattice distortion. The valence of Eu is 2⁺ (4f⁷). Electronic states near the Fermi edge are formed by the hybridization of Eu 5d_{x²-y²} and B 2p. According to optical spectroscopy studies, a number of excitations exist over a wide energy range up to 40 eV. In particular, optical spectrum below 10 eV consists of a number of narrow strong peaks. These peaks were assigned to 2p-5d charge transfer or 4f-5d on-site excitations. In the current Eu L₃-edge RIXS experiment, we found that resonant enhancements occur both near and above the Eu L₃ absorption peak. In both resonance features, we identify a number of narrow energy loss features and compare those features with the optical spectroscopy spectrum. Interestingly, we observed a drastic dependence on measurement geometry in a resonant enhancement above the Eu L₃ absorption peak. We discuss the excitation symmetry based on the geometry dependence. This study demonstrates the utility of the rare-earth L₃-edge RIXS as a probe of excited states in rare-earth systems.

Jungho Kim
University of Toronto

Date submitted: 18 Dec 2007

Electronic form version 1.4