

Determination of structural properties of nanostructures with extended x-ray absorption fine structure

S.-W. Han, H.-J. Yoo, B.-S. Kang, S.-H. Park*, S.-Y. Seo*, S.-H. Kim*,
S.-J. An*, J.-K. Yoo*, G.-C. Yi*

Chonbuk National University Division of Science Education, *Pohang University of
Science and Technology Department of Materials Science & Engineering

In general, structural properties of matters are fundamental in determining their physical properties. The canonical technique to study microscopic structures of crystals is diffraction. However, the diffraction is not much useful for the studies of structural properties of non-crystalline materials or nanostructures. We employed extended x-ray absorption fine structure (EXAFS) to determine atomic bonding lengths, disorders/distortion of nanostructures. From EXAFS studies, we found that there were substantial amount of distortions existing on the bonding lengths of the CeAl_2 nanoparticles which showed suppression of a magnetic ground state. The EXAFS showed that the lattice constants of ZnO nanorods was elongated along c -axis and shrunken in a, b -axes and that terminating atoms at the lateral surfaces of the ZnO nanorods were oxygen. We also studied the local structures around doped transition metals in diluted magnetic semiconductors with EXAFS.