Synchrotron X-Ray Absorption Spectroscopy (SXAS) as Advanced Characterization Tool for Nano-scaled Materials and Physics

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Abstract

The local structure information in functional materials could be investigated by a combination of X-ray Diffraction (XRD) and Synchrotron X-ray Absorption Spectroscopy (SXAS) techniques. In this work, $Pb(Zr,Ti)O_3$ crystals were investigated for their local structure information under the influence of temperature and electric field. The X-ray Absorption Near edge structure (XANES) and Extended X-ray absorption Fine Structure (EXAFS) spectra at the Ti K-edge were measured and compared with simulation done by FEFF8.2 program. The experimentally obtained different behaviors of the local structure were compared at various temperatures and applied electric fields. The polarization behavior of PZT crystals was discussed in term of the changes in the local structure.