Poster Presentation

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X-ray Absorption Spectroscopic studies of Single Crystal SrFeO3-δ

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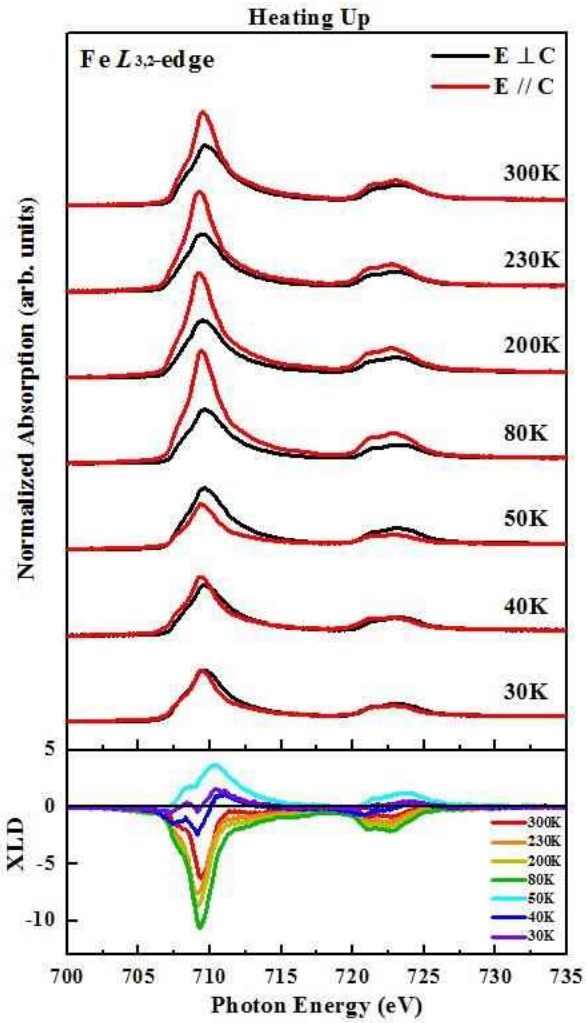
We have prepared a high quality single crystal of SrFeO3-δ (δ ~ 0.14) by the floating-zone method to study the electronic and atomic structures using temperature-dependent x-ray absorption near-edge structure (XANES), x-ray linear dichroism (XLD), and extended x-ray absorption fine structure (EXAFS) at the O K-edge, Fe L3,2- and K-edge. Resistivity measurements indicate that the SrFeO2.86 shows an anisotropic behavior, and thermal hysteresis behavior between 70 K and 40 K. The temperature dependent Fe K-edge EXAFS studies shows that the Fe-O bond length changes in ab-plane below transition temperature. The XLD results illustrate that as temperature is reduced from room temperature to below the transition temperature, the preferential occupancy of Fe majority-spin eg orbitals changes from the 3d3z2-r2 to 3dx2-y2, but restore to 3dx2-y2 after thermal hysteresis. Experimental findings suggest that the charge transfer during thermal hysteresis is induced by lattice distortions of the FeO6 octahedra in SrFeO2.86.



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