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Linear dichroism dependence on ferroelectric polarization SRINIVAS POLISETTY, JINLING ZHOU, MIKEL HOLCOMB, West Virginia University, ANDREAS SCHOLL, Lawrence Berkeley National Laboratory, LANE W. MARTIN, University of Illinois at Urbana-Champaign — X-ray absorption spectroscopy (XAS) and photoemission electron microscopy (PEEM) have been used to determine the magnetic properties of magnetoelectrics, possessing both ferroelectric and magnetic order; however, the additional sensitivity to the ferroelectricity in these films complicates the analysis. Nevertheless, an exclusive knowledge of ferroelectric order is important due to its vital role in manipulating magnetic properties of the magnetoelectrics. To shed light on ferroelectric order and polarization near surface region, we employed mainly PEEM and XAS on ferroelectric $PbZr_{0.2}Ti_{0.8}O_3$ (PZT) film deposited on $LaAlO_3$ substrate. Both out-of-plane and in-plane ferroelectric contributions at Ti $L_{3,2}$ and O-absorption edges have been measured over multiple poled regions on the sample to test various potential mechanisms causing this ferroelectric dichroism, such as surface charge. The ferroelectric order in PZT determined to be systematically evolving as a function of incident x-ray polarization for different rotated angles of the sample revealing a similar angular dependence to that of magnetic samples, allowing a formula for linear dichroism in complex ferroelectrics. This development allows this dynamic approach to be used to study the effect of ferroelectricity on interface coupling in a various materials.

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