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Characterizing Multiferroics: Analyses through X-Ray Diffraction EVAN WOLFE, HARLEY HART, SHELDON BLACKSHIRE, SRINIVAS POLISETTY, DISHENG CHEN, JINLING ZHOU, CHARLES FRYE, MIKEL HOLCOMB — Theory and experiments support that magnetoelectric coupling (electrical control of magnetism and vice versa) can be enhanced by taking advantage of interfacial coupling between magnetic and ferroelectric films. The interface between ferroelectric PZT and ferromagnetic LSMO is a promising candidate for storage and magnetic sensing devices. For example, LSMO, when exposed to a magnetic field, will contract; while PZT when strained will produce a voltage. Combining properties, the PZT/LSMO composite can be utilized to detect magnetic fields, and also be used as an energy scavenging device. In order to maximize the coupling across this interface, proper measurements and characterizations must be taken to detail how the materials interact on the atomic level. X-ray diffraction allows us to determine thickness, composite, and strain of the samples used. By analyzing the peak shift in XRD scans along our samples we can detail the amount of strain placed on the sample, aiding in discovering of the mechanisms responsible for interfacial magnetoelectric coupling. Through analysis, we can ensure the quality of the interface, thus allowing further advances for increases in magnetic sensitivity and higher voltage output.

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