Abstract Submitted
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Atomic-scale structure-property relationship of ferroelastic $LaCoO^3$ TIANTIAN YUAN, Department of Physics, University of Illinois at Chicago, NINA ORLOVSKAYA, University of Central Florida, MIHAELA TANASE, STEFAN KELL, ROBERT KLIE, Department of Physics, University of Illinois at Chicago — The ferroelastic oxide $LaCoO^3$ has attracted increasing attention by exhibiting room-temperature creep, which is usually only observed at temperatures close to a material's melting point. To advance our understanding of these unusual properties, a combination of TEM techniques, including electron diffraction, atomic-resolution Z-contrast imaging and electron energy-loss spectroscopy have been used to study the $LaCoO^3$ microstructures as a function of applied strain. In polycrystalline samples compressed at room temperature above the coercive strain, we observed the formation of superlattice domains with lattice constant $3a^0$, which have been attributed to monoclinic distortions within the rhombohedral lattice.$_1$ While in untreated $LaCoO^3$ and samples compressed below the coercive strain we only found twin boundaries within the grain. We will further show how these superstructure domains evolve as a function of time, and correlate the transformation of the monoclinic superlattice into highly twinned rhombohedral bulk to the room-temperature strain recovery observed in bulk $LaCoO^3$ after unloading.$_{2\ 1--}$ J.C. Walmsley et al., J. Mat Sci, 35, 4251-60 (2000) $_2$ Funded by: NSF CAREER Award DMR-0846748

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