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**Resistivity Effects of Cation Ordering in Highly-Doped $La_{2-x}Sr_xCuO_4$Epitaxial Thin Films** FRANKLIN BURQUEST, School of Engineering, University of St. Thomas, St. Paul, MN 55105, RODRIGO MARMOL, University of Saint Thomas, NICHOLAS COX, BRITTANY NELSON-CHEESEMAN, School of Engineering, University of St. Thomas, St. Paul, MN 55105 — Highly-doped $La_{2-x}Sr_xCuO_4$ (LSCO) films ($0.5 \leq x \leq 1.0$) are promising for many applications due to their electronic, ionic, and phonon transport. In this study, we investigate the effect of "electrostatic strain" on the electrical transport of LSCO thin films with large doping (x=0.5, 0.75, and 1.0). This "electrostatic strain" is applied by ordering differently charged A-site cations ($La^{3+}$ vs. $Sr^{2+}$) into charged A-O layers within the crystal structure. This causes internal polar electrostatic forces, which have been shown to cause stretching of the apical oxygen bond in analogous epitaxial nickelate films. Thin film samples are grown concurrently to minimize extraneous effects on film structure and properties. Atomic force microscopy and x-ray reflectivity demonstrate that the films are single crystalline, epitaxial, and smooth. X-ray diffraction is used to measure the c-axis of the films as a function of doping and dopant cation ordering. Electrical transport data of the ordered samples is compared with transport data of conventional disordered cation samples. Preliminary data indicates significant differences in resistivity at both 300K and 10K between the cation-ordered and cation-disordered samples. This work indicates that dopant cation ordering within the layered cuprates could significantly modify the conduction mechanisms at play in these materials.

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