Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Thickness dependence of the structural, magnetic, and electronic, properties of epitaxial $La_{0.5}Sr_{0.5}CoO_3$ films on $SrTiO_3$(001) substrates[1] MANISH SHARMA, MARIA TORIJJA, CHRIS LEIGHTON, Department of Chemical Engg. and Material Science, University of Minnesota — Bulk $La_{1-x}Sr_xCoO_3$ (LSCO) materials have received considerable attention due to the existence of spin-state transitions, magnetoelectronic phase separation, and giant anomalous Hall effect. In our prior work we have established optimized conditions for the deposition of high quality epitaxial LSCO thin films. In this work, we provide a comprehensive study of the variation of structural, morphological, magnetic, and electronic properties as a function of film thickness. This investigation has been carried out as a controlled function of oxygen stoichiometry using the total sputtering pressure (30, 70, and 140 mTorr, at an O_2 / Ar ratio of 0.4) as the control parameter. High resolution WAXRD, x-ray rocking curves, x-ray reflectivity, AFM, d.c. magnetometry, and electronic transport measurements have all been employed. Our results indicate that the thickness dependence of the electronic and magnetic properties is dominated by the sensitive interplay between oxygen stoichiometry and strain relaxation. The behavior at very low thickness is discussed in terms of the known phenomenology of the magnetoelectronic phase separation in this material.

[1]Work supported by NSF DMR.

Manish Sharma
Department of Chemical Engg. and Material Science,
University of Minnesota

Date submitted: 26 Nov 2006 Electronic form version 1.4