

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Thickness dependent properties of CMR Manganite thin films on lattice mismatched substrates: Distinguishing Strain and Interface Effects ANTHONY DAVIDSON III, RAJESWARI KOLAGANI, ELLISAVETA BACHAROVA, GRACE YONG, VERA SMOLYANINOVA, DAVID SCHAEFER, Towson University, RAJEH MUNDLE¹, Towson University — Epitaxial thin films of CMR manganite materials have been known to show thickness dependent electrical and magnetic properties on lattice mismatched substrates. Below a critical thickness, insulator-metal transition is suppressed. These effects have been largely attributed to the role of bi-axial lattice mismatch strain. Our recent results of epitaxial thin films of $\text{La}_{0.67}\text{Ca}_{0.33}\text{MnO}_3$ (LCMO) on two substrates with varying degrees of compressive lattice mismatch indicate that, in addition to the effect of lattice mismatch strain, the thickness dependence of the properties are influenced by other factors possibly related to the nature of the film substrate interface and defects such as twin boundaries. We have compared the properties of LCMO films on (100) oriented LaAlO_3 and (001) oriented NdCaAlO_4 both of which induce compressive bi-axial strain. Interestingly, the suppression of the insulator-metal transition is less in films on NCAO which has a larger lattice mismatch. We will present results correlating the electrical and magneto transport properties with the structure and morphology of the films.

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Date submitted: 13 Dec 2006

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