Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Magnetoresistance of Strained Rare Earth Manganese Oxide Thin Films: Effect of Post-Deposition Thermal Treatment[1] TYLER GOEHRINGER, PARUL SRIVASTAVA, E. KEVIN TANYI, DAVID SCHAEFER, RAJESWARI KOLAGANI, Towson University — We have studied the effects of thermal treatment (annealing) on the properties of thin films of manganese oxide materials $La_{0.67}Ca_{0.33}MnO_3$ and $La_{0.67}Ba_{.0.33}MnO_3$, which are known to exhibit colossal magnetoresistance (CMR) and an insulator to metal transition . These materialsshow properties which are desirable for applications such as magnetic sensors, bolometric infrared sensors, or field effect devices. Two properties of interest, magnetoresistance (MR) and insulator metal transition are especially sensitive to strain because of the relationship between the properties and the symmetry of the crystal. The properties are also sensitive to the oxygen stoichiometry of the film due to changes in the valence state of the manganese which determines the charge carrier density. Recent results from our laboratory have shown a large magnetoresistance in strained films grown on lattice mismatched substrates. The MR continues to increase with decreasing temperature in these films. In order to understand the contribution of strain to the observed MR behavior, in we employ 'thermal annealing' to allow for relaxation of strain. Annealing also serves to achieve the optimum oxygen stoichiometry. We will present the results of our annealing studies and their implications for understanding the MR in strained films.

[1] TG acknowledges support from Undergraduate Research grants from Fisher College of Science and Mathematics and Towson University Undergraduate research Committee.

Tyler Goehringer
Towson University

Date submitted: 11 Nov 2011 Electronic form version 1.4