Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Surface Modification of CMR Perovskite Manganite Thin Films using Atomic Force Microscopy DAVID SCHAEFER, RAJESWARI KOLAGANI, CAMERON BOLLING, JOHN SUNDERLAND, ANTHONY DAVIDSON III, Towson University, TYLER BRADLEY, Towson High School, BONNIE LUDKA, James Madison University, TOWSON UNIVERSITY TEAM, TOWSON HIGH SCHOOL TEAM, JAMES MADSION UNIVERSITY TEAM — Nanolithography using the atomic force microscope (AFM) is emerging as a promising tool for nanotechnology . We report our results of AFM- induced nanoscale surface modifications in thin films of the CMR manganite material $La_{0.7}Ba_{0.3}MnO_3$. CMR manganite materials have been demonstrated to be useful for a variety of technological applications including magnetic sensors and bolometric infrared detectors. AFM induced surface modifications would enable the realization of such sensors in nanotechnology applications. We have obtained reproducible patterns on these films in the form of nanoscale dots and lines induced by the AFM tip. We have studied these feature dimensions as a function of tip bias voltage, exposure time and humidity. We find that the feature heights are considerably larger on manganite thin film surfaces than those induced on silicon surface under similar conditions. Additionally, the speed of reproducible writing is also found to be significantly higher on the manganite films.

Rajeswari Kolagani
Towson University

Date submitted: 06 Dec 2005 Electronic form version 1.4