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Characterization of Nano-oxidation Lithography on La0.7Ba0.3MnO3 Thin Films Grown by Pulse-Laser-Deposition EKEMBU KEVIN TANYI, DAVID SCHAEFER, RAJESWARI KOLAGANI, PARUL SRIVASTAVA, Towson University — Nano-oxidation using Atomic Force Microscopy has been used to produce nano-scale patterns on a variety of materials, including semiconductors, insulators, metals and superconductors. Perovskite Oxide thin films have demonstrated unique material characteristics. The ability to make localized modifications on these films would allow nanofabrication of devices utilizing these unique properties. In this study, the atomic force microscope was used to modify the surface of $La_{0.7}Ba_{0.3}MnO_3$ thin films grown using Pulsed Laser Deposition Techniques. Surface patterns were produced and studied as a function of humidity, applied tip voltage, temperature, and growth conditions. Reproducible patterns were produced using both positive and negative tip voltages. Two growth modes were observed. A moderate growth rate was common for positive tip voltages up to 15 V (at T=75.1±1; H=78±2%) which allowed the controlled formation of features considerably larger than those produced on materials like silicon. Additionally, a significantly larger growth rate was observed for negative tip voltages exceeding -12V. This growth mode provides the potential to produce structures at significantly higher write speeds, making these manganese films candidates for data storage devices.

Ekembu Kevin Tanyi
Towson University

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