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AFM Nanolithography of Lanthanum Barium Manganese Oxide ($LaBaMnO_3$)Thin Films: The Effect of Oxygen Pressure Variations During Film Growth[1] CHRISTOPHER STUMPF, DAVID SCHAEFER, RAJESWARI KOLAGANI, GRACE YONG, ZOEY WARECKI, Towson Univ — In AFM nanolithography, a bias voltage applied between the tip of an atomic force microscope (AFM) and a sample is used to produce nanoscale modifications of material surfaces. AFM nanolithography has been studied extensively on a variety of materials, but limited studies have been performed on perovskite manganites such as Lanthanum Barium Manganese Oxide (LBMO). Studying such materials is important because of their potential applications for room-temperature nanoscale spintronic devices. Previous research on LBMO by our group has focused on how parameters such as applied tip voltage, temperature, and humidity affect the creation of nanopatterns. This paper reports on the influence of growth pressure of the LBMO films grown by pulsed laser deposition. Films grown on (100) $SrTiO_3$ were studied for growth pressures ranging between 100 mTorr to 400 mTorr. Our studies indicate that the type of nanopatterns induced by AFM and the relaxation dynamics of these patterns are sensitive to the film growth pressure. The growth pressure is mainly known to affect the oxygen concentration and the surface roughness, but possible variations in cationic stoichiometry could also contribute to these results.

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