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Analysis of Stoichiometry Variations in La $_{1-x}$Ba$_x$MnO $_y$ Thin Films using Laser-Ablation Inductively Plasma Mass Spectrometry and X-ray diffraction E. KEVIN TANYI, RAJESWARI KOLAGANI, MARK STEPHEN MONK, DAVID SCHAEFER, STEVEN LEV[1], Towson University — Structural, electrical and magnetic properties of thin films of the doped rare earth manganese oxide material s are known to change dramatically by varying the oxygen partial pressure employed during Pulsed Laser Deposition. In contrast to the commonly accepted idea that such variation is solely due to the variation of the oxygen stoichiometry of the films, we find that varying the deposition oxygen partial pressure also results in the variation of the cation stoichiometry at the rare earth site. We also find that in addition to oxygen partial pressure, laser fluence is a determining factor for the stoichiometry. We have analyzed the composition, structure and properties of La $_{1-x}$ Ba$_x$ MnO$_y$ thin films grown under a range of oxygen pressures. Cation composition is analyzed using the Laser-ablation Inductively Coupled Plasma Mass Spectroscopy technique (LA-ICPMS). LA-ICPMS results, coupled with structural information from 4-circle X-ray diffraction, allows us to delineate oxygen content variations from cation stoichiometry variations. We will correlate the changes in stoichiometry with surface morphology, and electrical and magneto-resistive properties.

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