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**Epitaxial Thin Film Growth of CMR Manganites on Silicon: The Effect of Thermal Stress** SANJAY ADHIKARI, BAO HA, GRACE YONG, DAVID SCHAEFER, RAJESWARI KOLAGANI, Towson University — Our research addresses some of the challenges associated with growing epitaxial thin films of the CMR manganite material, $Nd_{1-x}Sr_xMnO_3$ (NSMO) on Silicon for application as a bolometric x-ray sensor. Due to the chemical incompatibility between NSMO and Silicon, the formation of amorphous $SiO_2$ and crystal lattice mismatch issues, 'buffer layers' and 'template layers' of other suitable materials need to be interposed between NSMO and the Silicon substrate. Even with such schemes in place, there exists a mismatch between the thermal expansion coefficients of Silicon ($\alpha_{Si}$=2.618×10$^{-6}$K$^{-1}$ at 300K) and NSMO ($\alpha_{NSMO}$ ∼3×10$^{-5}$K$^{-1}$). This large mismatch induces thermal stresses that deteriorate the film properties. Our research investigates how the thermal stress evolves as a function of the thickness of the multi-layers, and how the process parameters such as the film growth kinetics and thermal kinetics can be optimized to minimize the stress. We are using the Pulsed Laser Deposition technique for thin film growth and characterizing the properties of the sensor layer using X-ray diffraction, electrical resistance measurements, optical microscopy and atomic force microscopy. Acknowledgement: We acknowledge support for this research from Lawrence Livermore National Laboratory.

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