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Conduction mechanisms in epitaxial and polycrystalline $SmNiO_3$ thin films SIEU D. HA, SHRIRAM RAMANATHAN, Harvard University, School of Engineering and Applied Sciences — Correlated oxides that exhibit metal-insulator phase transitions are emerging as potential candidates for switching devices and their fundamental physical properties are of interest. One such material is $SmNiO_3$, which has a transition temperature above room temperature ($\sim$400 K in bulk crystals). We present temperature- and bias-dependent conduction mechanisms in epitaxial and polycrystalline $SmNiO_3$ thin films. In both cases, at low electric field we observe thermally assisted hopping conduction through defect states. At high electric field the conduction transitions to a space-charge limited regime controlled by an exponential trap distribution. The trap decay parameter in epitaxial films does not have the expected 1/T temperature dependence, which may be a signature of band gap narrowing at high temperature due to the insulator to metal transition. The role of defects in affecting charge transport parameters will be discussed.

Sieu D. Ha
Harvard University, School of Engineering and Applied Sciences

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