Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Stoichiometry-Control of Electronic Transport at Complex Oxide Interface PENG XU, BHARAT JALAN, University of Minnesota- Twin cities — Employing the hybrid molecular beam epitaxy approach to grow $NdTiO_3/SrTiO_3$ heterostructures - a polar/nonpolar system sharing many similarities with $LaAlO_3/SrTiO_3$ with an added functionality of $NdTiO_3$ being an antiferromagnetic Mott insulator- we will present a detailed film growth and transport study as a function of cation stoichiometry in $NdTiO_3$. Irrespective of the cation stoichiometry (measured by high resolution x-ray diffraction and x-ray photoelectron spectroscopy), films grew in an atomic layer-by-layer fashion as evidenced by the reflection high-energy electron diffraction intensity oscillations, and films showed a temperature dependent metal-to-insulator (M-I) type behavior. Remarkably, T_{MI} was found to increase irrespective of whether films were Nd- or Ti-rich. Furthermore, hall measurement of a 3.5 nm $NdTiO_3$ film grown on 3 nm $SrTiO_3$ layer on LSAT substrate revealed n type carrier density, 3 x 10^{14} cm^{-2} for stoichiometric samples, which would be consistent with the interface conduction due to an interfacial polar discontinuity effect. Using detailed temperature dependent magneto-transport measurements, we will present a comprehensive study of correlation between film stoichiometry, interface conduction, and transport mechanisms.

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Date submitted: 15 Nov 2013 Electronic form version 1.4