Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Metal-insulator transition in $SrTi_{1-x}V_xO_3$ thin films[1] MAN GU, STUART WOLF, JIWEI LU, University of Virginia — Epitaxial $SrTi_{1-x}V_xO_3$ ($0 \leq x \leq 1$) thin films with thicknesses of $\sim$ 16 nm were grown on (001)-oriented LSAT substrates using the pulsed electron-beam deposition technique. The transport study revealed a temperature driven metal-insulator transition (MIT) at 95 K for the film with $x = 0.67$. The films with higher vanadium concentration ($x > 0.67$) were metallic, and the electrical resistivity followed the T^2 law corresponding to a Fermi liquid system. In the insulating region of $x < 0.67$, the temperature dependence of electrical resistivity for the $x = 0.5$ and 0.33 films can be scaled with Mott's variable range hopping model. The possible mechanism behind the observed MIT might be associated the interplay between electron-electron interactions and disorder-induced localization. The Ti^{4+} ion substitution introduces Anderson-localized states as well as lattice distortions that result in a reduction in the effective 3d bandwidth W.

[1]We gratefully acknowledge the financial support from the Army Research Office through MURI grant No. W911-NF-09-1-0398.

Man Gu
University of Virginia

Date submitted: 14 Nov 2013 Electronic form version 1.4