Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

High quality, hybrid-MBE growth of $SrVO_3$ thin films[1] JARRETT MOYER, Department of Physics, Department of Materials Science and Engineering, Pennsylvania State University, CRAIG EATON, Department of Materials Science and Engineering, Pennsylvania State University, ROMAN ENGEL-HERBERT, Department of Materials Science and Engineering, Pennsylvania State University — Vanadium-based transition metal oxides are an intriguing class of materials to study due to the metal-to-insulator (MIT) transitions that arise in many of the binary oxides (i.e. VO_2, V_2O_3, V_2O_5). The perovskite $SrVO_3$ is metallic in bulk; however, it is possible to induce an MIT by modulating the bandwidth through strain or dimensional confinement. A mandatory requirement for controlling the electronic phase transition properties in material systems with strong correlation is the growth of high quality, stoichiometric thin films. This is demonstrated here with the growth of $SrVO_3$ on LSAT (001) substrates using a hybrid-MBE technique, where the Sr is evaporated from an effusion cell and the V is provided through the metal-organic precursor vanadium oxo-tri-isopropoxide (VTIP). The structural properties of films with varying VTIP:Sr ratios are characterized by RHEED, XRD, AFM and TEM. These measurements demonstrate that $SrVO_3$ can be grown with excellent structural quality, atomically flat surfaces and rocking curves of the same width as the substrate, accomplishing a necessary first step in controlling the MIT in $SrVO_3$.

[1]This research is primarily supported by ONR Grant N00014-11-1-0665

Jarrett Moyer
Dept of Physics, Department of Materials Science and Engineering,
Pennsylvania State University

Date submitted: 25 Nov 2012 Electronic form version 1.4