Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Growth and Properties of a New Correlated Electron Perovskite Thin Film – $PbVO_3$. LANE W. MARTIN, QIAN ZHAN, WENKAN JIANG, Materials Science and Engineering, University of California, Berkeley, MIAOFANG CHI, NIGEL BROWNING, Chemical Engineering and Materials Science, University of California, Davis and National Center for Electron Microscopy, Lawrence Berkeley Nat. Lab., YURI SUZUKI, R. RAMESH, Materials Science and Engineering, University of California, Berkeley — We report the growth of single phase, fully epitaxial thin films of a relatively new perovskite material, lead vanadate ($PbVO_3$), using pulsed laser deposition. This growth realizes the first production of $PbVO_3$ outside of high-temperature and high-pressure techniques through growth of epitaxial thin films on various substrates. Structural analysis of the $PbVO_3$ thin films using transmission electron microscopy, x-ray diffraction, and Rutherford backscattering spectroscopy reveals films that are single phase, highly crystalline, and have a tetragonally distorted perovskite structure, with $a = 3.79$Å and $c = 5.02$Å (c/a = 1.32). Electron energy loss spectroscopy and x-ray absorption spectroscopy were used to show the stabilization of vanadium in the V^{4+} state, thereby proving the creation of a new d^1 system for intensive physical study. Films exhibit semiconducting behavior in plane of the film with thermally activated behavior and distinctly different properties from other d^1 AVO_3 thin films. Studies of the magnetic and ferroelastic/ferroelectric nature of $PbVO_3$ are also underway.

Lane W. Martin
University of California, Berkeley

Date submitted: 30 Nov 2005 Electronic form version 1.4