

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Colossal Magnetoresistance in thin films of the Mott metal CaVO_3 ¹ JIWEI LU, University of Virginia — Bulk CaVO_3 (CVO) is a Pauli paramagnetic metal with a single 3d electron. Some unusual drastic changes in the magneto-resistance, magnetic susceptibility and the Hall effect have been reported in single crystal CVO. We have simultaneously synthesized epitaxial CVO films grown on three differently oriented SrTiO_3 substrates. The temperature dependent conductivity of these CVO films demonstrated very strong Fermi metal behavior and the resistance ratio, defined as $R(300\text{ K})/R(2\text{ K})$ was more than 3000. Colossal magneto-resistance (MR) as well as large crystalline anisotropic was observed at low temperatures. The maximum MR, defined as $(R(7\text{ T})-R(0\text{ T}))/R(0\text{ T}) \times 100\%$, was over 1500 % at 2 K and 7 Tesla on the CVO films deposited on a (110) SrTiO_3 single crystal substrate, and didn't show any sign of saturation. An MR of over $\sim 500\%$ and $\sim 200\%$ were observed on (111) and (100) orientation films under the same condition, respectively. The MR ratio was much larger than that of single crystal CVO. We will discuss the peculiar MR in association with the magnetic ordering, oxygen stoichiometry and Fermi surface.

¹The author is grateful to the financial support by the ARO.

Jiwei Lu
University of Virginia

Date submitted: 15 Nov 2010

Electronic form version 1.4