Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Electric field induced metal-insulator transition and colossal magnetoresistance in $CdCr_2S_4$ C.P. SUN, C.C. LIN, J.L. HER, S. TARAN, C.C. CHOU, C.L. CHAN, C.L. HUANG, Department of Physics, Center for Nanoscience and Nanotechnology, National Sun Yat-Sen University, Kaohsiung 804, Taiwan, H. BERGER, Institutes of Physics of Complex Matter, EPFL, Lausanne, Switzerland, H.D. YANG, Department of Physics, Center for Nanoscience and Nanotechnology, National Sun Yat-Sen University, Kaohsiung 804, Taiwan — Multiferroic ordering existing in a single material is a recent hot topic in the field of condensed matter physics due to its potential application in device control. The chromium chalcogenide spinel $CdCr_2S_4$ is one of the attractive materials investigated by Hemberger *et al.* recently.[1] Based on the electrical measurement, there is no discontinuity through the ferromagnetic ordering at $T_C \sim 85$K.[2] We measure the temperature dependent resistance under various electric fields to investigate the electrical properties of the present material. To our knowledge, we first observe the electric field induced metal-insulator transition in this material around T_C. Moreover, a colossal magnetoresistance (CMR), which is comparable to that of manganese-based CMR material, is also observed near T_C. The origin for these properties is discussed. [1] J. Hemberger, P. Lunkenheimer, R. Fichtl, H.-A. Krug von Nidda, V. Tsurkan, A. Loidl, Nature 434, 364 (2006). [2] P. K. Baltzer, H. W. Lehmann, and M. Robbins, Phys. Rev. Lett. 15, 493 (1965).

Hung-Duen Yang
Department of Physics, Center for Nanoscience and Nanotechnology,
National Sun Yat-Sen University, Kaohsiung 804, Taiwan

Date submitted: 29 Nov 2007 Electronic form version 1.4