Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Magnetoelectricity in Spinel $FeCr_2S_4$[1] LIN LIN, DAN LIU, ZHENGYIN ZHAO, Laboratory of Solid State Microstructures, Nanjing University, Nanjing 210093, China, JIAJIA WEN, Department of Physics and Astronomy, The Johns Hopkins University, Baltimore, MD 21218, USA, ZHIBO YAN, Laboratory of Solid State Microstructures, Nanjing University, Nanjing 210093, China, SHUAI DONG, Department of Physics, Southeast University, Nanjing 210008, China, JUN-MING LIU, Laboratory of Solid State Microstructures, Nanjing University, Nanjing 210093, China — We report on ferroelectricity, magnetic susceptibility, dielectric property, and specific heat capacity of the polycrystalline spinel $FeCr_2S_4$. We provide clear evidence of a ferroelectric transition at $\sim$ 8.5K, which accompanies an orbital-ordering transition and a dielectric anomaly. The polarization increases with decreasing temperature, and reaches $3.6\mu C/m^2$ at 2 K. We also carry out detailed multiferroic measurements, and a remarkable magnetoelectric coupling is observed. A very small magnetic filed $H \sim 500$Oe enhances the polarization to $8.13.6\mu C/m^2$ at 2 K, with a magnetoelectric coupling coefficient $\alpha \sim 120\%$. However, the polarization rapidly decreases for fields beyond $H \sim 1$T. The multiferroic behavior of $FeCr_2S_4$ is proposed to arise from competition between the spin-orbital coupling and the Jahn-Teller effect for the Fe ion.

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[1]The National 973 Projects of China (Grants No. 2011CB922101 and No. 2009CB623303)

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Date submitted: 19 Nov 2012 Electronic form version 1.4