

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Sharp switching of the magnetization in $\text{Fe}_{1/4}\text{TaS}_2$ ¹ EMILIA MOROSAN, HENNY ZANDBERGEN, LU LI, MINH YEA LEE, JOSEPH CHECKELSKY, MICHAEL HEINRICH, THEO SIEGRIST, N. PHUAN ONG, ROBERT CAVA, Princeton University — Anisotropic magneto-transport measurements are reported on $\text{Fe}_{1/4}\text{TaS}_2$ single crystals grown by vapor transport. Both the magnetization and resistivity are extremely anisotropic, with the magnetic moments aligned parallel to the c crystallographic direction. $\text{Fe}_{1/4}\text{TaS}_2$ orders ferromagnetically below $T_C = 160$ K and displays very sharp hysteresis loops in the ordered state for $H||c$. The corresponding magnetoresistance is negative, and it qualitatively reproduces the features observed in the $M(H)$ data, by showing a sharp drop around the critical field H_s for the moment reversal. For field applied within the ab plane, the magnetization remains small and linear in field up to 5 T, and the magnetoresistance is positive and quadratic in field, with no visible hysteresis. The squareness of the $H||c$ $M(H)$ loops and the high critical field for the magnetization switch ($H_s = 3.7$ T at $T = 2$ K) allow us to classify $\text{Fe}_{1/4}\text{TaS}_2$ as a strong ferromagnet.

¹Research supported primarily by the US DOE-BES solid state chemistry program, and, in part, by the US NSF MRSEC program grant DMR 0213706.

Emilia Morosan
Princeton University

Date submitted: 25 Nov 2006

Electronic form version 1.4