

Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Thin film organic magnet based on vanadium methyl tricyanoethylenecarboxylate¹ YU LU, Department of Chemistry and Biochemistry, The Ohio State University, MEGAN HARBERTS, Department of Physics, The Ohio State University, CHI-YUEH KAO, Department of Chemistry and Biochemistry, The Ohio State University, HOWARD YU, ARTHUR EPSTEIN, EZEKIEL JOHNSTON-HALPERIN, Department of Physics, The Ohio State University — We report a new organic magnetic thin film based on vanadium and methyl tricyanoethylene carboxylate (MeTCEC) prepared by low temperature chemical vapor deposition (CVD). The magnetic ordering temperature, T_c , is above 300K and x-ray spectroscopy reveals the composition of the thin film is $V[MeTCEC]_2$. IR spectroscopy shows both cyano-vandium and carboxylate-vanadium bonding confirming the predicted chemical structure. The temperature dependence of the magnetization reveals spin glass behavior in the thin film below a blocking temperature of 190K. The hysteresis reveals a soft ferrimagnet with coercive field of 10 Oe at 5 K and 20 Oe at 300 K, respectively. Finally transport measurements show semiconducting behavior with an activation energy of 0.56 eV, consistent with the expected bandgap. Taken together, these properties reveal significant potential for a new class of semiconducting organic-based magnetic materials that complement the existing library of $M[TCNE]$ compounds (where $M = V, Co, Fe, Mn$).

¹Supported by NSF grant DMR-1207243

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Date submitted: 15 Nov 2013

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