Abstract Submitted for the MAR14 Meeting of The American Physical Society

Ferrimagnetic resonance in thin film organic-based magnets¹ HOWARD YU, ROHAN ADUR, Department of Physics, Ohio State University, YU LU, Department of Chemistry, Ohio State University, MEGAN HARBERTS, Department of Physics, Ohio State University, ARTHUR J. EPSTEIN, Departments of Chemistry and Physics, Ohio State University, P. CHRIS HAMMEL, EZEKIEL JOHNSTON-HALPERIN, Department of Physics, Ohio State University — Recent advances in spintronics suggest that the high frequency response of ferromagnetic materials is an attractive path to generating pure spin currents. Further, experiments in inorganic systems indicate that the linewidth of the ferromagnetic resonance (FMR) is an important metric for FMR driven spin injection. Here we perform magnetic resonance measurements on the organic-based ferrimagnetic semiconductor $V[TCNE]_{x\sim2}$, consisting of vanadium ions in a network of organic linking molecules. We observe a single resonance with an extremely sharp linewidth, on the order of 1 Oe (yttrium iron garnet, YIG, has a comparable linewidth). Previous studies of $V[TCNE]_{x\sim 2}$ show similar linewidths but with many peaks in the spectrum, indicating that our results represent a significant improvement in sample homogeneity. Finally, we also demonstrate the ability to manipulate the magnetic properties through chemical modification of the organic linker, yielding thin films of V[MeTCEC] and V[EtTCEC]. These studies demonstrate the potential for high frequency all-organic spintronic and magnetoelectronic devices.

¹Supported by NSF grant DMR-1207243.

Howard Yu Department of Physics, Ohio State University

Date submitted: 15 Nov 2013

Electronic form version 1.4