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Looking for higher anisotropy barriers in single-molecule magnets SAITI DATTA, University of Florida, CONSTANTINOS MILIOS, EUAN BRECHIN, The University of Edinburgh, U.K, STEPHEN HILL, UNIVERSITY OF FLORIDA COLLABORATION — We report single-crystal high-frequency electron paramagnetic resonance (HFEPR) studies of a series of recently discovered Mn_6^{III} single-molecule magnets (SMMs) with large barriers to magnetization reversal. All of the complexes consist of Mn_3^{III} triangles with a ferromagnetic interaction between them. Recent studies have shown that the exchange interactions within the triangular Mn_3^{III} units can be switched from antiferromagnetic to ferromagnetic,[1] resulting in a switching of the spin from $S = 4$ to 12 for many of the Mn_6 complexes. This strategy to "increase S" has resulted in the highest magnetic energy barrier and blocking temperature for any known SMM to date. Extensive frequency, temperature and field-orientation dependent HFEPR measurements were performed to determine the magnetic anisotropy parameters for each complex. These studies have contributed to important new insights concerning strategies for designing SMMs with high blocking temperatures, particularly for complexes containing manganese in its +3 oxidation state. [1] T. C. Stamatatos et al., J. Am. Chem. Soc. 129, 12505-12511, 2007.

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