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High Frequency Electron Paramagnetic Resonance Studies of High Spin Co(II) Complexes JON LAWRENCE, University of Florida, Physics Dept., CHRIS BEEDLE, EN-CHE YANG, JAMES MA, University of California at San Diego, Chemistry Dept., STEPHEN HILL, University of Florida, Physics Dept., DAVID HENDRICKSON, University of California at San Diego, Chemistry Dept. — Variable-High-Frequency Electron Paramagnetic Resonance (HFEPR) data have been collected for single crystals of $[Zn(hmp)(dmb)Cl]_4$ (**1**) doped with a small quantity of high-spin Co(II), and an isostructural tetranuclear cobalt complex $[Co^{II}(hmp)(dmb)Cl]_4$ (**2**). Crystals of complex **2** exhibit low temperature hysteresis, suggesting that it may be a single molecule magnet (SMM).[1] However, HFEPR data for complex **2** cannot be fit to a standard Giant Spin model, as is routinely the case for other SMMs. HFEPR data obtained for complex **1** indicate that the ground state of the Co^{II} ions is an effective spin $S\prime = {}^1/_2$ Kramers' doublet with a highly anisotropic g-tensor. The anisotropy is of the easy-axis type, with the individual easy axis directions tilted away from the crystallographic c direction by 58^o. We will attempt to rationalize the EPR spectrum obtained for complex **2** (as well as its possible SMM behavior) in terms of a simple model involving anisotropic exchange coupling between four effective spin $S\prime = {}^1/_2$ Co^{II}ions, with the local anisotropy entering only through the anisotropic g-tensor at each Co^{II} site. [1] E.-C. Yang, J. Appl. Phys. **91**, 7382 (2002).

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