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Signatures of magnetism in an individual Mn12O12 molecule probed by single-electron tunneling. MOON-HO JO, Dept of Materials Science and Engineering, POSTECH, JACOB E. GROSE, DANIEL C. RALPH, Dept of Physics, Cornell Univ, KANHAYALAL BAHETI, JEFFREY R. LONG, Dept of Chemistry. UC Berkeley, WENJIE LIANG, MANDAR M. DESHMUKH, HONGKUN PARK, Department of Chemistry & Chemical Biology and Department of Physics — We report low-temperature electron transport through individual molecular clusters, Mn12O12(O2C-R)16(H2O)4, [Mn12O12], where R is -CH3 and -CHCl2. Energy level spectroscopy with single-electron tunneling probes the ground state spin of the individual Mn12O12 molecules, and exhibits signatures of their magnetism. In particular the absence of the spin degeneracy is manifested as an energy splitting between low-lying energy manifolds of the ground state spin at zero-magnetic field, and it signifies the magnetic anisotropy of an individual Mn12O12 molecule. We also discuss the influence of this anisotropy to the electron tunneling spectrum in the presence of a magnetic field.

Moon-Ho Jo
Dept of Materials Science and Engineering, POSTECH

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