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STM Studies of Mn_{12}-Ph on Highly Oriented Pyrolytic Graphite

K. REAVES, Department of Physics and Astronomy, Texas A&M University; WPI-AIMR, Tohoku University, Japan, K. KIM, K. IWAYA, T. HITOSUGI, Y.G. KIM, K. ITAYA, WPI-AIMR, Tohoku University, Japan, H. ZHAO, K.R. DUNBAR, Department of Chemistry, Texas A&M University, H.G. KATZGRABER, Department of Physics and Astronomy, Texas A&M University; ETH Zurich, W. TEIZER, Department of Physics and Astronomy, Texas A&M University; WPI-AIMR, Tohoku University, Japan — Mn_{12}-Ph displays tunneling of quantized magnetization below 3K. In other Mn_{12} ligand variants this magnetic behavior can alter the electronic behavior of the molecule making it a good candidate for a molecular logic gate. $Mn_{12}O_{12}(C_6H_5COO)_{16}$ (Mn_{12}-Ph) has a Mn_{12} core and 16 Phenyl ligands and is deposited onto the surface of highly oriented pyrolytic graphite (HOPG). The samples are then studied via scanning tunneling microscopy in air at 300K and in ultra high vacuum at 300K and 4.2K. At 300K, film formation is studied to optimize samples for subsequent low-temperature studies. Isolated objects are observed via STM on the surface, clearly distinct from the underlying graphite lattice. Topographic data are analyzed in an attempt to correlate apparent features to the internal molecular structure of Mn_{12}-Ph. Voltage spectra of locations thought to be associated with the molecular core are compared to other locations thought to be the HOPG and Phenyl. Spectroscopic data indicate a bias voltage dependence at locations associated with the internal molecular structure thought to be related to the metallic-core of the molecules.

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