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STM Studies of Mn_{12}-Ph K. REAVES, Texas A&M University Materials Science & Engineering,Texas A&M University Department of Physics & Astronomy, WPI-AIMR Tohoku University, K. KIM, K. IWAYA, T. HITOSUGI, WPI-AIMR, Tohoku University, H. ZHAO, K.R. DUNBAR, Texas A&M University Department of Chemistry, H.G. KATZGRABER, Texas A&M University Department of Physics and Astronomy, ETH Zurich Theoretische Physik, W. TEIZER, Texas A&M University Materials Science & Engineering,Texas A&M University Department of Physics & Astronomy, WPI-AIMR Tohoku University — 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 them good candidates for a molecular logic gate or q-bit. $Mn_{12}O_{12}(C_6H_5COO)_{16}$ (referred to as Mn_{12}-Ph) has a Mn_{12} core with 16 Phenyl ligands and is deposited via spray injection onto surfaces of highly oriented pyrolytic graphite (HOPG) and other surfaces. We report Mn_{12}-Ph in isolation, resembling single molecules with metallic core atoms and organic outer ligands. The local tunneling current observed within the molecular structure shows a strong bias voltage dependence, which is distinct from that of the surface. Further, evidence of internal inhomogeneity in the local density of states has been observed with high spatial resolution, and this inhomogeneity appears to be due to localized metallic behavior. These results facilitate magneto-metric studies of single molecule magnets in isolation. As compared to bulk crystal studies, our experiments allow the specific investigation of atomic sites in individual molecules.

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