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Spin-Delocalization in Molecular Orbital Kondo Resonance[1]
U.G.E. PERERA, Ohio University, Athens, OH, H.J. KULIK, MIT, Cambridge, MA, V. IANCU, Ohio University, Athens, OH, L.G.G.V. DIAS DA SILVA, Oak Ridge Natl. Laboratory, Oak Ridge, and Uni. of Tennessee, Knoxville TN, S.E. ULLOA, Ohio University, Athens, OH, N. MARZARI, MIT, S.-W HLA, Ohio University, Athens, OH — Molecules with transition-metal complexes have great potentials in spintronics and molecular electronics. Controlling their spin states and spin polarization is a key challenge for future applications. Here, we report an extensive redistribution of spin density for self-assembled TBrPP-Co [5, 10, 15, 20 –Tetrakis -(4-bromophenyl)-porphyrin-cobalt] molecules adsorbed on a Cu(111) surface. The TBrPP-Co molecule has a spin-active cobalt atom caged at the center of porphyrin unit and four bromo-phenyl groups are attached to its four corners. These molecules readily self-assemble and form ordered, ribbon-like monolayer islands on Cu(111). We probe the spatially extended Kondo resonance of the molecules by means of tunneling spectroscopy and spectroscopic mapping. The origin of this effect is explained by means of first-principles and numerical renormalization group calculations.

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Gayani (U.G.E.) Perera
Ohio University

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