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Electronic and structural properties of TBrPP-Fe-Cl molecular self-assembly GAYANI PERERA, VIOLETA IANCU, SAW-WAI HLA, Nanoscale & Quantum Phenomena Institute, and Department of Physics and Astronomy, Ohio University, Athens, Ohio, 45701, USA — Self-assembled molecular (SAM) layers of TBrPP-Fe-Cl [5, 10, 15, 20 –Tetrakis -(4-bromophenyl)-Porphyrin-iron-chloride] are formed on a Cu(111) surface. The electronic and structural properties of these SAM layers are investigated by using scanning tunneling microscopy (STM) imaging and tunneling spectroscopy at 4.6 K. The STM images reveal three distinct molecular conformations inside the SAM layers. Local tunneling spectroscopy data are acquired on individual molecules with different conformations. These spectroscopic investigations provide the conformation dependent HOMO-LUMO orbital alignments of the molecules. Further more, the conductance tunneling spectroscopy measured in a small voltage range near the surface. Fermi level show a Kondo resonance originated by interactions between the spin of iron atom inside the molecule, and the surface state free electrons of Cu(111). This work is supported by a US-DOE grant, DE-FG02-02ER46012, and a NSF-NIRT grant, DMR-0304314.

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