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Single molecule Kondo switch VIOLETA IANCU, APARNA DESHPANDE, SAW-WAI HLA, Nanoscale & Quantum Phenomena Institute, and Department of Physics and Astronomy, Ohio University, Athens, Ohio, 45701, USA — We present manipulation of Kondo resonance originated from the interaction between the spin of a Co atom inside a TBrPP-Co molecule and free electrons from a copper surface by switching the conformation of isolated single molecules with a scanning tunneling microscope (STM) tip. The STM studies of isolated TBrPP-Co molecules [5, 10, 15, 20 –Tetrakis -(4-bromophenyl)-porphyrin-Co] deposited on a Cu(111) are performed at 4.6K in an ultra-high-vacuum environment. The molecules anchor on Cu(111) with two molecular conformations, planar and saddle. In the saddle conformation, the metal atom is lifted away from the surface as compared to the planar. We are able to switch from a saddle conformation of TBrPP-Co to a planar conformation by applying +2.2V voltage pulses from the STM-tip, thereby varying the vertical distance of Co atom from the Cu(111) surface. This conformational switching increases molecule-substrate interaction resulting in an enhanced spin-electron coupling and changes the associated Kondo temperature from 130K to 170K. This work is supported by a US-DOE grant, DE-FG02-02ER46012, and a NSF-NIRT grant, DMR-0304314.

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