Abstract Submitted
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Magnetotransport Properties of Switchable Valence Tautomer Films[1] WILLIAM RICE, FRANK TSUI, Physics, University of North Carolina at Chapel Hill, DANIEL STASIW, ROBERT SCHMIDT, DAVID SHULTZ, Chemistry, North Carolina State University, ROBERT BRUCE, WEI YOU, Chemistry, University of North Carolina at Chapel Hill — We report tunneling magnetoresistance (TMR) and spectroscopy results in trilayer stacks of spincoated molecular films sandwiched between two metallic thin film electrodes. The molecules, cobalt dioxolene complexes, exhibit switchable bistable paramagnetic states as a result of intramolecular electron transfer accompanied by a spin-crossover of the Co ion, the so-called valence tautomerism (VT). Temperature dependent differential conductance measurements show changes in the density of states that correspond to the temperature dependent VT transition. The observed electronic transition is shown to be switchable by light exposure, which correlates the counterpart in the magnetic susceptibility. In trilayers with two ferromagnetic electrodes, e.g. Permalloy and Co, spin valve effects have been observed above and below the VT transition, including room temperature. The dependence of the TMR effect on bias voltage, light exposure, and molecular film thickness has been examined systematically as a function of temperature, aimed at exploring the effects of spin dependent states in the VT molecules.

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