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Transport properties of a novel molecular rotor MEI XUE, K.L. WANG, SANAZ KABEHIE, JEFFREY I. ZINK, UCLA — Rotary motion around a molecular axis has been controlled by electron transfer process and by photoexcitation. The basis of the motion is intramolecular rotation of a ligand (3,8-diethynyltrityl-1, 10-phenanthroline) around a copper axle. The asymmetric copper system is synthesized by immobilizing a "stator" to a silicon support. The "rotator," 3,8-di-ethynyltrityl-1, 10-phenanthroline is complexed to the metal center, Cu (I) or Cu (II) serving as an "axle". The Cu (I) system structure is tetrahedral, but that of Cu (II) is square planar. The interconversion of the two provides the basis for controlled, rotational motion. Hysteresis is observed in the different region of the applied voltage for different stators. The peak of the bisP-Si shifts to the left compared to that of the phen-Si stator because of the larger energy gap of phen-Si. The energy states of the Cu (I) and Cu (II) are extracted from the transport measurement results.

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