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Direct Observation of Magnetoresistance Variation in Molecular Junctions Induced by Electrode Geometry XIANGMIN FEI, GUANGFEN WU, VANESSA LOPEZ, GANG LU, California State University, Northridge, HONG-JUN GAO, Institute of Physics, Chinese Academy of Sciences, LI GAO, California State University, Northridge — Spin-polarized electron transport in the Co/C60/Co/Ni molecular junctions, in which the fullerene (C60) molecule is in electrical contact with electrodes, has been investigated using an ultra-high vacuum cryogenic scanning tunneling microscope (STM). By combining spin-polarized STM and current-displacement measurements, the spin-polarized contact conductance of molecular junctions has been measured at 5 K. Large tunnel magnetoresistance (TMR) values higher than -60% have been observed. Depending on electrode geometry, the measured TMR values vary by a factor of ~ 1.5. The atomic-scale geometry of the electrode apex strongly impacts the spin-polarization of the electrodes and that of the interfacial hybrid molecular states. Our findings suggest that atomic-scale engineering of electrodes represents a new and effective approach to tuning the magnetotransport in molecular spintronic devices.

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