

Abstract Submitted
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Spin and Charge Injection and Transport in Ferromagnet/Organic Semiconductor/Ferromagnet Heterojunction¹ JUNG-WOO YOO, Department of Physics, The Ohio State University, H. W. JANG, C. B. EOM, Department of Materials Science and Engineering, University of Wisconsin-Madison, CHI-YUEH KAO, Department of Chemistry, The Ohio State University, A. J. EPSTEIN, Department of Physics and Chemistry, The Ohio State University — We studied the spin injection and transport in organic semiconductor by employing LSMO and Fe as an anode and cathode in hybrid spin valve structure. Using thin layer ($t < 10$ nm) of rubrene as a spacer, our device displays MR as high as 50 % at low temperature and at low bias voltage. The charge injection into organic spacer in our devices is injection limited. At high applied voltage ($V > V_{th}$) field-driven drift current prevails in current density through the organic semiconductor. At low bias V , inelastic hopping followed by thermionic emission is dominant at high T , which decreases significantly as T lowered. And eventually the current density through the device becomes purely tunneling at low T and V_b . The spin and charge injection, effects of inclusion of tunneling barrier, and the effects of crystallinity of organic layer will be discussed.

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