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Magnetoresistance in organic spin-valve devices with low work-function metal H.-JAE JANG, Semiconductor and Dimensional Metrology Div., NIST & Dept of Phyiscs, WFU, KURT P. PERNSTICH, DAVID J. GUNDLACH, Semiconductor and Dimensional Metrology Div., NIST, OANA D. JURCHESCU, Dept. of Physics, Wake Forest Univ., CURT A. RICHTER, Semiconductor and Dimensional Metrology Div., NIST — Organic thin-films have recently generated interest for studies related to spin-based phenomena. Long spin transport through organic semiconductors has been predicted due to their weak spin-orbit and small hyperfine interactions. This property gives them great potential for spintronic applications. While magnetoresistance (MR) has been reported by multiple research groups, controversy still remains over whether the basic mechanism is the transport of spin-polarized carriers through the organic semiconducting thin films or transport via unintended tunneling paths through the devices. We investigate the MR of organic thin-film spin valve devices fabricated from tris[8-hydroxyquinoline]aluminium (Alq3), high Tc transition ferromagnetic metals, and low work-function metals. The devices are fabricated without the exposure to the air to minimize the oxidation. We observe the MR as large as 3 % at 4.5K in devices containing Alq3 as thick as 150 nm.

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