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Abstract Submitted
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Tuning Interfacial States Using Organic Molecules as Spin Filters[1] ANDREW DELOACH, JINGYING WANG, CHRISTOPHER M. PAPA, MYKHAYLO MYAHKOSTUPOV, FELIX N. CASTELLANO, DANIEL B. DOUGHERTY, NC State University, WEI JIANG, FENG LIU, University of Utah — Organic semiconductors are known to have long spin relaxation times which makes them a good candidate for spintronics(1). However, an issue with these materials is that at metal-organic interfaces there is a conductivity mismatch problem that suppresses spin injection(2). To overcome this, orbital mixing at the interface can be tuned with an organic spacer layer to promote the formation of spin polarized interface states(3,4). These states act as a "spin filters" and have been proposed as an explanation for the large tunneling magnetoresistance seen in devices using *tris*-(8-hydroxyquinolate)-aluminum(Alq_3)(3). Here, we show that the spin polarized interface states can be tuned from metallic to resistive by subtle changes in molecular orbitals. This is done using spin polarized scanning tunneling microscopy with three different tris-(8-hydroxyquinolate) compounds: aluminum, chromium, and iron. Differences in d-orbital mixing results in different mechanisms of interfacial coupling, giving rise to metallic or resistive interface states. (1)J. Devkota *et al.* Adv. Funct. Mater. 26,22 (2016). (2)G. Schmidt *et al.* Phys. Rev. B 62,8 (2000). (3)C. Barraud *et al.* Nat Phys 6,8 (2010). (4)V. A. Dediu, Nat Phys 9,4 (2013).

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