Spintronics Detection of Interfacial Magnetic Switching in a Paramagnetic Tris(8-hydroxyquinoline)iron(III) Thin Film

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Organic semiconductors find increasing importance in spin transport devices due to the modulation and control of their properties through chemical synthetic versatility. The organic materials are used as interlayers between two ferromagnet (FM) electrodes in organic spin valves (OSV), as well as for magnetic spin manipulation of metal-organic complexes at the molecular level. In the latter, specifically, the substrate-induced magnetic switching in a *paramagnetic molecule* has been evoked extensively, but studied by delicate surface spectroscopies. Here we present evidence of the substantial magnetic switching in a thin film of the paramagnetic molecule, tris(8-hydroxyquinoline)iron(III) (Feq_3) deposited on a FM substrate, using the magnetoresistance response of electrical 'spin-injection' in an OSV structure; and the inverse-spin-Hall effect induced by state-of-art microwave 'spin-pumping'. We show that interfacial spin control at the molecular level may lead to a macroscopic organic spin transport device; thus, bridging the gap between organic spintronics and molecular spintronics.