

Tuning the magnetic response of molecular spin interfaces

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Paramagnetic organic molecules can open the route to engineer spintronic devices when their magnetic moments are stabilized against thermal fluctuations. We report on advanced metal organic spin architectures constituted by molecules magnetically coupled with ferromagnetic layer(s) through a graphene (Gr) spacer, exhibiting a residual magnetic coupling up to room temperature, with tunable (anti- or ferromagnetic) alignment. The fundamental role of the occupation and symmetry of the magnetically active molecular orbitals suggests that the magnetic response of such interfaces can be further manipulated by electron doping. A switching from an antiferromagnetic to a ferromagnetic response is turned on changing the symmetry of the orbital carrying the spin via alkali doping. These archetypal spin interfaces can be prototypes to demonstrate how antiferromagnetic/ ferromagnetic coupling can be optimized by selecting the molecular orbital symmetry, paradigmatic examples to exploit in surface-supported molecular spin electronics.