

# GROWTH OF SELF-ASSEMBLED MONOLAYERS DIRECTLY ON FERROMAGNETIC METAL SURFACES

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Molecular spintronics combines the potential of chemistry with the spin degree of freedom provided by spintronics. In spintronic devices, metal/molecule hybridization can strongly influence interfacial spin properties going from spin polarization enhancement to its sign control [1]. SAMs are composed by a head, a body and an anchoring group that can be independently tuned, thus allowing an easy engineering of the spintronic barrier. In this scenario, while scarcely studied, self-assembled monolayers (SAMs) seem to be the perfect toy barriers to test these tailoring properties in molecular magnetic tunnel junctions (MTJs).

In this communications, we present nanodevices based on alkyl phosphonic acid SAMs used as tunnel barriers and grafted on the half-metallic manganite (La,Sr)MnO<sub>3</sub> (LSMO) [2]. We will present the atypical bias voltage dependence of tunnel magnetoresistance (TMR) highlighting the peculiar role of molecules in the spin dependent tunneling transport. However, as LSMO's surface Curie temperature (T<sub>c</sub>) is close to room temperature, spintronics effects in LSMO-based devices are expected only at low temperature. Unlike LSMO, 3d FM metals like Cobalt or Permalloy (Py) have higher T<sub>c</sub> but readily oxidize, and additional precautions have to be taken to successfully graft SAMs over them. We will introduce a solution-based grafting protocol for the integration of SAMs and 3d FM metals into spintronic devices. Moreover, we will present the formation of alkanethiol SAMs on Py under inert atmosphere without surface oxidation [3]. Finally, we will show our first results on their integration of SAMs into room-temperature spintronic nanodevices (Fig. 1).

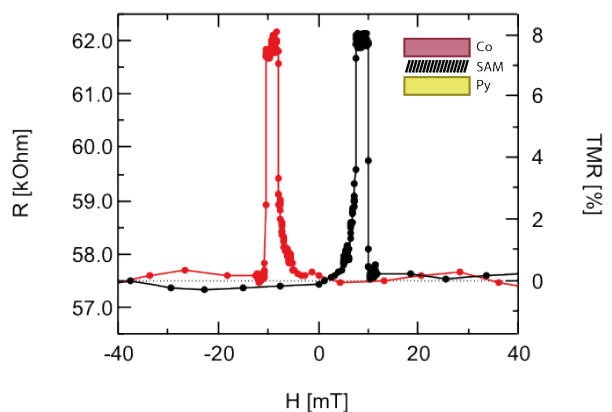


Fig. 1. Magnetic (b) field dependence of conductance measured at 300 K and 40 mV in a Co/SAM//Py junction

*Keywords:* Spintronics; Self-assembled monolayers

## References

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