Spin injection into functionnalized multiwall carbon nanotubes

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Due to their weak spin-orbit coupling and hyperfine interaction carbon based nanomaterials such as carbon nanotubes and graphene are promising materials for spin transport [1,2]. However, the contact resistance remains a key issue for an efficient spin injection at the interface between ferromagnetic metals and this kind of materials. Here, we show that using multiwall carbon nanotubes covalently functionnalized by diqzonium molecules one can consistently control and increase the resistance to ferromagnetic electrodes. We will also present magnetoresistance measurements performed on the functionalized nanotubes and describe how it is influenced by the superlattice effects present in these systems.

[1] P. Seneor et al., Spintronics with graphene, MRS Bull. **37**, 1245 (2012)
[2] L. Hueso et al, Transformation of spin information into large electrical signals using carbon nanotubes, Nature **445**, 410 (2007)

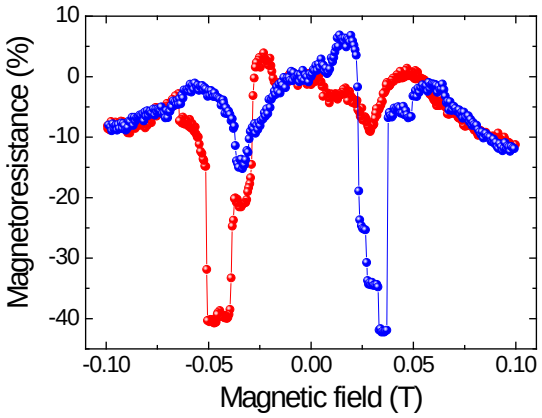

Figure 1 : Magnetoresistance of a mutiwall functionnalized carbon nanotube contacted with Ni electrodes measured at T = 1.5 K.