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Magnetoresistance in oxidized Ni nanocontacts D. JACOB, Universidad de Alicante, J. FERNANDEZ-ROSSIER, J. J. PALACIOS — Whether or not ferromagnetic nanocontacts display large magnetoresistance (MR) is still a matter of debate [1,2]. From the theory side it has been shown[3] that MR in pure Ni nanocontacts is certainly not large in good agreement with recent experiments [2]. Here we explore the effect of oxygen atoms in the electronic structure and transport of nickel nanocontacts. Since bulk nickel oxide is an insulating antiferromagnet, nano-oxidized nickel is an interesting system on its own. Here we present ab-initio quantum transport calculations of Ni nanocontacts in the presence of oxygen adsorbates in the contact region. We show that the presence of a single oxygen atom leads to strongly spin-polarized transport for parallel alignment of electrodes magnetizations while for antiparallel alignment the conduction is strongly suppressed resulting in large MR.

(1) H. D. Chopra, Nature Materials 4, 832 (2005)

(2) K. I. Bolotin et al., cond-mat/0510410; W. F. Egelhoff et al., J. Appl. Phys. 95, 7554 (2004)

(3) D. Jacob et al., Phys. Rev. B 71, 220403(R) (2005)

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