

Supporting Information

Combined spin filtering actions in hybrid magnetic junctions based on organic chains covalently attached to graphene

Pascal Martin¹, Bruno Dlubak^{2}, Richard Mattana², Pierre Seneor², Marie-Blandine Martin², Théo Henner^{2‡}, Florian Godel², Anke Sander², Sophie Collin², Linsai Chen¹, Stéphan Suffit³, François Mallet³, Philippe Lafarge³, Maria Luisa Della Rocca³, Andrea Droghetti^{4*}, Clément Barraud^{3*}*

1. Université Paris Cité, Laboratoire ITODYS, CNRS, UMR 7086, 75013 Paris, France
 2. Unité Mixte de Physique, CNRS, Thales, Université Paris-Saclay, 91767 Palaiseau, France
 3. Université Paris Cité, Laboratoire Matériaux et Phénomènes Quantiques, CNRS, UMR 7162, 75013 Paris, France
 4. School of Physics and CRANN, Trinity College, Dublin 2, Ireland
- E-mail: clement.barraud@u-paris.fr

Control measurements with only one ferromagnetic electrode

Control junctions with only one ferromagnetic electrode made of Au/NB (1.3 nm)/Co were fabricated and electrically characterized. As shown in Fig. S1, they do not show any magnetoresistive response typically attributed to tunneling anisotropic magnetoresistance^{1,2}.

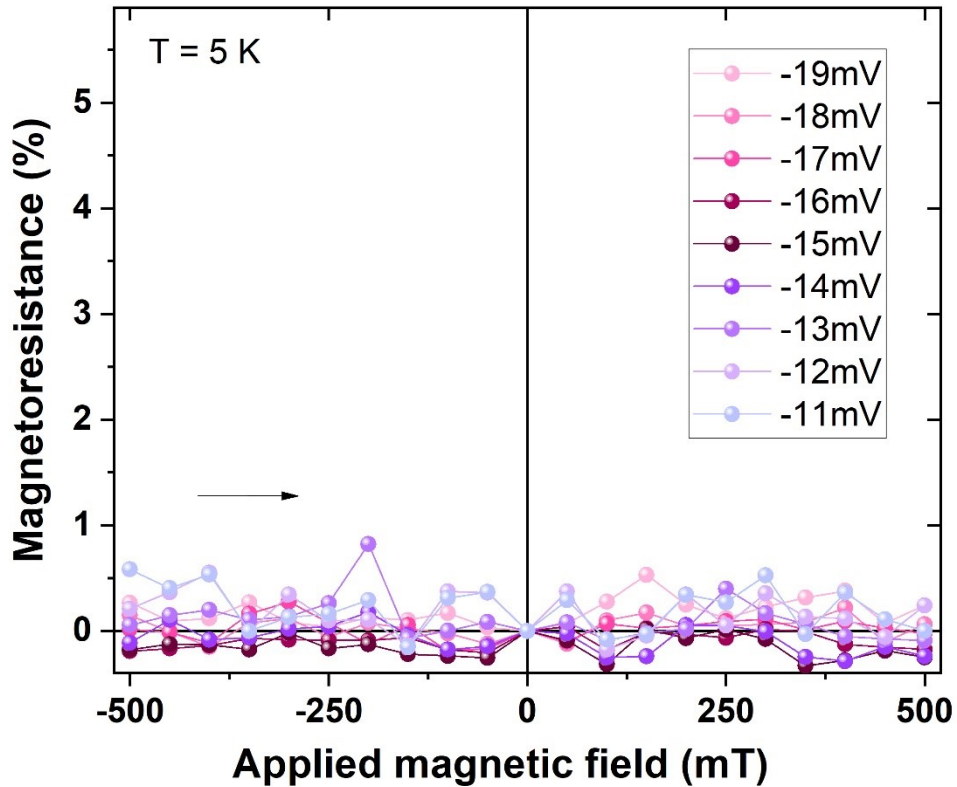


Fig. S1. Absence of tunneling anisotropic effect in a control Au (50 nm)/NB (1.3 nm)/Co (15 nm) junction. The arrow indicates the sweeping direction. The magnetic field is applied in-plane and along the Au electrodes direction.

Additional calculations

Density of states at finite bias voltage

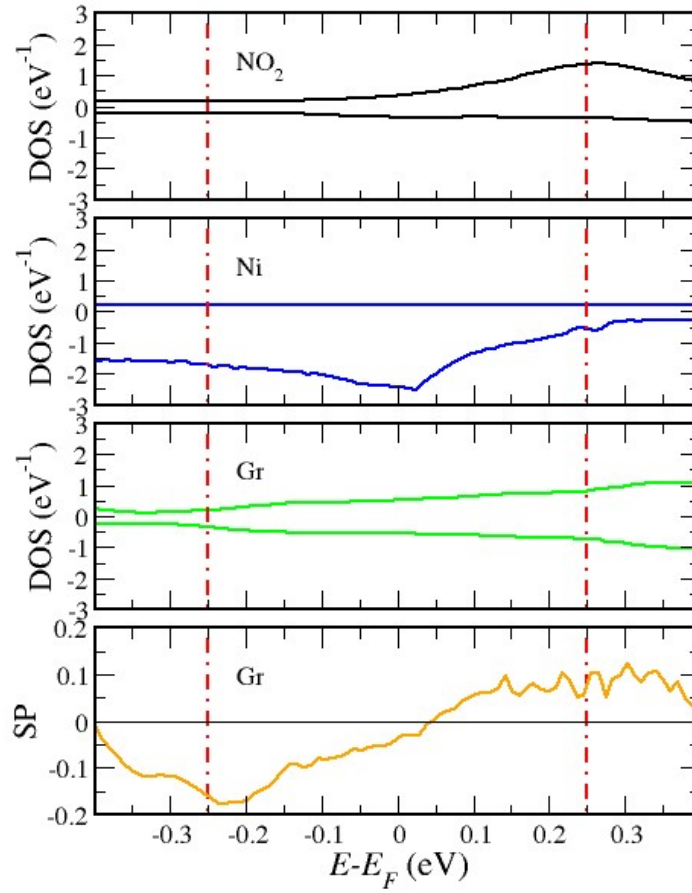


Fig. S2. DOS projected over the molecule topmost NO_2 unit, where the LUMO is localized. DOS projected over a Ni atom of the bottom electrode. Total graphene DOS and graphene spin-polarization $SP = DOS^\uparrow - DOS^\downarrow$. Bias voltage = 0.5V.

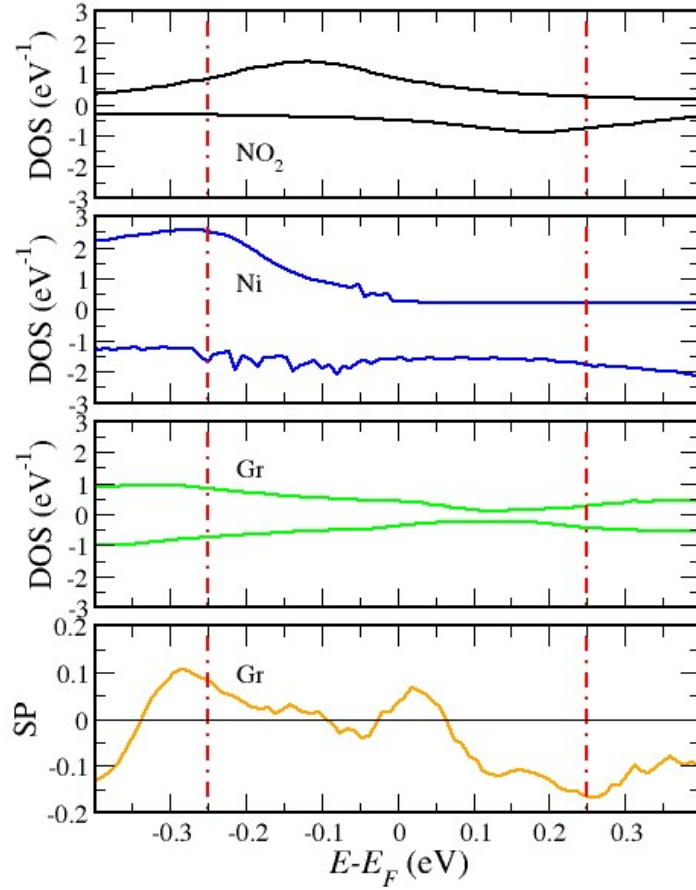


Fig. S3. DOS projected over the molecule topmost NO_2 unit, where the LUMO is localized. DOS projected over a Ni atom. Total graphene DOS and graphene spin-polarization $SP = DOS^\uparrow - DOS^\downarrow$. Bias voltage = -0.45V .

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- 2 C. Gould, C. Rüster, T. Jungwirth, E. Girgis, G. M. Schott, R. Giraud, K. Brunner, G. Schmidt and L. W. Molenkamp, *Phys. Rev. Lett.*, 2004, **93**, 117203.