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**Understanding and controlling the magnetic interaction between Ln(III) bis-(phthalocyanine)s "Double Decker" molecular nanomagnets and a magnetic substrate** ANDREA CANDINI, SIMONE MAROCCHI, VALDIS CORRADINI, FILIPPO TROIANI, VALERIO BELLINI, Istituto Nanoscienze - CNR, Italy, ROBERTO BIAGI, VALENTINA DE RENZI, UMBERTO DEL PENNINO, MARCO AFFRONTE, Università di Modena e Reggio Emilia, Italy, SVETLANA KLYATSKAYA, MARIO RUBEN, Karlsruhe Institute of Technology (KIT), Germany, DAVID KLAR, HEIKO WENDE, University of Duisburg-Essen, Germany — Understanding and controlling the interaction between molecules and substrate is of crucial importance for the realization and implementation of moleculecular devices. Here we present the study by means of XAS and XMCD of the magnetic coupling between $LnPc_2$ "Double Decker" (Ln = Tb, Dy, Er) molecular nanomagnets sublimated *in situ* on top of a Ni(111) single crystal. We find an antiferromagnetic exchange coupling between the molecules and the Ni substrate. The observed dependence of the coupling strength on the specific Ln ion is explained by the analysis of the Ln spin-polarized density of states as calculated by DFT. This allows us to identify the microscopic origin of the magnetic interaction between the Ln ions and the molecule environment which happens by the mediation of the organic part of the molecule.[1] This result will be particularly relevant also for the investigation of molecular spintronics devices employing $TbPc_2$ molecules. Finally, we show how this interaction can be further tuned by the insertion of a graphene layer.

[1]A. Candini et al., *paper submitted*(2014)

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