Hybridization and Charge transfer in Graphene–Nickel nano System: a Tight-Binding model Study

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Abstract. We have investigated the electronic and magnetic properties of graphene–nickel system by tight-binding mean-field method. Here monolayer graphene is placed over one layer of ferromagnetically ordered metal Ni (111). Due to the close matching of lattice constant between graphene and nickel, the hybridization between graphene $2p_z$ and Ni $3d_{z^2}$ orbitals are very strong. This hybridization greatly affects the electronic and magnetic properties of this bilayer system, resulting in a significantly reduced local magnetic moment of the nickel layer and an induced spin polarization on the graphene layer. We have calculated the intrinsic magnetization in nickel (111) and induced magnetization on the graphene layer by Zubrev's double time Green's function techniques and results are interpreted with experimental observations.

[Full Paper]