Doped Graphene Induced Magnetization Reversal and Spintronics of Ni/Graphene/Co

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Using the full potential linearized augmented plane wave (FLAPW) method, we have investigated the magnetization reversal induced by carrier doped graphene in Ni/Graphene/Co and the potential application for spintronics devices. In undoped Ni/Graphene/Co, the Ni and the Co layers have an antiferromagnetic coupling in ground state and this feature is still preserved even when hole carriers are doped in graphene. Interestingly, we find magnetization reversal from antiferromagnetic (AFM) to ferromagnetic (FM) interaction between two magnetic layers and this behavior is induced by Cl doped graphene. In addition, the Ni and Co layers show the opposite spin asymmetry near the Fermi level, thus we propose that the Ni/Graphene/Co structure can be utilized for potential spintronics application because the oppositely spin polarized in-plane current will be generated if an external bias is applied.