Induced spin polarization in graphene via interaction with halogen doped MoS_2 and $MoSe_2$ monolayers

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By fabrication of different heterostructures it is possible to obtain new materials with unique properties [1, 2]. The graphene/TMD heterostructures seem to be particularly interesting. However, defects can significantly affect the properties of nanomaterials. By controlling the type, quantity, and location of defects in the material, it is possible to create completely new nanoelectronic devices. The purpose of this work was to investigate the electronic properties of MoX_2/graphene heterostructures (X = S, Se) in which individual MoX_2 monolayers were doped by halogen atoms. The linear dependence of induced spin polarization on graphene near the Fermi energy on halogen periodic number was demonstrated. A possible way for detection of the arrangement of the dopants on the MoX_2 surface through STM measurements was presented. The obtained results open new prospects of the application of doped heterostructures in spintronics and optoelectronics.

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