Tunable magnetoresistance in gapped graphene junction with strain and magnetic barrier

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Received: 30.08.2017 Final revised: 17.04.2018 Accepted: 22.10.2018

Abstract: In this paper, by applying strain and magnetic barrier simultaneously in gapped graphene which has been located between two ferromagnetic electrodes, the transmission of the coefficient and conductance of the junction have been studied and the condition has been provided to reach giant magnetoresistance. The results show that the valley gap cannot be achieved in graphene only by using strain and it comes into being in strain graphene with magnetic barrier and it is controllable by changing substrate mass gap. Also, it is found that MR strongly depends on the strain, magnetic barrier, magnetization configuration of the ferromagnetic regions, and substrate mass gap in a way that by applying appropriate values for these parameters, MR can reach up to 100%. Specially, for K valley, by changing the configuration magnetization from parallel to antiparallel, the antiparallel conductance reduces to zero faster than the parallel conductance for the above parameters. So, the junction is transparent only for parallel conductance leading to an increase of MR to 100%. Tunability of the MR reveals the potential application of the proposed junction for future spin-electronics devices.

Keywords: Magnetoresistance, Strain, Magnetic barrier, Gapped graphene

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