Spintronics in graphene

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The development of nanotechnology requires the production of multifunctional nanoscopic devices. In order to achieve this goal, it is necessary to search for new multifunctional materials, which allow the integration of different functionalities in a single device. Spintronics is one of the most promising paths in this direction since it is based on the use of both spin and charge of carriers for storage, transport and manipulation of information. The recent production of graphene electronic devices opens a new path for the development of graphene-based nano electronics. The intrinsic spin-orbit coupling in graphene is extremely weak, making it a promising spin conductor for spintronic devices. However, for many applications, it is desirable to also be able to generate spin currents. Previous experiences indicate that the incorporation of impurities into a graphene layer can modify its physical properties. I will review different ways to transform graphene into an active spintronics material with the use of adsorbed atoms and clusters.