# Ferromagnetic Semiconductors: Preparation and Properties

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The injection of spins into nonmagnetic semiconductors has recently attracted great interest due to the potential to create new classes of spin-dependent electronic devices. A recent strategy to achieve control over the spin degree of freedom is based on dilute ferromagnetic semiconductors. Ferromagnetism has been reported in various semiconductor groups including II-VI, III-V, IV, and II-IV-$V_2$, which will be reviewed. On the other hand, to date the low solubility of magnetic ions in non-magnetic semiconductor hosts and/or low Curie temperature have limited the opportunities. Therefore the search for other promising ferromagnetic semiconducting materials, with high magnetic moments and high Curie temperatures ($T_C$), is of the utmost importance. In this talk, we also introduce new pure ferromagnetic semiconductors, $MnGeP_2$ and $MnGeAs_2$, exhibiting ferromagnetism and a magnetic moment per Mn at 5K larger than 2.40 $\mu_B$. The calculated electronic structures using the FLAPW method show an indirect energy gap of 0.24 and 0.06 eV, respectively. We have observed spin injection in $MnGeP_2$ and $MnGeAs_2$ magnetic tunnel junctions through semiconducting barriers.