

CARRIER-CONTROLLED FERROMAGNETIC SEMICONDUCTORS

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Recent advances in understanding of carrier-controlled ferromagnetism in tetrahedrally coordinated diluted magnetic semiconductors and their nanostructures will be reviewed with a focus on the phenomena important for prospective spintronic devices. Experimental results for III-V materials, where the Mn atoms introduce both spins and holes, will be compared to the case of II-VI compounds, in which the Curie temperatures T_C above 1 K have been observed for the uniformly and modulation-doped p-type heterostructures but not in the case of n-type films. The experiments demonstrating the tunability of T_C by light and electric field will be presented. The tailoring of domain structures and magnetic anisotropy by strain engineering and confinement will be discussed emphasizing the role of the spin-orbit coupling in the valence band. Recent progress in search for semiconductors with T_C above room temperature and hopes associated with compounds containing magnetic ions other than Mn will be presented.

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13.4 cm

Subject category :

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9.7 cm