ROOM TEMPERATURE FERROMAGNETISM IN TRANSITION METAL DOPED OXIDE SEMICONDUCTORS, TiO_2 and ZnO

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Semiconductors with ferromagnetism at room temperature has been actively searched for in recent years; a prospect of devices using both charge and spin continuously gives impetus to the activities. Transition metal doped oxide materials have been of particular interest. Co substituted ZnO [1] and TiO_2 [2] thin films, for example, were reported to show ferromagnetic properties at room temperature. However, various studies do not seem to converge on a definite picture [3,4,5]. The issue is rather fundamental: whether a system shows ferromagnetic properties at all, and in case it does, whether the system possesses a close coupling between magnetism and transport properties. In this talk, we shall assess the current status of transition metal doped oxide materials as room temperature ferromagnetic semiconductors.

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