Magneto-optical properties of ZnO:Co nanocrystalline films

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Abstract: Co doped ZnO films were synthesized from the precursors $Zn(CH_3COO)_2.2H_2O$ and $Co(CH_3COO)_2.4H_2O$ by using a "High Voltage Spray Pyrolysis" technique. The physical properties of the prepared films were characterized by using scanning electron microscopy (SEM), X-ray diffraction (XRD) and physical property mesurement system (PPMS) measurements. The films studied were of a wurtzite phase with grain sizes of about 20 nm. The 5 % Co-doped ZnO films exhibited ferromagnetic behavior at room temperature. The transmission and the optical magnetic circular dichroism (MCD) measurements confirmed that Co^{2+} was located at the tetrahedral sites of the ZnO wurtzite structure. MCD results showed that the observed ferromagnetism was less likely related to a carrier-induced mechanism.

Author Keywords: Diluted magnetic semiconductor; Ferromagnetism; Optical magnetic circular dichroism

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