

Effect of Doping Concentration on $\text{Zn}_{1-x}\text{Mn}_x\text{O}$ Thin Films Grown by RF Magnetron Sputtering

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We have investigated the effect of doping concentration on structural, optical and magnetic properties of Mn-doped ZnO thin films deposited on Si (100) substrate by RF magnetron sputtering. The films have been characterized by X-ray diffraction (XRD), photoluminescence (PL) and superconducting quantum interference device (SQUID) magnetometry. It is observed from XRD, that the increase of Mn content increases the FWHM which indicates the degradation of crystalline quality. The photoluminescence spectrum reveals that the incorporation of Mn ions suppresses the deep level emissions considerably in comparison to those observed in pure ZnO. The near band edge (NBE) emission of Mn-doped films is shifted to the lower energy side (red shift) in comparison to pure ZnO film. The room temperature SQUID magnetometer results reveal that all the films show paramagnetic behaviour due to the lack of interactions among Mn moments.

Key words: Sputtering; Mn-Doped ZnO Thin Films; Diluted Magnetic Semiconductor.