

Investigation of room temperature ferromagnetic behavior in Mn doped ZnO nanoparticles

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Abstract: In this research, work nanopowders of $Zn_{1-x}Mn_xO$ ($0.0 \leq x \leq 0.1$) dilute magnetic semiconductor were prepared via sol-gel autocombustion method. The crystal structure and phase purity of samples were confirmed by X-ray powder diffraction (XRD) analysis. The particle sizes were found to be 5-35 nm from Transmission Electron Microscopy (TEM) and Scherer's formula. The hysteresis in the M-H behavior shows the presence of room temperature ferromagnetism in Mn doped ZnO. XPS results show that there is Mn^{2+} ions in all Mn doped samples. Antiferromagnetic interaction between neighboring Mn-Mn ions suppressed the ferromagnetism at higher doping concentrations of Mn.

Keywords: Dilute magnetic semiconductor; zinc oxide; sol-gel method.

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