

ABSTRACT

Title of the Thesis	:	STUDIES ON SOME OXIDE NANOCRYSTALS
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Several researchers have focused their research interest on quantum dots, which are semiconductor nanocrystals that can be tuned to emit or absorb particular colours of light for use the solar energy or fluorescent biological labels.

We have prepared nanocrystalline $Zn_xCd_{1-x}O$ and $Zn_xCd_{1-x}O:Mn$ composites, for the first time, by using same simple solvothermal methods. The prepared samples were annealed to improve the ordering. Grain size and material composition were determined by x-ray powder diffraction (PXRD) and energy dispersive X-ray (EDX) measurements. AFM and TEM were also used to confirm the grain sizes obtained. Morphology was studied by using Scanning Electron morphology (SEM). The crystalline (grain) size is not found to vary in a particular order with the composition.

UV-Viz absorption and photoluminescence (PL) spectral studies were carried out on all the samples to characterize them optically. The present study shows a significant reduction in bandgap energy when compared to that observed for thin

films. Impedance and Photo acoustic (PA) measurements were carried out on few selected samples to characterize electrically and thermally. Useful results were obtained and understand the semiconducting nature of the materials prepared.

Magnetic characterization was done by carrying out electron paramagnetic resonance (EPR) and vibration sample magnetometric (VSM Measurements. The results obtained indicate that the $Zn_xCd_{1-x}O$ nanocomposites are dilute magnetic semiconductor (DMS) materials having Ferromagnetic order at room temperature.

A report of this research work is presented in detail in this thesis.