

Investigation of Structural and Spectroscopic Behaviour of Fe^{2+} Substituted ZnS Nanostructures

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Abstract: Pure ZnS and Fe^{2+} based ZnS semiconducting nanostructures have been produced by a simple chemical precipitation process using their acetate salts and sodium sulphide in the presence of N-N dimethyl Formamide as the reaction catalyst. The structure and optical behaviour of synthesized nanostructures have been investigated by means of XRD and diffused reflectance spectra. X-ray diffraction analysis confirms cubic zinc blend phase with no any secondary phase for pure and Fe^{2+} incorporated ZnS nanocrystals. The average crystallite size as computed to be around 3.8-4.7 nm range. The crystallite size shows decrement due to the substitution of Fe^{2+} impurity ions. Diffused reflectance spectra show increment in the optical band gap from 3.83- 4.0 eV as the doping concentration of Fe^{2+} increase

Keywords: ZnS:Fe, chemical precipitation, XRD, DRS, Optical band gap, refractive index