

## Effect of Manganese Doping Percentage on Optical Band Gap and Conductivity of Copper Sulphide Nano-Films Prepared by Electrodeposition Method

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**Abstract :** Mn doped copper sulphide (CuS:Mn) nano-films were deposited on indium coated tin oxide (ITO) glass substrates using electrodeposition method. Electrodeposition was carried out using bath of PH = 3 at room temperature. Other deposition parameters such as deposition time (DT) are kept constant while Mn doping was varied from 3% to 23%. Absorption spectra of CuS:Mn films was obtained by using JENWAY 6405 UV-VIS -spectrophotometer. Optical band gap ( $E_g$ ), optical conductivity ( $\sigma_o$ ) and electrical conductivity ( $\sigma_e$ ) of CuS:Mn films were determined using absorption spectra and appropriate formula. The effect of Mn doping % on these properties were investigated. Results show that film thickness (t) for the 13.27 nm to 18.49 nm; absorption coefficient ( $\alpha$ ) from  $0.90 \times 10^{11}$  to  $1.50 \times 10^{11}$  optical band gap from 2.29eV to 2.35 eV; optical conductivity from  $1.70 \times 10^{13}$  and electrical conductivity from 160 millions to 154 millions. Possible applications of such films for solar cells fabrication and optoelectronic devices applications were also discussed.

**Keywords :** copper sulphide (CuS), Manganese (Mn) doping, electrodeposition, optical band gap, optical conductivity, electrical conductivity

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