

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

Authors : P. C. Okafor, A. J. Ekpunobi

Abstract : Mn doped copper sulphide (CuS:Mn) nano-films were deposited on indiums coated tin oxide (ITO) glass substrates using electrodeposition method. Electrodeposition was carried out using bath of PH = 3 at room temperature. Other depositions 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 (σ_o) and electrical conductivity (σ_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 (α) from 0.90×10^{11} to 1.50×10^{11} optical band gap from 2.29eV to 2.35 eV; optical conductivity from 1.70×10^{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

Conference Title : ICMMSE 2015 : International Conference on Manufacturing and Materials Science and Engineering

Conference Location : Amsterdam, Netherlands

Conference Dates : May 14-15, 2015