Potentiostatic deposition of copper indium disulfide thin films: effect of cathodic potential on optical and photoelectrochemical properties

Abstract

CuInS2 thin films were one-step potentiostatically deposited onto indium tin oxide (ITO) coated glass from aqueous solution containing CuCl2, InCl3 and Na2S2O3. The effect of cathodic potentials on the structural, photoelectrochemical and optical properties of the deposited film were studied. X-ray diffraction (XRD) patterns showed that the deposited CuInS2 material was polycrystalline with tetragonal structure. Photoactivity of the samples was studied using linear sweep voltammetry. A typical increase from 1.25 to 2.30 eV in the optical band gap energy was observed on increasing the cathodic potential from -0.30 to -0.70 V (Ag/AgCl).

Keyword: CuInS2; Potentiostatic deposition; Cathodic potential; Photoactivity; Band gap