

Pulse electrodeposition and solid phase voltammetry of copper indium disulfide semiconductor thin films

Abstract

CuInS₂ thin films were deposited onto fluorine doped tin oxide coated glass (FTO) using pulse electrodeposition from aqueous solutions comprising Cu-EDTA, In₂(SO₄)₃ and Na₂S₂O₃. Deposited films were polycrystalline with tetragonal structure and behavior as a p-type semiconductor. A smooth and adherent film was obtained at pulse height of -1.00 V and the band gap energy was found to be 1.40 eV with indirect transition. The Cu:In:S compositions of the films was 1.1:1.0:1.8. From morphological studies, the particles had worm like structure which interconnected with each other. Solid phase voltammetry resulted in redox couple of Cu²⁺/Cu⁺ and Cu⁺/Cu⁰.

Keyword: Pulse electrodeposition;, Solid phase voltammetry; Copper indium disulfide