

A cyclic voltammetric synthesis of ZnS thin films using triethanolamine as a complexing agent

ABSTRACT

ZnS thin films have been synthesized by means of cyclic voltammetry technique. An aqueous solution of zinc chloride was used as Zn²⁺ source, sodium thiosulfate as S²⁻ source and triethanolamine as complexing agent for depositing ZnS thin films. The influence of complexing agent on the formation and properties of zinc sulphide thin films was investigated. Structure and surface morphology of thin films were characterized by X-ray diffraction and atomic force microscopy, respectively. The band gap energy and type of optical transition were determined from optical absorbance data. The band gap energy varies from 1.7 to 2.5 eV for the films prepared at different amounts of triethanolamine. XRD data indicate that the thin film deposited in presence of triethanolamine is polycrystalline in nature with cubic phase. Increase in amount of triethanolamine (5 ml) in electrochemical bath leads film is homogeneous, well covered to the substrate and exhibits higher absorption characteristic. We can conclude that the amount of complexing agent could affect the structure, surface morphology and optical properties of deposits. The good quality of zinc sulphide thin film could be prepared in the presence of triethanolamine.

Keyword: Cyclic voltammetry; Triethanolamine; Thin film; Zinc sulphide