

Deposition and characterization of MnS thin films by chemical bath deposition method

ABSTRACT

The chemical bath deposition technique was used to deposit MnS thin films onto indium tin oxide glass substrate. During the deposition, manganese sulphate and thiourea were supplied Mn²⁺ and S²⁻ ions, respectively. X-ray diffraction and atomic force microscopy were used to investigate the structural and morphological properties of films, respectively. The band gap energy was determined using UV-VIS spectrophotometer. The influence of bath temperature was investigated to determine the best conditions for deposition process. The deposited films showed cubic structure of MnS. The highest peak observed was (200) plane. The number of peaks referred to MnS increased as the bath temperature was increased from 35 to 65°C based on the XRD patterns. For the films deposited at lower bath temperature, the grains were small and thinner films to be formed. Conversely, for the films prepared at higher bath temperature, the grains were larger and thicker films to be formed. From the optical properties analysis, the band gap energy was to be dependent on the bath temperature.

Keyword: Chemical bath deposition; Manganese sulphide; Thin films; X-ray diffraction