

Effects of deposition time on the chemical bath-deposited CuS thin films

ABSTRACT

The chemical bath deposition technique was used to deposit thin films of copper sulphide onto indium tin oxide glass substrates. The bath composition included copper chloride which was the source of Cu^{2+} and sodium thiosulfate which supplied the S^{2-} ions. X-ray diffraction and atomic force microscopy were used to investigate structural and morphological characterization, respectively. The influence of deposition time was studied to determine the optimum condition for deposition process. The deposited CuS films showed hexagonal structure. The number of peaks attributable to CuS increased as the deposition time was increased to 16 hours based on XRD data. AFM images revealed that the chemical bath-deposited films for 16 hours showed more homogeneous and uniform compared with other deposition times, and the highest absorbance value was obtained for the films deposited at this period. The band gap energy decreased from 2.9 to 2.45 eV when the deposition time was increased from 8 to 20 hours.

Keyword: Chemical bath deposition; Copper sulphide; Thin films; Solar cells