

## Effects of deposition period on the chemical bath deposited Cu<sub>4</sub>SnS<sub>4</sub> thin films

### ABSTRACT

Cu<sub>4</sub>SnS<sub>4</sub> thin films were prepared by simple chemical bath deposition technique. The influence of deposition period on the structural, morphological and optical properties of films was studied. The films were characterized using X-ray diffraction, atomic force microscopy and UV-Vis Spectrophotometer. X-ray diffraction patterns indicated that the films were polycrystalline with prominent peak attributed to (221) plane of orthorhombic crystal structure. The films prepared at 80 min showed significant increased in the intensity of all diffractions. According to AFM images, these films indicated that the surface of substrate was covered completely. The obtained films also produced higher absorption characteristics when compared to the films prepared at other deposition periods based on optical absorption studies. The band gap values of films deposited at different deposition periods were in the range of 1.6-2.1 eV. Deposition for 80 min was found to be the optimum condition to produce good quality thin films under the current conditions.

**Keyword:** Thin film; Chemical bath deposition; Band gap energy