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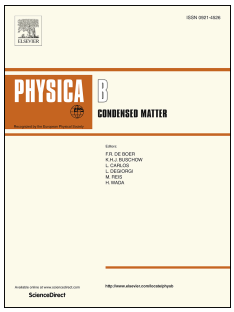

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Deposition and characterization of spray pyrolysed p-type Cu_2SnS_3 thin film for potential absorber layer of solar cell

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ABSTRACT

Thin film of ternary Cu_2SnS_3 (CTS), a potential absorber layer for solar cells was successfully deposited by chemical spray pyrolysis technique. The GIXRD pattern revealed that the film having tetragonal Cu_2SnS_3 phase with the preferential orientation along (112), (200), (220) and (312) plane and it is further confirmed using Raman spectroscopy by the existence of Raman peak at 320 cm^{-1}. Atomic Force Microscopy (AFM) was used to estimate the surface roughness of 28.8 nm. The absorption coefficient was found to be greater than the order of 10^5 cm^{-1} and bandgap of 1.70 eV. Hall effect measurement indicates the p type nature of the film with a hole concentration of $1.03X10^{16}cm^{-3}$ and a hall mobility of 404 cm^2/V. The properties of CTS thin film confirmed suitable to be a potential absorber layer material for photovoltaic applications.

Keywords: Cu_2SnS_3 (CTS**)**, thin film, Spray pyrolysis, Structural properties, Optical properties, Electrical properties.

1. Introduction