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International Journal of Thin Film Science and Technology

Volume 9, Issue 1, January 2020, Pages 1-5

Characterization of spray pyrolysed nano tin disulphide thin film(Article)

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Abstract

Tin disulphide (SnS₂) thin film has been prepared on glass substrate by chemical spray pyrolysis technique using the precursor solutions of tin (IV) chloride and thiourea, which were atomized with compressed air as carrier gas. Thin layer of SnS₂ film has been grown at lower thermal energy of 473 K. The Structural properties have been analyzed by X-ray diffraction (XRD) and surface morphology by SEM micrograph. The optical properties of the thin film deposited were obtained using experimentally recorded transmission spectral data as functions of the wavelength, in the range of 400–800 nm. Analysis of the spectral absorption of the deposited film revealed optical direct forbidden band gap (2.2 eV) and indirect band gap energy (2.35 eV) respectively for SnS₂ layer. The DC room temperature electrical resistivity of this film is calculated using four probe technique as $4.2 \times 10^4 \Omega \text{ cm}$ in dark and $1.65 \times 10^3 \Omega \text{ cm}$ in light respectively. Activation energy of this thin film was plotted by Arrhenius plot. © 2020 NSP Natural Sciences Publishing Cor.

Author keywords

Band Gap

Diffraction

Optical

Thin Film

Transmittance

ISSN: 20909519

Source Type: Journal

Original language: English

DOI: 10.18576/ijfst/090101

Document Type: Article

Publisher: Natural Sciences Publishing

Cited by 1 document

Soonmin, H.

Deposition of metal sulphide thin films by chemical bath deposition technique: Review

(2021) International Journal of Thin Film Science and Technology[View details of this citation](#)

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