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Structural, Optical and Electrical Properties of Nebulizer Spray-Deposited Tin Disulphide Thin Films with Different Substrate Temperatures(Article)

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Abstract

The Nebulizer spray pyrolysis technique is used to make tin disulphide thin films at various substrate temperatures. SnS_2 thin films structural, electrical and optical properties are investigated. The polycrystalline nature was confirmed by X-ray diffraction (XRD) analysis, which revealed a hexagonal structure with a preferred orientation along the (0 0 2) plane. The full width half maximum value of the Bragg peak is used to calculate the size of SnS_2 crystallization. Scanning Electron Microscope (SEM) is used to examine the composition and surface morphology of SnS_2 thin films. The wavelength range of 400-1110 nm is used to determine the transmittance and absorption spectra of these films. With increasing substrate temperature, the optical band gap of tin disulphide thin films decreases from 3.17 eV to 2.61 eV. With regard to substrate temperature, the absorption coefficient and activation energy were reduced with SnS_2 deposition. © 2022. MechAero Foundation for Technical Research & Education Excellence.

Author keywords

Band gap | Bragg peak | Scanning electron microscope | X-ray diffraction

Indexed keywords

Engineering controlled terms: Activation energy | IV-VI semiconductors | Morphology | Optical properties | Scanning electron microscopy | Spray pyrolysis | Sulfur compounds | Surface morphology | Thin films | Tin compounds | X ray diffraction analysis

Engineering uncontrolled terms: Bragg peaks | Different substrates | Nebulisers | Optical and electrical properties | Scanning electron microscope | Scanning electrons | Spray-deposited | Substrates temperature | Thin-films | X- ray diffractions

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