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## Effect of Substrate Temperature on Structural, Electrical and Optical Properties of Sprayed Tin Selenide Thin Films Applicable for Photovoltaic Measurements(Article)

Mangaiyar Karasi, A.E., Sambasivam, R., Seshadri, S., Amalraj

<sup>a</sup>PG and Research Department of Physics, Urumu Dhanalakshmi College, Trichy Affiliated to Bharathidasan University, India<sup>b</sup>Department of Physics, Shrimati Indira Gandhi College, Trichy (Affiliated to Bharathidasan University), India<sup>c</sup>Research Department of Physics, VHNSN College, Virudhunagar, India

### Abstract

Thin films of Tin selenide (SnSe) have been prepared on glass substrates at different temperatures in the range of 250 C to 375 C in steps of 25 C for optimization were discussed. The deposited tin selenide thin films were characterized using X-ray diffraction analysis (XRD), Elemental dispersive X-ray analysis (EDAX), Scanning electron microscopy (SEM), Optical absorption, Photoluminescence (PL), Raman spectroscopy and electrical measurements. From XRD analysis a single-phase tin selenide thin film having orthorhombic crystalline structure with crystallite size of 17 nm to 62 nm were investigated. The surface morphology revealed the presence of uniformly distributed spherical grains of SnSe thin films without pores and voids. Optical absorption spectrum revealed a direct band gap of 1.15 eV and having very high absorption coefficient (104/cm) was calculated. The Raman scattering analysis confirmed the presence of B3g and Ag vibrational modes of SnSe thin films. PL studies revealed a strong luminescence peak near-band-edge (NBE) emission at 785 nm due to recombination of bound excitons. Photoconductivity characteristics of SnSe thin films were due to the existence of continuous distribution of localized states in the band gap data. Thus tin selenide thin films were used as an absorber layer in the photovoltaic application. © 2022 Electrochemical Society Inc.. All rights reserved.

### Author keywords

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### Indexed keywords

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