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Journal of Sol-Gel Science and Technology

Volume 89, Issue 2, 15 February 2019, Pages 392-402

## Effect of molar concentration on physical properties of spraydeposited SnO <sub>2</sub> thin films using nebulizer(Article)

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### Abstract

In the present paper, tin dioxide (SnO <sub>2</sub>) thin films had been fabricated with different precursor concentration in the range of 0.01–0.09 M onto amorphous glass substrates utilizing nebulizer spray method. The effect of precursor concentration on electrical, morphological, structural, optical, and photoluminescence properties has been investigated. XRD spectrum revealed that the polycrystalline nature of SnO <sub>2</sub> thin films with tetragonal structure in the range of precursor concentration 0.03–0.09 M, which are having a favorable growth orientation along (110) direction. The estimated average crystallite size varied between 22 and 53 nm. UV-Visible spectrum exposes the transmittance of SnO <sub>2</sub> thin films lies between 90 and 78% in the visible range. The direct band gap energy reduced from 3.83 to 3.71 eV on increasing precursor concentration upto 0.07 M and then it was further increased. Photoluminescence spectra at room temperature exhibited a strong peak at 362 nm with shoulder peak at 376 nm and two broad peaks are 493 nm and 518 nm. SEM analysis illustrated that the polyhedron-like grains were homogeneously arranged over the film surface. The film prepared at 0.07 M precursor concentration shows the least resistivity  $2.41 \times 10^{-3} \Omega\text{-cm}$  and good figure of merit  $16.41 \times 10^{-3} (\Omega/\text{sq})^{-1}$ . [Figure not available: see fulltext.] © 2018, Springer Science+Business Media, LLC, part of Springer Nature.

### Author keywords

Electrical measurements NSP Optical Tin dioxide

### Indexed keywords

Engineering controlled terms:

Amorphous films Crystallite size Energy gap Photoluminescence Substrates Tin dioxide

Engineering uncontrolled terms

Different precursors Electrical measurement Molar concentration Optical  
Photoluminescence properties Photoluminescence spectrum Precursor concentration  
Tetragonal structure

Engineering main heading:

Thin films

### Funding details

Funding text

We are thankful to Dr. R. Ramesh Babu, Assistant Professor, Department of Physics, Bharathidasan University, Tiruchirappalli, India for analyzing the electrical characterization using Hall measurement instrument.

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CODEN: JSGTE  
Source Type: Journal  
Original language: English

DOI: 10.1007/s10971-018-4894-5  
Document Type: Article  
Publisher: Springer New York LLC

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