

## Optical Characterization and Surface Morphology of SnO<sub>2</sub> Thin Films Prepared by Spin Coating Technique

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**Abstract :** In this work, tin oxide thin films (SnO<sub>2</sub>) were prepared using the spin coating technique. The effects of precursor concentration on the thin film properties were investigated. Tin oxide was synthesized from anhydrous Tin (II) Chloride (SnCl<sub>2</sub>) dispersed in Methanol and Acetic acid. The metallic oxide (SnO<sub>2</sub>) films deposited were characterized using the UV Spectrophotometer and the Scanning Electron Microscope (SEM). From the absorption spectra, absorption increases with decrease in precursor concentration. Absorbance in the VIS region is lower than 0 % at higher concentration. The optical transmission spectrum shows that transmission increases as the concentration of precursor decreases and the maximum transmission in visible region is about 90% for films prepared with 0.2 M. Also, there is increase in the reflectance of thin films as concentration of precursor increases. The films have high transparency (more than 85%) and low reflectance (less than 40%) in the VIS region. Investigation showed that the direct band gap value increased from 3.79eV, to 3.82eV as the precursor concentration decreased from 0.6 M to 0.2 M. Average direct bandgap energy for all the tin oxide films was estimated to be 3.80eV. The effect of precursor concentration was directly observed in crystal outgrowth and surface particle densification. They were found to increase proportionately with higher concentration.

**Keywords :** anhydrous TIN (II) chloride, densification, NIS- VIS region, spin coating technique

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