FORMATION OF TIN DIOXIDE THIN FILMS USING CHEMICAL SPRAY TECHNIQUES: SUBSTRATE TEMPERATURE FOR ENHANCING THE ELECTRICAL AND OPTICAL PROPERTIES

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Tin dioxide thin films were deposited on sodocalcic glass substrates by spray pyrolysis technique using tin tetrachloride dissolved in ethanol and distilled water as precursor. The mass transportation reduction of the thin film from the precursor to the substrate as the substrate temperature increases produced different film thicknesses.

The deposition was done for four (4) samples labelled A, B, C, and D with every parameter kept constant except the substrate temperatures that varied, ranging from 325 °C – 400 °C at interval of 25°C. The effects of substrate temperature on the electrical and optical properties of tin dioxide [SnO\textsubscript{2}] films were investigated in the visible range. The average transmittance increased with increase in substrate temperature from 44.6% in sample A to 76.9% in sample D.

The electrical conductivity of this material shows a drastic increase between 31.76 S/m (sample B, 350 °C) and 386.72 S/m (sample C, 375 °C) with increase in substrate temperature.

Optical band gap for direct band gap increased with increase in substrate temperature. The refractive index also varied with increase in substrate temperature. The obtained results revealed that the optical and electrical properties of the films were greatly affected by substrate temperature.

**Keywords**: Tin oxide, Thin Films, Chemical spray

**References**:


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