

# Synthesis and Characterization of Tin oxide Thin Film for Gas Sensor Applications

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The effects of annealing temperature on the structural and electrical properties of tin dioxide ( $SnO_2$ ) thin films were systematically studied for a gas sensing application. Tin dioxide thin films with different number of layers and annealing temperature were prepared on indium tin oxide substrates by sol-gel dip-coating technique. SEM micrographs show that the approximately grain size of the  $SnO_2$  thin films increased with increasing number of layers and annealing temperature. X-ray diffraction analysis showed that the  $SnO_2$  thin film was tetragonal at 400 °C. The calculating crystallite size from Scherrer's formula was about 40-60 nm. Dielectric property of desired  $SnO_2$  thin films was investigated by LCR meter. It was found that the dielectric constant decrease when the frequency of applied signal and annealing temperature increases. Those properties of  $SnO_2$  films were promising for electronics devices like gas sensor.

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