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Deposition and characterization of SnO_2:Sb thin films fabricated by the spray pyrolysis method

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Abstract: In this study, thin films of transparent semiconductor tin oxide doped with antimony impurities on the glass substrates with different concentrations of antimony that have been prepared using spray pyrolysis method. The effects of different concentration of antimony on the structural, optical, and electrical properties of the thin films were investigated. Prepared layers were characterized by X-ray diffraction (XRD), field emission scanning electron microscopy (FESEM) and optical absorption (UV-vis). XRD analysis showed that samples have polycrystalline with orientations (110), (101), (200), (211) and (301) that was related to tin oxide phase. With increasing concentrations of antimony overall average size of nano-crystalline grains increased and the average grain size increased-decreased. Optical studies of samples showed that, increasing of antimony concentration caused reduction of transmission in the range of visible light from 72% to 15% and the optical band gap from 3.72 to 2.98 eV. Increasing of antimony concentration led to increasing-decreasing behavior of electrical resistance. Thermoelectric studies of samples revealed n-type conductivity in them.

Keywords: *thin film; tin oxide; antimony impurity.*

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