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ITO thin films were prepared by electron beam evaporation of ceramic ITO target. The films were subsequently annealed in an air atmosphere at the temperatures 300 degrees C and 600 degrees C in order to improve their optical and electrical properties. The crystal structure and morphology of the films are investigated by X-ray diffraction and scanning electron microscope techniques, respectively. The films exhibited a cubic structure with the predominant orientation of growth along (222) direction and the crystallite size increases by rising annealing temperature. Transparency of the films, over the visible light region, is increased by annealing temperature. The resulting increase in the carrier concentration and in the carrier mobility decreases the resistivity of the films due to annealing. The absorption coefficient of the films is calculated and analyzed. The direct allowed optical band gap for as-deposited films is determined as 3.81 eV; this value is increased to 3.88 and 4.0 eV as a result of annealing at 300 degrees C and 600 degrees C, respectively. The electrical sheet resistance is significantly decreased increasing annealing temperature, whereas the figure of merit is increased.

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