

Electrical, Optical, and Structural Characteristics of indium oxide films on Polymer Substrates by Reactive Ion-Assisted Deposition

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Indium oxide film (In_2O_3) and tin-doped indium oxide film (ITO) are a degenerate n-type semiconductor material that have wide applications in optics and optoelectronics. Most of the research of In_2O_3 films is concentrated on the simultaneous improvement of the conductivity and transparency of films on deposited on glass substrate by various deposition techniques. However, very little work is reported on Indium oxide films deposited on polymer substrates since these substrates have low thermal stability.

Ion-assisted deposition could modify a number of film properties including stoichiometry, surface morphology, film adhesion, and etc. In particular, additional energy of bombarding ions during deposition lower the substrate temperature for thin film formation. In this work, Indium oxide films were deposited on polycarbonate (PC) substrates at room temperature and 100 °C by reactive ion-assisted deposition. Optical transmittance, microstructure, and electrical conductivity of indium oxide films were examined by spectrophotometric transmittance, SEM, XRD, four point probe and Hall effect measurement.