Study of electron-beam evaporated Sn-doped In_2O_3 films

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Abstract

Electron beam evaporated Sn-doped In_2O_3 films have been prepared from the starting material with composition of $(1-x)$ $In_2O_3 - x$ SnO_2, where $x = 0.0$, 0.010, 0.025, 0.050, 0.090, and 0.120. X-ray photoelectron spectroscopy, Rutherford backscattering spectrometry, and X-ray diffraction analysis were carried out on the films. Luminous transmittance and electrical resistivity of the films, show weak dependence on x. The composition of the film ([Sn]/[In] atomic ratio) was found to differ from that of the starting material. In fact, the atomic ratio was higher in the film than in the starting material by a factor which increases with x (ranging from 1.0 to 2.6). There is a relatively broad resistivity minimum in the layer atomic ratio range Sn/In = 0.06 – -0.09. These results compare well with those reported in the literature for Sn-doped In_2O_3 films, prepared by pyrolitic (spray) method.

Keywords: Electron beam evaporation; Sn-doped In_2O_3 films; Atomic ratio; Resistivity minimum