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Abstract
In order to obtain the high quality indium tin oxide (ITO) films, the ITO films have been deposited on plastic substrate by using DC 80W magnetron sputtering without heating substrate, and annealed at 150℃ various ambiences which include hydrogen and nitrogen were investigated. The surface morphology, crystallite size, orientation and optical transparency in visible region of the ITO film have been studied. The grain size is increased with annealing time. The grain size in ITO film is increase at nitrogen than that at hydrogen. The sheet resistance of ITO films annealed at 150℃ nitrogen ambient for 8hr is reduced from 87Ω/sq to 65Ω/sq. It is observed that after the nitrogen ambient annealing for 8hr, the average transmittance is up to 88%.

In order to understand the etching behavior of ITO films, HCl and aqua regia were investigated. The higher etching rate in aqua regia was obtained than that in HCl. However, the more surface residual byproduct in aqua regia etchant was found than that in HCl via XPS analysis. The surface concentration (ratio chlorine to indium) is 7.2322 and 0.38533 in aqua regia and HCl, respectively. The phenomena are also observed that the surface residual byproduct reduces the carrier mobility due to the impurity scattering.

In order to obtain the performance of flexible organic light-emitting diode (FOLED), the effect of the thickness of FOLED was investigated. The larger luminance and luminance efficiency is 1160 cd/㎡ and 2.71 lm/W respectively can be obtained at NPB thickness is 45nm with the Alq3 thickness is 35nm. It rises dramatically when the Alq3 thickness is 45nm at bias voltage of 19V. The highest luminance arrives at 2190 cd/㎡. The Sharp characteristic of FOLED may be useful to an organic electrically pumped laser.
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