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Abstract
The fabrication of ITO transparent conductive film has been a mature technology and been practically employed for flat panel display industry. However, several ITO film properties need to be improved for flexible OLED applications, such as the ITO surface work function and roughness. This project tends to modulate the ITO surface work function by the introduction of high work function metal stripes or dots laterally located in the ITO film. High optical transmittance and low resistivity ITO films will be deposited on plastic substrates at low temperature, followed by the formation of strip- and dot-shape trenches using the photolithography process. Ni or Pt metal will then be deposited into the trenches and the metal on top of the ITO layer can be removed using CMP approach, by which the ITO surface roughness can be also investigated. From this result, the existence of Ni atoms and NiOx in the ITO matrix is proved to have the significant effect to the OLED device on the turn-on voltage performance. The reduction of the turn-on voltage by the Ni-embedding in ITO is attributed from the increase of the anode’s work function, which reduces the energy barrier of hole injections into the organic layer.
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