ITO/ZnO/Ag/ZnO/ITO Multilayers Films for the Application of a Very Low Resistance Transparent Electrode on Polymer Substrate

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Abstract : Multilayer transparent electrodes, having a much lower electrical resistance than the widely used transparent conducting oxide electrodes, were prepared by using radio frequency magnetron sputtering. The multilayer structure consisted of five layers, indium tin oxided(ITO)/zinc oxide(ZnO)/Ag/ oxide(ZnO)/ITO. With about 50nm thick ITO films, the multilayer showed a high optical transmittance in the visible range of the spectrum and had color neutrality. The electrical and optical properties of ITO/ZnO/Ag/ZnO/ITO multilayer were changed mainly by Ag film properties, which were affected by the deposition process of the upper layer. Especially ZnO layer was improved to adhesion of Ag and ITO. A high quality transparent electrode, having a resistance as low as and a high optical transmittance of 91% at 550nm, was obtained. It could satisfy the requirement for the flexible OLED and LCD

Key Words : Indium tin oxide, Zinc oxide, Ag, Transmittance, Multilayer