

## Comparison of characteristics of IZO-Ag-IZO and IZO-Au-IZO multilayer electrodes for organic photovoltaics

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We compared the electrical, optical, structural, and interface properties of indium zinc oxide (IZO)-Ag-IZO and IZO-Au-IZO multilayer electrodes deposited by linear facing target sputtering system at room temperature for organic photovoltaics. The IZO-Ag-IZO and IZO-Au-IZO multilayer electrodes show a significant reduction in their sheet resistance (4.15 and 5.49 Ohm/square) and resistivity ( $3.9 \times 10^{-5}$  and  $5.5 \times 10^{-5}$  Ohm-cm) with increasing thickness of the Ag and Au layers, respectively. In spite of its similar electrical properties, the optical transmittance of the IZO-Ag-IZO electrode is much higher than that of the IZO-Au-IZO electrode, due to the more effective antireflection effect of Ag than Au in the visible region. In addition, the Auger electron spectroscopy depth profile results for the IZO/Ag/IZO and IZO/Au/IZO multilayer electrodes showed no interfacial reaction between the IZO layer and Ag or Au layer, due to the low preparation temperature. To investigate in detail the Ag and Au structures on the bottom IZO electrode with increasing thickness, a synchrotron x-ray scattering examination was employed. Moreover, the OSC fabricated on the IZO-Ag-IZO electrode shows a higher power conversion efficiency (3.05%) than the OSC prepared on the IZO-Au-IZO electrode (2.66%), due to its high optical transmittance in the wavelength range of 400-600 nm, which is the absorption wavelength of the P3HT:PCBM active layer.