

Characteristics and Fabrication of ZTO/Ag/ ZTO Multilayer Transparent Conducting Electrode

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We study on the optical and electrical properties of indium-free ZTO(ZnSnO)/Ag/ZTO (ZAZ) multilayer electrodes for the low-cost transparent electrode. In the first step, each single layer was deposited using rf magnetron in-line sputter with various working pressure based on O₂/Ar+O₂ ratio (0~3%) and power at room temperature. Secondly, we studied the optical and electrical properties by analyzing the refractive index, extinction coefficient, transmittance and resistivity of each layer. Finally, we optimized the thickness of each layer using macleod simulation program based on the analyzed optical properties and fabricated the multilayer electrode. As a result, We achieved a low sheet resistance of 11 Ω/sq and anaverage transmittance of 80% in the visible region of light (380 ~780 nm). This indicates that indium-free ZAZ multilayer electrode is a promising low-cost and low-temperature processing electrode scheme.

Keywords: Transparent electrode, Transmittance, Sheet resistance, Refractive index, Extinction coefficient