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Transparent ITO/Ag/i-ZnO Multilayer Thin Film enhances Lowing Sheet Resistance

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The past thirty years have seen increasingly rapid advances in the field of Indium Tin Oxide (ITO) transparent thin film.[1] However, a major problem with this ITO thin film application is high cost compared with other transparent thin film materials.[2] So far, in order to overcome this disadvantage, we show a transparent ITO/Ag/i-ZnO multilayer thin film electrode can be the solution. In comparison with using amount of ITO as a transparent conducting material, intrinsic-Zinc-Oxide (i-ZnO) based on ITO/Ag/i-ZnO multilayer thin film showed cost-effective and it has not only highly transparent but also conductive properties.

The aim of this research has therefore been to try and establish how ITO/Ag/i-ZnO multilayer thin film would be more effective than ITO thin film. Herein, we report ITO/Ag/i-ZnO multilayer thin film properties by using optical spectroscopic method and measuring sheet resistance. At a certain total thickness of thin film, sheet resistance of ITO/Ag/i-ZnO multilayer was drastically decreased than ITO layer approximately 40Ω/□ at same visible light transmittance.(minimal point 5.2 Ω/□). Tendency, which shows lowly sheet resistive in a certain transmittance, has been observed, hence, it should be suitable for transparent electrode device.

Keywords: Indium Tin Oxide (ITO)/silver (Ag)/intrinsic-Zinc Oxide (i-ZnO)