Application of Indium-Tin-Oxide on - Solar Cells

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ABSTRACT

The goal of this thesis is to study the potential of indium-tin oxide (ITO) and SiO2/ITO used as anti-reflective coatings (ARCs) on GaAs-based solar cells. First, ITO and SiO2 films were coated on glass substrates to measure the refractive index (n) and absorption index (k) for optical simulation. The simulation was conducted by a commercial software named Film-star. For analysis, ITO and SiO2/ITO ARCs were deposited on solar cells and glass substrates, simultaneously. Then, reflectivity and/or transmittance were measured. The cells before and after ARCs were characterized using a solar simulator with AM1.5 illumination. The open voltage, fill factor, and efficiency of the cells without ARCs were 0.955V, 0.969, and 15.7%, respectively. The efficiencies of the cells with ITO and SiO2/ITO ARCs were 18.6% and 19.6%, respectively. 25% of enhancement was obtained in this study. The other parameters, open voltage and fill factor, were not degraded by ARC process.

Keywords: Solar Cell、Indium-Tin-Oxide、Anti-reflection Coating、Silicon dioxide

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