

Rapid thermal anneal process for indium-tin-oxide electrode formed on chemically strengthened glass

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Abstract

Recently, projected-capacitive-type touch screen panel (TSP) has been an emerging big industry, and the main technology has been changing from GFF (window glass/film electrode/film electrode) to G2 (window glass/electrode thin film/electrode thin film) due to increased transmittance, thinner structure, and reduced material cost. Therefore many companies are interested in the fabrication of indium-tin-oxide (ITO) thin films directly deposited on chemically strengthened glass (CSG). However, ITO thin films formed on the CSG substrate show increased sheet resistances after high-temperature anneal process (>200 °C) because of the out-diffusion of potassium ions (K⁺) from the CSG. To make matters worse, this high temperature-long time annealing can have a serious impact on the strength of CSG, caused by K⁺ out-diffusion. In order to suppress the out-diffusion from K⁺ of CSG to ITO film, we tried to use one minute – rapid thermal anneal (RTA) (>400 °C). After RTA, the sheet resistance of 25-nm thick ITO thin film decreased from 160 Ω /sq to 100 Ω /sq. Fortunately, strength, center stress and strengthened depth of CSG did not change after RTA. As a result, RTA was effective for improving the electrical and optical properties of the ITO thin film deposited on the CSG, preventing effectively the out-diffusion of K⁺ from CSG.