

IN-SITU GRAIN GROWTH STUDY OF NANO-ITO

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Indium-tin oxide (ITO) materials are widely employed in transparent conducting oxide applications, such as in flat-panel displays, due to their high transparency and high electrical conductivity. Understanding ITO's grain growth behavior is important due to the structure-property relationship of grain size and electrical properties, such as conductivity. Particle size can affect the packing density of powders and the solubility limit of tin into the indium oxide crystal structure. The change in crystallite size of nano-ITO was investigated in-situ as a function of annealing temperature and atmosphere. X-ray powder diffraction measurements were taken on nano-sized, over-doped ITO under ambient atmospheric composition and under a reducing gas environment. The reducing gas significantly affects the grain growth behavior at lower temperatures and can lead to metallization of the oxide material.