

Annealing effects on the characteristics of Sputtered ZnO films for ZnO-based thin-film transistors

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Zinc Oxide (ZnO) thin-films were deposited according to the magnetron sputtering method. The deposited ZnO films were annealed with RTA equipment at various annealing temperatures in a vacuum ambient. The influence of the annealing temperature on the structural, electrical, and optical properties of the ZnO films was experimentally investigated, and the effect of conductivity of the ZnO active layer on the device performance of the oxide-TFT was tested. As a result, an increase of the annealing temperature was attributed to improvements of crystallinity in ZnO films. The grain size was found to lead to an increase of conductivity in the ZnO films. Fabricated ZnO TFTs with annealed ZnO active layer provided good performance in the TFT devices. Consequently, the performance of the TFT was determined by the conductivity of the ZnO film, which was related to the structural properties of the ZnO film.