Short Communication

Effects of Doped Stannum in the Fabrication of Zinc-Oxide Thin-Film Transistors

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A sol-gel method was applied with acetates as precursors under standard atmospheric conditions to fabricate ZnO semiconducting thin-films. We evaluated the performances of thin-film transistor (TFT) which has a ZnO active channel layer and the effects of stannum (Sn) doping on the threshold voltage of ZnO TFTs at a low temperature (300 °C), which was compared with the performances of the undoped ZnO and stannum-doped zinc oxide (ZTO) TFT. The electrical characteristics of thin-films and TFTs doped with stannum concentrations of 0.3 mole ratio were examined; and reductions at the threshold voltage of 5.6 V were found. At 300 °C, it was observed that the stannum-doped zinc oxide (ZTO) device has a mobility of 4.2×10^{-4} cm²/V-s, a threshold voltage of 5.3 V, and an on/off current ratio of 10⁴.

Keywords: Thin-film transistor, threshold voltage, zinc tin oxide, ZnO, ZTO

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