TFT 소자에 응용하기 위한 ALD에 의해 성장된 ZnO channeal layer의 두께에 대한 영향

안철현, 우창호, 황수연*, 이정용*, 조형균
성균관대학교, *한국과학기술연구원

Abstract : .We utilized atomic layer deposition (ALD) for the growth of the ZnO channel layers in the oxide thin-film-transistors (TFTs) with a bottom-gate structure using a SiO_2/p-Si substrate. For fundamental study, the effect of the channel thickness and thermal treatment on the TFT performance was investigated. The growth modes for the ALD grown ZnO layer changed from island growth to layer-by-layer growth at thicknesses of > 7.5 nm with highly resistive properties. A channel thickness of 17 nm resulted in the good TFT behavior with an on/off current ratio of > 10^6 and a field effect mobility of 2.9 without the need for thermal annealing. However, further increases in the channel thickness resulted in a deterioration of theTFT performance or no saturation. The ALD grown ZnO layers showed reduced electrical resistivity and carrier density after thermal treatment in oxygen.

Key Words : ZnO TFT, ALD, Annealing