

Thickness of Zinc Oxide channel layer on Thin Film Transistor

K. H. Park¹, Yonghan Roh¹

¹School of Information and Communication engineering, Sungkyunkwan University

Recently, Zinc oxide(ZnO) has been investigated many research group because ZnO has many interesting characteristics. It has been suggested that intrinsic ZnO could be used as the active channel layer in the thin film transistors, which utilize a transparent oxide semiconductor. ZnO is a II-VI compound semiconductor with a wide band gap of 3.37eV. Also, It is large exciton binding energy (60 meV) and typically exhibits n-type conductivity. Applications of ZnO have liquid crystal displays and organic light-emitting diode display. ZnO films were deposited methods of deposition techniques as sputtering, Chemical vapor deposition (CVD), molecular beam epitaxy (MBE), pulsed laser deposition (PLD), sol-gel, and more.

In this work, we investigated the electrical properties of ZnO Thin film Transistor. ZnO film was synthesized by radio frequency(RF) magnetron sputtering using pure target. The pressure of the chamber before deposition was 1.3mTorr and 30sccm of Ar gas . RF power was varied 50W, 65W, 80W and 100W. The study showed that the properties of channel layer in accordance with changing of RF power can be explained using I_D-V_D , I_D-V_G graphs. ZnO-based TFTs will be applicable to transparent flexible electronic devices like wearable computers and bend paper display.