

Fabrication and characterization of the ZnO based thin film transistors

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ZnO has much interest as a potential material for application in TFT due to many advantages, such as, high transmittance in the visible region, wide band gap, high thermal stability, robustness to light radiation and easy processing.

We report on the fabrication and characterization of ZnO based thin film transistor. ZnO was deposited as a channel layer at 300°C by radio frequency magnetron sputtering in Ar/O₂ mixture. SiN_x and indium tin oxide (ITO) were deposited on glass substrate as a gate insulator and gate electrode, respectively. We deposited ZnO thin films at different rf power as a channel layer. The SEM image and XRD analysis showed that a ZnO thin film deposited at rf power of 80w has a good crystal quality. This film showed the best saturation current and the field effect mobility. The ZnO TFT showed a mobility of 19cm²/Vs, on/off ratio of 10⁴, threshold voltage of 15V and subthreshold voltage of 5.01V/decade.