This paper shows the investigation of electrical performance of ZnO-based thin-film transistors (TFTs) with a multichannel layer. The multichannel TFTs consisting of HfO2 and ZnO layers were deployed to insight of sufficient channel mobility and electrical stability. The obtained sub-threshold slope (1.69 ± 0.16 Volt/decade) decreased in comparison to single channel, with an increase in ON/OFF ratio ION/IOFF (3.1 ± 1.6 × 105). The device mobility is found increased due to addition the channel layer. The mobility achieved is 2.36 × 10-3 cm2/V-s. Due to the reduced interface trap density between the channel and dielectric layers, increases in the offset and the bandgap and improves the dielectric and interface quality. The oxide TFTs with a multilayer channel displayed comparatively good stability and mobility.

References

Investigation of Electrical Performance of HfO2-ZnO Bilayer Channels of Thin-Film Transistors using TCAD


Index Terms
Keywords

Hafnium-oxide (HfO2), multilayer channel, thin-film transistor (TFT), ZnO, TCAD.