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Effect of dielectric thickness on MgZnO Thin Fil characteristics

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Abstract

From past ten years, low-k dielectric was used as dielectric material in Thin Film Transistors T

Reduction of dimension of device can be done with the reduction the thickness of dielectric m thickness of dielectric material capacitances increases therefore drain current increases. But fu leads to leakage current which effect other parameter like threshold voltage. To enhance perfc thickness of dielectric material use high-k dielectric material so overall capacitances increases the parameters of the Mg_xZn1-_x thin film transistors are compared. Composition of Mg in ZnC Due to composition of Mg into ZnO that affects the electrical parameter of a transistor. Mg_xZn transistor's electrical performance with high-k ($Al_2O_3(K \sim 9)$) dielectric materials thickness is dielectric is taken as 150nm, 100nm, 50nm, 20nm. Electrical characteristics are good for 20nr Optimized electrical parameter of transistor like threshold voltage, mobility, and on/off ratio a after simulation on TCAD. Results shows that this type of results for Thin film Transistors are u

Introduction

In today scenario Thin Film transistors based on ZnO have a great potential in large area and lc display because of high mobility, good on/off ratio and most important high optical transparer II-IV group with a direct band gap of 3.34eV. Bandgap greater than 3.1eV provides visible tran active channel layer using ZnO are being explored. But the active layer and insulator layer botl [1], [2], [3], [4], [5]. A lot of investigation has been already done on active layer of TFT. Study of performance are very few. ZnO-TFT with SiO_2 dielectric layer suffer from high operating voltag because of gate insulator with low-k dielectric constant. Low-k dielectric in TFT increases oper High capacitance can be obtained by the increasing the relatively high-k dielectric material or

Wang et al. [7] fabricated a low voltage $Mg_xZn_{1-x}O$ TFT with Al_2O_3 insulator grown by pulse las the crystal quality of the active layer is observed. Jyun -Yi Li et al. [8] reported an $Mg_xZn_{1-x}O$ TI photo-electrical properties. The main objective is to study the optimum dimension for TFT ele optimum thickness is necessary because by reducing thickness of dielectric material it suffers dielectric with optimum thickness gives overall improvement in TFT characteristics. In this wc 100nm, 50nm to 20nm with 30nm MgZnO active channel layer thickness is done. The electric

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