

고유전 $(\text{Bi}_{1.5}\text{Zn}_{1.0}\text{Nb}_{1.5}\text{O}_7)_{0.7}(\text{MgO})_{0.3}$ 게이트 절연막을 이용한 저전압
구동 상온공정 ZnO 박막트랜지스터

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Low-Voltage, Room Temperature Fabricated ZnO Thin Film Transistor using High-K
 $(\text{Bi}_{1.5}\text{Zn}_{1.0}\text{Nb}_{1.5}\text{O}_7)_{0.7}(\text{MgO})_{0.3}$ Gate Insulator

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Abstract : Low voltage organic TFTs (OTFTs) and ZnO based TFTs (<5V), utilizing room temperature deposited $\text{Bi}_{1.5}\text{Zn}_{1.0}\text{Nb}_{1.5}\text{O}_7$ (BZN) thin films were recently reported, pointing to high-k gate insulators as a promising route for realizing low voltage operating flexible electronics. $\text{Bi}_{1.5}\text{Zn}_{1.0}\text{Nb}_{1.5}\text{O}_7$ (BZN) thin film is one of the most promising materials for gate insulator because of its large dielectric constant (~60) at room temperature. However their tendency to suffer from relatively high leakage current at low electric field (>0.3MV/cm) hinder the application of BZN thin films for gate insulator. In order to improve leakage current characteristics of BZN thin film, we mixed 30mol% MgO with 70mol% BZN and their dielectric and electric properties were characterized. We fabricated field-effect transistors with transparent oxide semiconductor ZnO serving as the electron channel and high-k $(\text{Bi}_{1.5}\text{Zn}_{1.0}\text{Nb}_{1.5}\text{O}_7)_{0.7}(\text{MgO})_{0.3}$ as the gate insulator. The devices exhibited low operation voltages (<4V) due to high capacitance of the $(\text{Bi}_{1.5}\text{Zn}_{1.0}\text{Nb}_{1.5}\text{O}_7)_{0.7}(\text{MgO})_{0.3}$ dielectric.

Key Words : High-K, TFT, Gate Insulator, ZnO