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Use of nonpolar $BaHfO_3$ gate oxide for field effect on the high mobility $BaSnO_3$ CHULKWON PARK, USEONG KIM, YOUNG MO KIM, CHANJONG JU, KOOKRIN CHAR, Department of Physics & Astronomy, Seoul National University — Recently, $BaSnO_3$ (BSO) has attracted attentions as a transparent conducting oxide and/or a transparent oxide semiconductor due to its novel properties: the excellent oxygen stability even at high temperature and the high electrical mobility at room temperature. We fabricated field effect transistors using La-doped BSO as the semiconducting channel on undoped BSO buffer layers on $SrTiO_3$ substrates. A non-polar perovskite $BaHfO_3$ was used as the gate insulator, and 4% La-doped BSO as the source, the drain, and the gate electrodes grown by pulsed laser deposition. We have measured the optical and the dielectric properties of the epitaxial $BaHfO_3$ gate oxide layer, namely the optical band gap, the dielectric constant, and the breakdown field. Using such $BaHfO_3$ gate oxide, we observed carrier modulation in the active layer by field effect. In this presentation, we will report on the performance of such field effect transistors: the output and the transfer characteristics, the field effect mobility, the I_{on}/I_{off} ratio, and the subthreshold swing.

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