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**Field Effect in transparent perovskite semiconductor BaSnO<sub>3</sub>**

USEONG KIM, CHULKWON KIM, CHANJONG JU, WOONGJAE LEE, KEE HOON KIM, KOOKRIN CHAR, Seoul Natl Univ, CSCMR TEAM, CENSCMR TEAM — A field effect transistor made entirely of perovskite materials has great potentials since it can be easily integrated in future devices controlling various properties. Recently, perovskite La-doped BaSnO<sub>3</sub> (BLSO) were reported to possess high electron mobility and thermal stability. We fabricated a field effect transistor structure on SrTiO<sub>3</sub> substrates using BLSO as a channel layer and lattice-matched LaInO<sub>3</sub>(LIO) as a gate dielectric. We have measured the dielectric properties of the epitaxial LIO, such as the dielectric constant and the breakdown field. Using this gate oxide, we obtained the conductivity modulation by a factor of 5 in the channel with the electric field of 1.3 MV/cm. The magnitude of the field effect was found to be consistent with the materials parameters of BLSO and LIO. During the modulation process, the leakage current between the gate and channel was about 4 orders of magnitude lower than the channel current. The field effect mobility in the channel was calculated as 13 cm<sup>2</sup>/Vs, which is comparable to the mobility of BLSO films in our previous study and indicates that the conductivity modulation was caused by modulation of carriers. Our field effect results suggest that the BLSO/LIO interface seems ideal, devoid of any charge trap or extra scattering.

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