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Scanning tunneling microscope study of La- and Sb-doped BaSnO₃ thin films CHAN-JONG JU, HOONMIN KIM, USEONG KIM, CHULKWON PARK, KOOKRIN CHAR, Department of Physics in Seoul National University, MATERIALS & DEVICES PHYSICS LAB. TEAM — The La-doped BaSnO₃(BLSO) system was found to exhibit high electron mobility and high oxygen stability along with its transparency in visible spectrum. Additionally, we recently observed a significant difference in electron mobility values between BLSO and Sb-doped BSO (BSSO) epitaxial thin films. In order to elucidate the origin of the different mobility in BLSO and BSSO thin films, we have investigated a density of states (DOS) of BLSO and BSSO by scanning tunneling microscopy and spectroscopy. Our measurements were performed at 77 K in ultra-high vacuum of 2×10^{-10} Torr. We will compare the DOS of the conduction band of BLSO with that of BSSO. Only in the conduction band of BSSO, we found a specific peak that can be identified as due to the localized Sb impurity states. Our results provide strong evidence for the strong influence of localized Sb impurity states on the electron mobility. We will explain our data by anisotropy of scattering on the Fermi surface by resorting to band structure calculations of BLSO and BSSO.

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