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Photoconductivity of transparent perovskite oxide semiconductors $BaSnO_3$ and $SrTiO_3$ epitaxial thin films JISUNG PARK, USEONG KIM, KOOKRIN CHAR, Seoul Natl Univ, INSTITUTE OF APPLIED PHYSICS, DEPARTMENT OF PHYSICS AND ASTRONOMY, SEOUL NATIONAL UNIVERSITY, SEOUL TEAM — We have measured the photoconductivity (PC) of epitaxial thin films of transparent semiconductor $BaSnO_3$ (BSO) and $SrTiO_3$ (STO) at room temperature. The epitaxial thin films of BSO and STO were grown by pulsed laser ablation technique on the MgO substrates to exclude any conductance from the substrate owing to its large bandgap (~7.8 eV). Despite the same crystalline structure and similar band gap sizes (~3.2 eV), the PC of BSO behaved very differently. The slowly varying component in the PC of BSO is much larger than that of STO; the PC of BSO increased slowly, reached higher magnitude after the same duration of illumination, and persisted longer than many hours after the light was turned off, whereas the PC of STO showed little persistent conductivity. The spectral responses of the PC of BSO and STO showed their highest peaks below 400 nm when measured by a UV monochromator system, suggesting that the electron-hole pair generation is the main mechanism of the PC for both materials. The higher mobility of BSO should be partially responsible for the higher PC. The large persistent PC of BSO seems related to the dislocations that trap electrons easily.

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