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Large photoconductivity in transparent perovskite semiconductor BaSnO3 JISUNG PARK, USEONG KIM, HOONMIN KIM, KOOKRIN CHAR, Seoul Natl Univ, MATERIAL DEVICE PHYSICS LAB. TEAM — Photoconductivity of perovskite oxide such as SrTiO3 (STO) has been intensively studied because of its large potential for applications such as UV detector and optical devices. We have measured the photoconductivity of transparent perovskite semiconductor BaSnO3 (BSO) which has started to attract a large attention due to its high electron mobility and thermal stability. Measured photoconductivity of BSO is 1000 times higher than that of STO, although BSO and STO have the same perovskite structure and similar band gap. Epitaxial thin films of BSO and STO were made by pulsed laser deposition on a large bandgap substrates such as sapphire and MgO. The spectral responses measured by a monochromator have peaks around the band gap of each film, which is a clear evidence that electron-hole pair generation is the main mechanism of photoconductivity of both materials. The high mobility of BSO, which is two orders of magnitude larger than that of STO at room temperature, should be partially responsible for the higher photoconductivity. In addition, the small difference between the direct gap and indirect gap of BSO may make band to band transition easier. The results suggest that BSO can be used as more effective UV detector and optical devices than STO.

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