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Colossal photoconductivity in transparent perovskite semiconductor $BaSnO_3$ JISUNG PARK, USEONG KIM, KOOKRIN CHAR, Seoul Natl Univ — We compare photoconductivities of $BaSnO_3$ (BSO) and $SrTiO_3$ (STO). Photoconductivity of STO has been intensively studied for its high potential for UV detector and optical devices. On the other hand, BSO has recently started to draw a large attention for its high electron mobility and thermal stability. BSO and STO have the same perovskite structure and similar band gap. Epitaxial thin films of BSO and STO were grown by pulsed laser ablation. The spectral responses measured by the monochromatic light showed peaks around the band gap of each film, an evidence that the electron-hole pair generation is the main mechanism for the photoconductivity in both materials. We have found the photoconductivity of BSO to be several orders of magnitude higher than that of STO. In addition, there exists a larger "persistent" photoconductivity in BSO. 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. The small difference between the direct gap and indirect gap of BSO may make band to band transition easier. We are also investigating the effect of dislocations on the "persistent" photoconductivity.

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