

Abstract Submitted
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pn junctions based on a single transparent perovskite semiconductor BaSnO₃ HOON MIN KIM, USEONG KIM, CHULKWON PARK, HYUKWOO KWON, WOONGJAE LEE, TAI HOON KIM, KEE HOON KIM, KOOKRIN CHAR, Seoul National University, MDPL, DEPARTMENT OF PHYSICS AND ASTRONOMY TEAM, CENSCMR, DEPARTMENT OF PHYSICS AND ASTRONOMY TEAM — Successful p doping of transparent oxide semiconductor will further increase its potential, especially in the area of optoelectronic applications. We will report our efforts to dope the BaSnO₃ (BSO) with K by pulsed laser deposition. Although the K doped BSO exhibits rather high resistivity at room temperature, its conductivity increases dramatically at higher temperatures. Furthermore, the conductivity decreases when a small amount of oxygen was removed from the film, consistent with the behavior of p type doped oxides. We have fabricated pn junctions by using K doped BSO as a p type and La doped BSO as an n type material. I-V characteristics of these devices show the typical rectifying behavior of pn junctions. We will present the analysis of the junction properties from the temperature dependent measurement of their electrical properties, which shows that the I-V characteristics are consistent with the material parameters such as the carrier concentration, the mobility, and the bandgap. Our demonstration of pn junctions based on a single transparent perovskite semiconductor further enhances the potential of BSO system with high mobility and stability.

Hoon Min Kim
Seoul National University

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