Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

P-type hole mobility measurement in Na-doped $BaSnO_3$[1]
SUNGYUN HONG, YEAJU JANG, JISUNG PARK, KOOKRIN CHAR, Seoul Natl Univ — P-type doping in oxide materials has been a difficult task because of the oxygen vacancies. Taking advantage of the excellent oxygen stability in $BaSnO_3$ (BSO), we replaced Ba with Na in BSO to achieve p-type doping. $Ba_{1-x}Na_xSnO_3$ (BNSO) films with varying dopant ratios were epitaxially grown by the pulsed laser deposition technique. We confirmed that the BNSO films were properly grown and determined their lattice constants with respect to the dopant ratio by x-ray diffraction. Due to the high resistance of the films at room temperature, we measured the transport properties of the BNSO films at temperatures ranging from 200 C to 400 C. Hall resistance measurements in a 5 kG magnetic field were performed to confirm that the films are indeed p-type. As the temperature increased, the hole carrier concentration of the films increased while the film resistance decreased. The hole mobility values, in the tens of cm^2/Vsec range, were found to decrease with the temperature. We will present the complete doping rate and temperature dependence of the hole mobility and compare their behavior with those of n-type La-doped BSO.

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Date submitted: 12 Nov 2016 Electronic form version 1.4