
High mobility, stability and dopability of transparent perovskite semiconductor BaSnO₃

Kookrin Char*¹

¹Center for Strongly Correlated Materials Research – Dept. of Physics and Astronomy, Seoul National University, South Korea

Abstract

We have recently discovered that a perovskite BaSnO₃ exhibits high mobility at room temperature when doped with La in the Ba sites. We will go over the mechanism for the high mobility, especially when compared with Sb doping in the Sn sites. We will describe the large effect of threading dislocations on the mobility of epitaxial thin films on SrTiO₃ substrates. In addition, a very stable oxygen stoichiometry in BaSnO₃ system has been measured. Such high chemical stability promises a large potential for well-defined interface in heterostructures based on them. To demonstrate in this direction, we will present our current research efforts in pn-junctions and FETs based on the BaSnO₃ system. Furthermore, 2DEG based on the BaSnO₃ system can shed light on the exact mechanism of 2DEGs found at the interfaces of polar perovskites. We will report on our recent findings in this area as well. Due to high-mobility, chemical stability, and bipolar dopability, the BaSnO₃ system promises a large potential for scientific research and technological applications.

*Speaker