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High Mobility and Scattering Mechanisms in La-doped $BaSnO_3$ Films Grown by a Radical-based Oxide MBE Approach[1] ABHINAV PRAKASH, PENG XU, University of Minnesota - Twin Cities, Minneapolis, ALIREZA FAGHANINIA, Washington University, SUDHANSHU SHUKLA, Nanyang Technological University, JOEL AGER, Lawrence Berkeley National Laboratory, CYNTHIA LO, Washington University, BHARAT JALAN, University of Minnesota - Twin Cities — Using experiment and transport modeling, we will present on the detailed electronic transport study of La-doped $BaSnO_3$ films grown *via* a radical-based oxide MBE approach. Using a chemical precursor of tin, effusion cell for Ba and rf plasma for oxygen, we will first present the discovery of an "MBE growth window", in which cation stoichiometry of $BaSnO_3$ films was maintained as 1:1 for a range of Ba/Sn flux ratios. Temperature dependent electronic transport measurements were then performed to investigate the effect of La doping on mobility (μ) and carrier concentrations (n) in stoichiometric $BaSnO_3$ films grown on $SrTiO_3$ (001) substrates. We will discuss the role of charged dislocations, non-stoichiometry and dopant density on the electronic transport properties. Using *ab initio* calculation and Boltzmann transport equations, temperature-dependent mobility and Seebeck coefficient are calculated and will be presented to elucidate different mobility-limiting scattering mechanisms as a function of n and temperature.

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