

Point Defects in MBE-Grown ABO_3 Perovskite Thin Films: Identification and Quantification

Roger A. De Souza

Institut für Physikalische Chemie
RWTH Aachen University
52056 Aachen, Germany

desouza@pc.rwth-aachen.de

www.ipc.rwth-aachen.de/desouza

Identifying the types of intrinsic point defects present in a solid and quantifying their concentrations can be a formidable task, especially if the volume of the solid sample is small, as is the case in thin-film samples and if the samples are prepared from high-purity starting materials by Molecular Beam Epitaxy (MBE). In this presentation, taking MBE-grown thin-film samples of the perovskite oxides $BaSnO_3$ and $LaInO_3$ as examples, I will show how to attack this problem through a powerful combination of electronic and ionic transport experiments and molecular dynamics simulations. In both cases this combination reveals that native point-defects determine the defect chemistry and transport properties of these oxides. In addition, it explains why the presence of these defects leads to a lower limit of achievable carrier density.