

# 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](mailto:desouza@pc.rwth-aachen.de)

[www.ipc.rwth-aachen.de/desouza](http://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.