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“Towards solid state batteries: Understanding materials transport and transport limitations”

The advent of solid-state batteries has spawned a recent increase in interest in lithium conducting solid electrolytes. However, many open questions remain when trying to optimize electrolytes and understand solid state battery chemistries.

In this presentation, we will show that it is not only important to find fast ionic conductors, but that fast ionic conduction is paramount within solid state battery composites. Measuring the effective ionic transport in electrode composites provides an avenue to explore transport and stability limitations that in turn provide better criteria for solid state battery performance

In a second part of this presentation, we will show how pressure induces dislocation densities in solid ionic conductors. By increasing the strain and dislocations in solid ionic conductors the overall ionic transport properties improve providing a new avenue for materials optimization.

In a final part, we will discuss local structures of ionic conductors raising the question if average structural solutions are really the best descriptor of ionic conductors.

Bio: Wolfgang Zeier holds a chair in Solid State Chemistry at the University of Münster. In addition, he heads a department at the Helmholtz-Institute Münster, Ionics in Energy Storage. His research interests encompass the fundamental structure-to-property relationships in solids, with a focus on thermoelectric and ion-conducting materials, as well as solid-solid interfacial chemistry for all-solid-state batteries.

