Seminar

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Monday, 28th October, 15:00 s.t.
TU Wien, Getreidmarkt Campus
Building BC, 2nd Floor, Seminar Room BC 2

The seminar will also be held as a Zoom Meeting
https://tuwien.zoom.us/j/66376638746?pwd=A9SNAGga9tlHiTRrJK4Fm5aSHNORSl.1
Meeting ID: 663 7663 8746
Password: 2a512f09

Solid Electrolytes Bulk and Interfaces Analysis to Improve All-Solid-State Batteries Performance

The development of all-solid-state batteries (ASSBs) has the potential to be transformational as a safer more efficient storage of energy for stationary and transport applications.
However, progress in developing well-performing and long-lasting ASSB cells has been delayed due to the difficulty to develop solid electrolytes that possess high cation conductivity combined with the adequate electro-chemo-mechanic stability required at cell level. This is associated to the complex and dynamic solid/solid interfaces that are generated during processing and that evolve upon cycling, which are difficult to study and therefore, optimize.
Most studies are trying to find a solution to this in the use of composite and hybrid solid electrolytes which adds even more complexity to understand which are the key factors governing the performance of the devices.
In this work, we analyze a range of inorganic and polymer-inorganic solid electrolytes with a combination of experimental and computational techniques, we discuss structural and chemical factors affecting the ion mobility in these systems and how it can be altered by the processing conditions at a bulk and interface level. High frequency (up to 3GHz) electrochemical testing allows for the quantification of ionic motion and separate bulk processes from processes taking places at the different interfaces. Synchrotron and neutron diffraction analysis is employed to understand how structural features and degrees of order-disorder might impact the cations conduction paths and conductivity. Surface-sensitive analysis ex-situ and operando are used to understand how the interfaces evolved and how this can be correlated to the electrochemical performance. Finally, good adhesion and controlled reactivity among materials is analyzed and routes for optimization are proposed.

All interested colleagues are welcome to this seminar lecture
(45 min. presentation followed by discussion).

Günther Rupprechter
Director of Research

André Vogel
Coordinator