

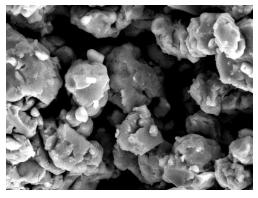
Thesis

Influence of Synthesis conditions and Particle size on the Ionic Conductivity of Li-Thiophosphate for All Solid State Li-Ion Batteries

Lithium-ion batteries have become an essential part of our everyday lives. Their importance will most likely even increase in the near future due to the transition towards renewable energy sources and electric transport.

However, commercial Li-ion batteries using a liquid electrolyte are approaching a limit for possible improvements. Additionally, they suffer from safety concerns. One way to go forward is the application of solid electrolytes for more safety and possibly higher capacities.

In order to find suitable solid electrolyte materials, we need to understand the conduction mechanisms within these materials and how they can be influenced by the micro,- and macrostructure of the material.



For this project, first, the influence of synthesis parameters on the particle size and size distribution will be evaluated. Then the density and electrochemical properties will be studied to find a relationship between particle size and ionic conductivity.

Task:

- Preparing samples in the glovebox
- Synthesis of Material by ball-milling,
- Particle size analysis by DLS and SEM
- Size-dependent particle separation
- Material characterization with XRD and Raman (mainly)
- Ionic conductivity measurements using Impedance spectroscopy

Requirement:

- Background in chemistry, chemical engineering, material science or a related field
- Interest in batteries and/or material science

Location:

Campus North.

Start time:

As soon as possible

Kontakt:

If interested, contact ramon.zimmermanns@kit.edu