

Bachelor / Master Project

Processing and Microstructural Characterization of NASICON Ceramic Cells

Research Area

Ceramic research

Focus & Methods

- ☒ Literature review
- ☒ Materials research
- ☐ Mechanical properties
- ☒ Methods / equipment development
- ☐ Design
- ☐ Modeling & visualization
- ☒ X-ray methods
- ☒ FIB/REM
- ☒ TEM

Project start

Immediately

Contact

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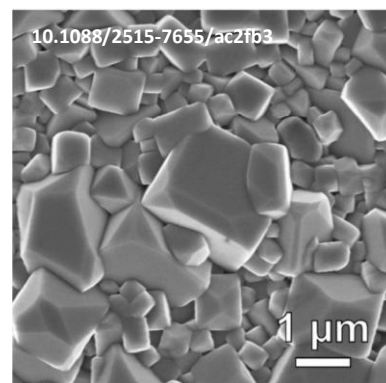
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Problem Description

Ceramic solid electrolytes are of great interest for next-generation energy storage systems. In particular, NASICON-type materials are promising due to their high ionic conductivity and their relevance for solid-state sodium batteries. Their performance strongly depends on powder processing, shaping, sintering, and the resulting microstructure.

As ceramics research is currently being established and expanded at the university site, this project offers the opportunity to contribute directly to the development of a new research field. Using NASICON-based ceramic cells as a model system, the project focuses on building and testing an experimental workflow from sample preparation to multi-scale characterization.



Objective

The aim is to investigate how processing parameters influence densification, porosity, grain structure, and defects in ceramic cells. The project is designed as a collaborative team effort and provides hands-on experience with modern ceramic processing and analytical techniques.

Methodology

- literature review on NASICON materials and processing
- powder preparation and shaping of ceramic samples
- sintering and heat treatment
- sample preparation for microscopy
- characterization using SEM, optionally TEM
- complementary 3D defect analysis by μ CT
- evaluation of processing–microstructure relationships