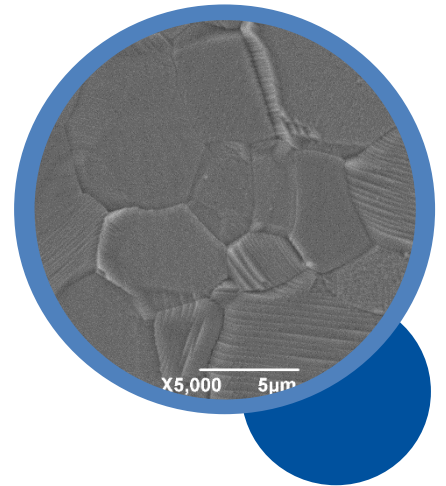


## Bachelor-/Studien-/Masterarbeit

Date: 12.11.2024

### Topic:

Sintering of donor-doped perovskites for green energy applications



### Background:

Perovskites are increasingly recognized as promising candidates for green energy technologies, including batteries, fuel cells, and solar cells.

We are looking for motivated students to join our research on perovskite-type materials with a focus on Calcium Titanate ( $\text{CaTiO}_3$ ).

Doping is a well-known method to influence the electrical properties of materials. It involves the introduction of small amounts of foreign atoms with different charges into the host material's structure. This does not only alter the bulk electronic structure of the material but affects grain boundaries.

Grain boundaries are interfaces between individual crystallites. Many material's properties are dominated by these interfaces. Their properties play a crucial role during sintering, a process where ceramic particles fuse together to create a dense, solid structure.

We want to gain a broad understanding of how dopant species behave and influence grain boundaries and their properties like mobility and conductivity.

### Tasks:

- Synthesis of donor-doped  $\text{CaTiO}_3$  using the mixed solid oxide route
- Characterization of the powders regarding particle size and phase purity
- Preparation of samples (cold isostatic pressing)
- Sintering of the samples at different temperatures, heating rates and dwells
- Comparison of influence factors on grain size, densification and porosity
  - XRD and electron microscopy
  - Conductivity and characterization

### Areas:

Mechanical Engineering, Energy Technology, Electrical Engineering, WPT, Material Science and related

### Prior Knowledge:

Experience in sintering, defect chemistry, SEM and XRD would be helpful but are not necessarily required

**Beginn:** Starting now

Ansprechpartnerin

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Anschrift

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