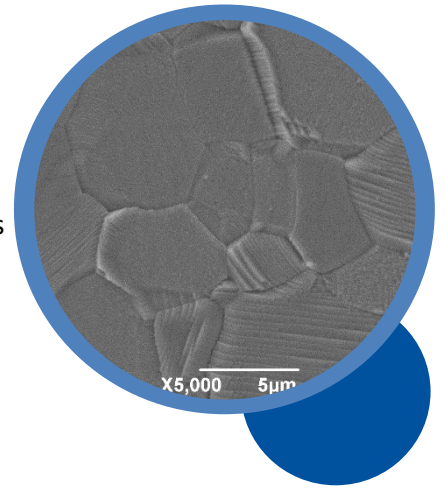


## Hiwi-Stelle

Date: **05.03.2025**

### Topic:

Sintering of SrTiO<sub>3</sub> doped with isovalent dopants for 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 strontium titanate (SrTiO<sub>3</sub>).

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

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

Yet, it is not well understood how dopants or impurities with the same charge as host ions (isovalent) interact with grain boundaries or influence grain growth behavior.

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

### Tasks:

- Synthesis of isovalent (Ba & Ca) doped SrTiO<sub>3</sub> using mixed solid oxide route
- Characterization of powders regarding particle size and phase purity
- Preparation of samples (uniaxial and cold isostatic pressing)
- Sintering of the samples at different temperatures, heating rates and dwells
- Sample preparation for SEM analysis
- Comparison of influence factors on grain size, densification and porosity
  - XRD and electron microscopy

### 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

Ansprechpartner

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Anschrift

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