

Abschlussarbeit Bachelor/Master:
Influence of microstructure on the ionic conductivity of Samarium doped Ceria SDC for application as dual phase membrane in CO₂ sensors and SOFCs

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Sprache: Deutsch/English

Samarium doped ceria is ionic conducting at elevated temperatures. Possible applications are in dual phase membranes for CO₂ separation and high temperature CO₂ sensors or as membrane in solid oxide fuel cells (SOFC). This thesis is focused on the preparation of pellets by variation of pressing and sintering parameters, electrode application and temperature resolved electrical characterization via impedance spectroscopy.

The powder of ionic electrolyte will be grinded, pressed and sintered (uniaxial, conventional sintering, spark plasma sintering SPS, hot press HP) by different routes in order to study about the influence of the porosity, grain size and micro structure on the electrical properties, mainly the ionic conductivity and activation energy from intragranular and grain boundary components. In order to characterize the resulting membranes, SEM-EDX, XRD and mercury porosimetry will be applied.

The following processing methods will be used:

- Grinding
- Granulation
- **Pressing**
- **Sintering**

The obtained samples will be characterized by:

- Laser diffraction (Particle size distribution)
- BET (pore size and specific surface area)
- SEM microscopy
- **Temperature resolved Impedance spectroscopy**

The candidate will be assisted during the project, developing an experience in ceramic processing technology and characterization methods. Master students with outstanding qualifications (e.g. prior research experience, excellent grades in relevant courses) have the possibility to apply for a fellowship.