

# Investigation of coupled FEM simulation and shrinkage behavior during sintering of piezoelectric ceramics

## ✓ Bachelor- / Studien- / Masterarbeit

Piezoelectric ceramic components undergo significant densification and shrinkage during the sintering process. The final geometry, density distribution, and mechanical properties strongly depend on thermal gradients, material parameters, and boundary conditions. Simulation tools enable thermo-mechanically coupled analyses to predict shrinkage, distortion, and residual stresses during sintering. The aim of this work is to develop and validate a reliable simulation workflow to predict the deformations of free-form piezoelectric ceramic structures during sintering.

### Tasks:

- Develop a thermo-mechanically coupled FEM model for sintering
- Investigate influence of boundary conditions and support concepts
- Validate simulation results with experimental shrinkage measurements

**Nature of the study:** Experimental and simulation-based research combining

**You will learn:** Coupled-field FEM simulation (thermal–mechanical), Implementation of temperature-dependent material laws, Validation strategies: Simulation ↔ Experiment

### Additional information:

- You select language of the work, either German or English
- Multiple works on same topic possible (e.g. Studienarbeit + Masterarbeit)

