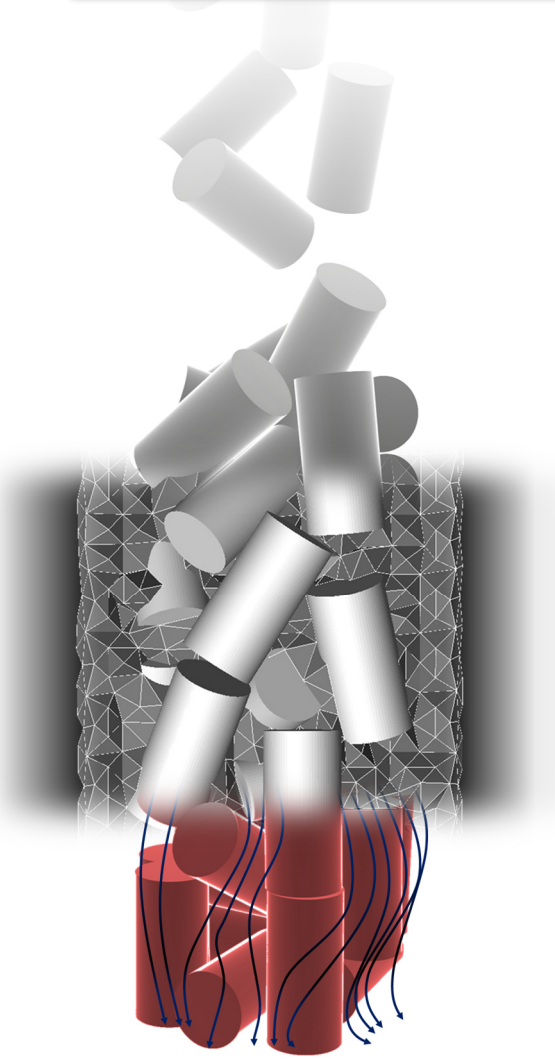
FRIEDRICH-ALEXANDER
UNIVERSITÄT
ERLANGEN-NÜRNBERG
TECHNISCHE FAKULTÄT

Department Chemie- und
Bioingenieurwesen (CBI)
Lehrstuhl für Energieverfahrenstechnik
Prof. Dr.-Ing. Jürgen Karl

Master's thesis

Particle-resolved numerical simulation of methanation



Topic:

Catalytic methanation is a promising approach to convert hydrogen and carbon dioxide into methane. Using renewable hydrogen, it provides a promising avenue for long-term energy storage and natural gas substitution. However, control and operation of this highly exothermic reaction is challenging. For this reason, the Chair of Energy Process Engineering is currently working on innovative process design and simulation of catalytic methanation in fixed bed reactors in order to optimize overall performance.

The present work addresses the extremely precise simulation of the fixed bed by computational fluid dynamics (CFD). The major objectives comprise further development of the workflow which includes geometry generation of the fixed bed with BLENDER and PYTHON, grid generation in ANSYS CFD ICEM and CFD simulation in ANSYS Fluent.

Tasks:

- Geometry generation and modification with BLENDER and PYTHON
- Data transfer between BLENDER and ANSYS CFD ICEM
- Grid generation and mesh quality analysis with ANSYS CFD ICEM
- CFD simulation in ANSYS Fluent
- Accurate documentation of the results

Your profile:

- Interest in energy engineering and energy storage systems
- Basic knowledge of simulation and CFD
- Motivated, communicative and able to work independently

Start:

- Project start is flexible

Contact:
Simon Markthaler, M.Sc.
Phone: +49 911 5302-9113
Email: simon.markthaler@fau.de