Friedrich-Alexander-Universität
Technische Fakultät

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

Master's thesis

Determining the thermal conductivity of 50% $NiO-Al_2O_3$ catalyst through temperature distribution analysis in fixed bed experimental facility and rebuilding the fixed bed test facility for methanation

Content:

Catalytic fixed-bed reactors play a crucial role in various industrial processes, especially methanation. Understanding the heat transfer mechanisms within these reactors is vital for optimizing their performance and efficiency. The thermal conductivity of catalyst particles and the fixed bed bulk significantly influence the heat transfer characteristics and overall reactor performance.

This research project builds upon previous studies that have focused on characterizing catalyst particles and analyzing heat transfer phenomena in fixed-bed reactors. By analyzing the temperature distribution in a fixed bed experimental facility, we will determine the effective thermal conductivity of the fixed bed bulk, providing valuable insights into the heat transfer behavior within the reactor. Based on the effective thermal conductivity of fixed bed bulk, the thermal conductivity of the catalyst particles will be derived and used for subsequent CFD simulations. After determining the thermal conductivity of catalyst particles and bed bulk, the test facility will be rebuilt for subsequent methanation.

Tasks:

- Literature research: heat transfer and methanation in fixed bed
- Contributing to the establishment of the experimental facility
- Perform experimental measurements to determine the effective thermal conductivity of fixed bed bulk
- Rebuilding the fixed bed test facility for subsequent methanation

Required Skills and Qualifications:

- Interest in reactor building, as well as the knowledge of heat transfer and methanation.
- Currently pursuing a graduate degree in Chemical Engineering, Materials Science, or a related field.
- Experience in experimental work, including data collection, analysis.
- Ability to work independently and collaborate effectively within a research team.

Start: as soon as possible.

Contact:

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