Lehrstuhl für Energiesysteme
TUM School of Engineering and Design
Technische Universität München

# Master's Thesis

(Experimentell)

## Application of predictive modeling methods to model volatile release under entrained flow conditions

### Description:

In view of the climate-related shift in resources and energy, as well as the high dependence on imports of fossil raw materials, the development of new raw materials, such as biogenic residues or plastic waste, is of utmost importance. Closing the carbon cycle is also a crucial aspect for making the chemical industry more sustainable. A promising approach in this context is entrained flow gasification to convert residues or biomass into high-quality synthesis gas (H2 & CO), which can then be used, for example, in IGCC power plants for electricity generation or in catalytic syntheses to produce basic chemicals such as methanol or FT-products.

As the first step of the gasification process, devolatilization plays a decisive role in the conversion behavior of the fuel in the gasification reactor. For this reason, the release of volatiles is studied at the Chair of Energy Systems independently of the gasification reaction in a wired mesh reactor. This allows for experimental determination of various influences, such as the effect of temperature, pressure, or heating rate. To work more resource-efficiently in the future, both financially and in terms of working time, a predictive model for the release of volatiles is to be developed.

The aim of this work is therefore to develop a predictive model for forecasting the release of volatiles from residues and biomass. For this purpose, data from previous work and literature will be analyzed to identify important correlations. Subsequently, a predictive model will be developed and experimentally validated. The results are to be compared with the literature and documented in writing.

### Requirements:

- Independent way of working
- Reliability and personal responsibility
- Programming skills desirable

### Work Packages:

- Familiarization with predictive modeling methods and the basics of entrained flow gasification
- Development of a predictive model and experimental validation of the model
- Documentation of the work and regular meetings with the supervisor

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