



Term Project

(Experimentell)

Waste-to-X: Experimental Investigation of thermal deactivation of pre-treated residues during gasification

Description:

In view of the climate-related resource and energy transition and the high dependence on imports of fossil raw materials, the development of new raw materials, such as biogenic or plastic residues, is of utmost importance. In context of the chemical industry closing the carbon cycle is one key to a sustainable future. One promising option is entrained-flow gasification for the conversion of pre-treated residues into high-quality synthesis gas (H_2 & CO), which can be converted into basic chemicals like methanol through catalytic syntheses.

As the conversion rate defining step of the gasification process, thus the slowest step of the whole process, the conversion of solid pyrolysis char into synthesis gas plays a decisive role for the design of gasification reactors, especially for reactor concepts with short residence times such as entrained flow gasifiers. For this reason the conversion of solid pyrolysis char into synthesis gas is investigated extensively at the Chair of Energy Systems. Various influences such as the influence of pyrolysis conditions, temperature, pressure, pore structure or catalytic components can be investigated.

The aim of this work is the experimental investigation of the influence of pyrolysis conditions on the conversion behavior of pretreated biomass under gasification conditions, thus the thermal deactivation behaviour. The results are to be compared with the literature and classified in the thesis.

Requirements:

- Enjoy experimental activities
- Independent and structured way of working
- Reliability and personal responsibility

Work Packages:

- Familiarisation with entrained flow gasification, in particular thermal deactivation
- Carrying out and evaluating the experimental investigations
- Documentation of the experimental work and regular discussions with the supervisor

Start: 01.10.2025

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