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Experimental investigation of the gasification kinetics of biomass residues by thermogravimetric analysis

Experimentelle Untersuchung der Vergasungskinetiken von Biomassereststoffen mittels thermogravimetrischer Analyse

From organic waste to green maritime and aviation fuels.

The aviation and shipping transportation sectors are difficult to electrify. Biofuels with negative CO₂ emissions can make a significant contribution to the sustainability of these sectors. This is being investigated at EST in the CARBIOW research project by converting biomass residues into synthesis gas in a fluidized bed and then into biofuels. The fluidized bed is to be operated on a 1 MW pilot scale with pure oxygen and steam and investigated in advance using process simulations. Analysis of the feedstock will help to understand the underlying reactions and kinetics taking place during the gasification process.

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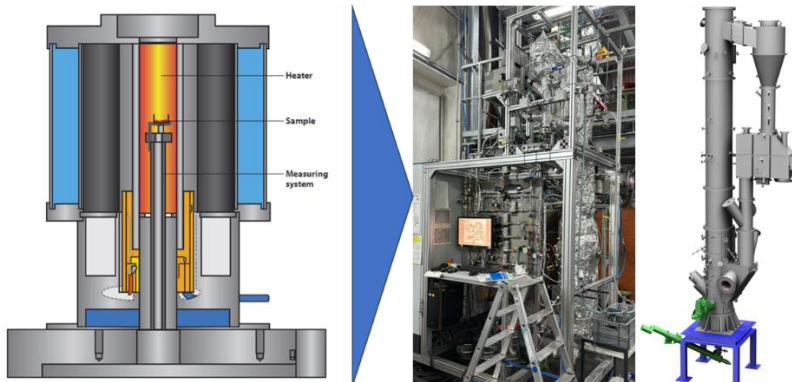
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Date: 23.06.2024

Starting date:
immediate

Requirements:
Interest in chemical and process engineering issues, programming, and lab work.



Objectives and work steps

In this work different feedstock are to be investigated via thermogravimetric analysis under gasification and inert conditions. From the experimental data effective reaction kinetics should be derived. Additionally, the limitations of the experimental setup regarding the reaction kinetics shall be analyzed:

- Familiarization with the literature on gasification, pyrolysis, and reaction kinetics
- Development of an experimental thermogravimetric analysis procedure
- Deriving effective reaction kinetics for gasification and pyrolysis from the experimental data
- Identification of limiting factors of the experimental data for the prediction of the conversions in the fluidized bed reactors
- Documentation, discussion and presentation of the results



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