Master thesis

Kinetic investigation of the wet oxidation of hydrothermal process water

TOPIC

Hydrothermal liquefaction (HTL) is a thermo-chemical process that can be used to convert wet waste biomass into a bio-oil, known as biocrude, which can be upgraded to be used as sustainable aviation fuel or precursor for the chemical industry. The process water contains the water-soluble by-products, including organic acids, furfural, phenols and organic nitrogen compounds. This results in an increased chemical oxygen demand (COD), which represents an economic and ecological challenge. One option to treat this process water is wet oxidation. Molecular oxygen and catalysts are used to break down the organic matter. This enables a reduction of the COD by 50-99 %. The treated water can then be discharged or utilised via anaerobic digestion. This thesis will investigate the suitability of heteropolyacids as catalysts. This will involve planning and carrying out experiments and, based on these, developing a kinetic model to describe the degradation of selected compounds.

YOUR MAIN ACTIVITIES

- Literature research into the catalysis of the oxidation of organic compounds by heteropolyacids
- Production of biocrude and process water on a 0.5 L scale
- Planning and carrying out experiments on wet oxidation on a laboratory scale (20 mL)
- Evaluation using bulk parameters and detailed analysis
- Kinetic modelling

WHAT WE EXPECT

- B. Sc. Chemistry, Chemical Engineering or comparable
- Interest in kinetic modelling
- Structured, independent and accurate work
- Proficiency in English and/or German

WHAT WE OFFER

- A good professional introduction to the topic as well as competent and motivated support in the processing of the tasks
- A family-friendly, modern working environment in a collegial working atmosphere
- A technically well-equipped workplace and an advanced laboratory, as well as the opportunity to work remotely
- Good public transport connections

POSSIBLE START:

01.07.2025

DURATION:

24 Weeks (flexible)

WORKPLACE:

Deutsches Biomasseforschungszentrum, Torgauer Straße 116, 04347 Leipzig

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YOUR APPLICATION:

Please apply with your convincing application including a letter of motivation and a current certificate of enrolment (only 1 attachment possible, preferably as pdf, max. 5 MB).
E-Mail: bewerbung@dbfz.de

For an encrypted transmission of your application, you can use the Cryptshare upload form.
www.dbfz.de/stellen