Master Thesis in Chemistry and Chemical Technology

Modeling depolymerization of polyhydroxyalkanoates in melt hydrolysis

This master thesis explores the kinetics of polyhydroxyalkanoates (PHA) depolymerization during melt hydrolysis, with a focus on building upon and refining existing simulation-assisted kinetics model. By leveraging detailed data on depolymerization products, this project aims to enhance the predictive accuracy of simulation assisted kinetics model, particularly for low molecular weight and water-soluble depolymerization products. A core component involves investigating the effects of Brønsted acids as catalysts including acids stemming from the hydrolysis itself. Moreover, the nuances of the type of polyhydroxyalkanoates on the depolymerization outcome in conjunction with depolymerization kinetics will underpin the research of bio polyester recycling.

Tasks

- Refine and expand existing depolymerization models, focusing on accurately predicting low molecular weight and water-soluble products.
- Conduct melt hydrolysis experiments to validate model predictions
- Study the impact of Brønsted acids on the depolymerization of PHA
- Explore how different types of PHA influence depolymerization outcomes

Expertise

- Experience in data analysis and polymer chemistry
- Knowledge in chemical kinetics and developing models
- Good analytical and problem-solving skills
- Independent and structured workflow
- Effective communication skills in both English and German

Offer

- Contribute to the foundation of data-driven modeling in sustainable polymer recycling
- Collaborate with leading experts to advance your skills in chemical kinetics, analytical methods, and polymer chemistry
- Earn a competitive salary while making impactful contributions to innovative research
- Support sustainable recycling solutions by refining models that enhance predictive accuracy in polymer depolymerization