

Master Thesis in Chemistry and Chemical Technology

Advanced bio polyester depolymerization techniques

This master thesis focuses on exploring alternative depolymerization methods for polyhydroxybutyrate (PHB). The project's initial phase will involve designing and optimizing a thermolytic distillation apparatus tailored to PHB depolymerization. The thermolytic depolymerization of PHB will then be assessed and benchmarked with kinetics in melt hydrolysis. In parallel, the study will investigate the electro-depolymerization of PHB, utilizing deep eutectic solvents and ionic liquids. The final phase of the research will combine thermolytic distillation and electro depolymerization to investigate synergistic effects, aiming to enhance overall depolymerization efficiency and product selectivity.

Tasks

- Design and optimize a thermolytic distillation apparatus
- Benchmark thermolytic distillation with melt hydrolysis and investigate the nuances in reaction kinetics and modeling thereof
- Assemble an electro depolymerization apparatus and recycle PHB electrochemically utilizing deep eutectic solvents and ionic liquids
- Study synergy between electro depolymerization and thermolytic distillation

Expertise

- Experience in electrochemistry and engineering
- Knowledge in chemical kinetics and reaction mechanism
- Experience in data analysis
- Good analytical and problem-solving skills
- Independent and structured workflow
- Effective communication skills in both English and German

Offer

- Work alongside academic professionals to enhance your expertise in reaction kinetics, electrochemistry, and polymer chemistry.
- Earn a competitive salary while making impactful contributions to innovative research
- Play a key role in advancing sustainable recycling by developing and optimizing cutting-edge depolymerization methods for biopolymers.