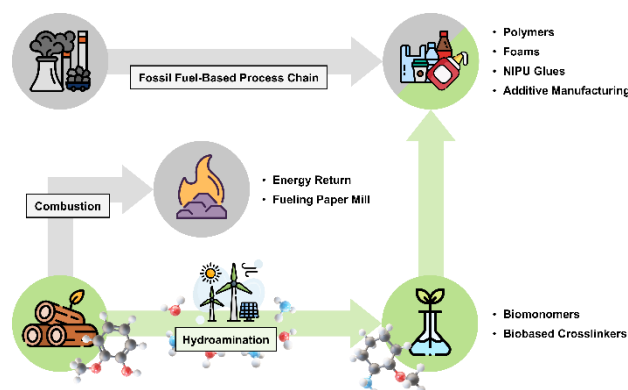


Master Thesis

Electrochemical upgrading of lignin-derived guaiacol using a novel pressure electrolysis reactor

Lignin is the most abundant natural source of aromatic compounds. In contrast to the conventional, fossil fuel-based aromatic feedstock, a biorefinery based on electrochemical lignin valorization offers a promising sustainable pathway for highly functionalized key- and drop-in chemicals. One especially desired group of intermediates are primary di- and polyamines, as they address the demand for sustainable monomers and crosslinkers in the adhesive industry for the production of bio-based polymers and foams. Guaiacol is a suitable model molecule for investigating the aromatic nature of lignin-derived oligomers and has already been successfully upgraded through heterogenous catalysis.

This master thesis is part of a government-supported research project exploring innovative electrochemical pathways for the sustainable valorization of lignin. The work involves commissioning and testing a novel pressure electrolysis setup for electrochemical biomass upgrading under harsh reaction conditions. By first investigating well-researched electrochemical systems, like the alkaline water electrolysis (AWE), under pressure, the setup shall be verified. Afterwards, a central aspect will be the comparison of the new electrochemical approach with established thermocatalytic methods, enabling a direct evaluation of its potential and limitations.



Topics: organic electrosynthesis, alkaline water electrolysis, hydrogen evolution reaction, biomass valorization, electrode manufacturing, catalysis, HPLC

Qualifications:

- Experience and conscientious, clean working in a technical-chemical laboratory
- Ability to work independently as well as in a group environment
- Personal initiative and creativity in new fields of research; open to learning new things
- Preferably proficient in fundamentals of electrochemistry (three-electrode-setup, methods, etc.)
- Critical thinking and interpretation, as well as presentation of research results



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Interested?

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