Professur für Chemische und Thermische Verfahrenstechnik
Campus Straubing für Biotechnologie und Nachhaltigkeit
Technische Universität München

Theoretical Master thesis, Research internship

Life Cycle Assessment of Electrochemically Regenerated Absorption Processes for Direct Air Capture

Description

At the Professorship of Chemical Process Engineering, processes for capturing carbon dioxide directly from ambient air are investigated. Direct Air Capture (DAC) combined with long-term CO_2 storage can contribute to net-negative CO_2 emissions. Electrochemical regeneration processes, such as pH-swing concepts, offer a promising alternative to conventional thermally regenerated DAC processes. However, their overall environmental performance depends strongly on electricity demand, process efficiency, material requirements, and component lifetimes.

The aim of this project is to investigate the environmental performance of selected electrochemical DAC processes using Life Cycle Assessment (LCA). The work may include the development of life-cycle inventories, comparison of different regeneration concepts, and sensitivity or scenario analyses of relevant process parameters. The goal is to identify key environmental impacts and technological parameters influencing the environmental performance of electrochemical DAC processes.

Requirements

Prior knowledge and experience in Life Cycle Assessment is required. Knowledge of process engineering or Direct Air Capture is beneficial but not required.

Start date

Flexible

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