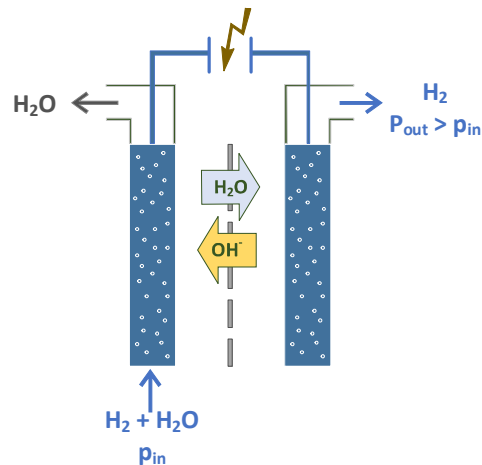


# Experimental investigation of electrochemical compression based on AEM technology

## Description:

In order to store, transport and use renewable hydrogen for cross-sector decarbonization, it must be compressed efficiently. Conventional mechanical compression technologies have problems due to moving parts, such as noise generation, susceptibility to wear, contamination and inefficiency. Electrochemical compressors (ECC) have great potential to overcome these problems and lead to highly efficient compression. At the same time, ECC technology enables the purification of the compressed  $H_2$  through the selective membrane. The basic mode of operation of an electrochemical compressor is based on the PEM (proton exchange membrane) technology. Electrochemical compressors (ECC) based on innovative AEM (anion exchange membrane) represent a promising solution to the problems mentioned and have a high economic and sustainable potential such as lower investment cost and the use of PFAS-free materials.

In this thesis in the course of the project AEM TECC "*Proof of concept for AEM Technology in ElectroChemical Compression*", the experimental investigation of the operation parameters (temperature, pressure, etc.) and the water management in the cell will be done by means of cell characterization (IV characteristic curves, impedance spectroscopy, etc.) followed by data evaluation and interpretation.



Scheme of the concept of electrochemical compression based on AEM technology

## Content:

- Literature research on electrochemical compression and membrane electrolysis technologies (1 month)
- Planning and execution of single cell tests in the lab setup (3 months)
- Data evaluation and interpretation (1 month)
- Thesis writing (1 month)

**Start:** Any time  
**Duration:** approx. 6 months

## Paid Master Thesis

**Contact:** DI Dr.techn. Bianca Grabner, +43 (316) 873-9525, [grabner@hycenta.at](mailto:grabner@hycenta.at)  
 DI Dr.techn. Marie Macherhammer, +43 (316) 873-9521, [macherhammer@hycenta.at](mailto:macherhammer@hycenta.at)