

Master's thesis

Topic: Experimental investigation of gas separation in an electrochemical hydrogen separation cell (EHS) using various feed gas mixtures

Task description:

Hydrogen is a vital component of sustainable energy systems and chemical processes. However, hydrogen obtained from natural sources or industrial processes often contains impurities that can negatively affect the performance and lifespan of energy converters and equipment. Electrochemical hydrogen separation and compression (EHC & EHS) is a promising technology that can compress and purify hydrogen simultaneously using electrochemical processes.

This thesis aims to investigate the principles of EHC & EHS, research possible gas mixtures and their influence on the cell components as well as tests under laboratory conditions.

The tasks of the research project include:

- Literature research on the state of research and technology for electrochemical hydrogen separation mechanisms and the principles of electrochemical hydrogen separation
- Literature research on gas mixtures occurring in natural (white) hydrogen
- Development of test procedures and test protocols for the analysis of gas separation in various gas mixtures
- Experimental investigation of the EHS cell under laboratory conditions, and analysis of hydrogen separation and compression performance of different gas mixtures
- Collection and documentation of experimental data
- Presentation and clear visualisation of the obtained results.

The assignment must be submitted as an individual piece of work. The focus of the work may be tailored to the current stage of the project or the necessary steps, in consultation with the supervisor.

Start:

Examiner: Prof. Dr.-Ing. Thomas von Unwerth

Supervisor: Patrick Schaarschmidt M.Sc.