

Master's thesis

Topic: Experimental investigation of gas separation in an electrochemical hydrogen separation (EHS) using a high temperature separation cell

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 (EHS) is a promising technology that can purify hydrogen using electrochemical processes.

This thesis aims to investigate the principles of EHS in combination with carbon monoxide resistant high temperature PEM (HT-PEM) cells, research possible cell and test designs and perform 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 in combination with high temperature PEM fuel cells
- Research of possible membrane types and manufacturers
- Experimental investigation of the EHS cell under laboratory conditions, and analysis of hydrogen separation and compression performance of a given cell
- 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.