

Master's thesis

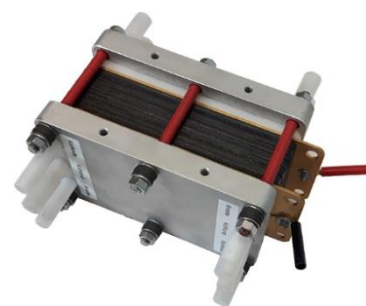
theoretical

experimental

Master's thesis

Assessment on electrochemical ammonia synthesis from renewable power for its use as energy carrier and chemical product

The efficient, decentralized production of ammonia from renewable energy sources forms a focal point for the storage of hydrogen. In addition to its role as a basic material for the production of fertilizers, ammonia will be used in the future as a climate-neutral energy source, for example in ships. To date, the worldwide production of approx. 180 million tons per year has been almost exclusively obtained by the energy-intensive Haber-Bosch process, using natural gas or coal to generate both the necessary energy and the hydrogen by means of steam reforming.



Innovative processes such as direct electrochemical ammonia synthesis, chemical looping, plasma catalytic ammonia synthesis and bio-electrocatalytic production of ammonia are of great technical interest and are being investigated at Graz University of Technology from catalyst development to pilot plant scale in the research focus Hydrogen and Fuel Science.

The present master thesis includes:

- A **review of the underlying fundamental mechanisms and state of the art** of electrochemical ammonia synthesis.
- An **experimental evaluation of identified promising cell configurations** including materials preparation, experimental testing, analysis and evaluation.
- A **critical assessment and discussion** of the experimental outcomes.

We offer to be part in a team of experienced researchers, supportive PhD students with expertise in materials preparation, electrochemistry and cell characterization as well as other motivated master students. The research group provides a fully equipped laboratory and existing infrastructure for the projected experimental work.

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