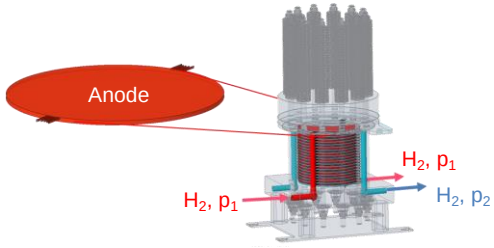
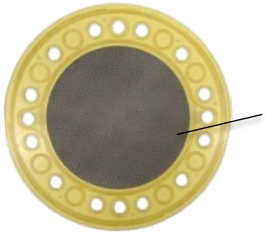
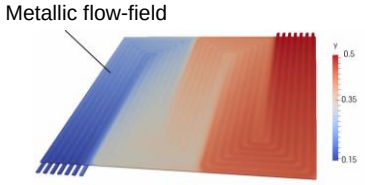
Anode Simulation for Development of Electrochemical Hydrogen Compressor



Source: HyCentA





Source: Reimer, Froning, et.al (2019), FZ Jülich

Description

Hydrogen plays a key role in the transition of a carbon based energy system towards a system based on renewable energy sources. Most of the applications in the mobility, industrial and energy storage sector require high pressure levels of gaseous hydrogen. In contrast to the currently very ineffective mechanical compression with reciprocating or membrane compressors, the electrochemical hydrogen compression (EHC) offers a high potential for an energy and cost efficient process with low noise emissions. In order to develop a novel prototype of an EHC short stack, various anode half cell designs (flow-field vs. microporous layer) will be evaluated via CFD simulation. Due to the high pressure difference between cathode and anode, the membrane is subjected to high stresses. Thus, a suitable anode design is essential to support the membrane without potential damage aiming a long lifetime of the compressor unit.

Content

- Literature research and requirement analysis (1 month)
- CFD simulation of defined anode flow field options (3 months)
- Evaluation of simulation data (1 month)
- Creation of written master thesis in english or german (1 month)

Start	05/2020
Duration	ca. 6 months
Compensation	€ 2.600
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