

Master thesis

in the research field of

Energy Conversion

Chair for Electrochemistry

(Prof. Dr. Thomas J. Schmidt)

www.electrochemistry.ethz.ch, www.psi.ch/lec

Title:

Development, Optimization and Application of new Membranes for Elevated Temperature Polymer Electrolyte Water Electrolysis

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Topic:

Polymer electrolyte water electrolysis (PEWE) technology offers the most promising prospects for hydrogen (and oxygen) generation for distributed as well as centralized operation, owing to its wide operational range of current densities, excellent dynamic response to variable electricity input and on/off cycling, and the possibility to operate at significant differential pressure. The aim of this project is to study the prospects of increasing the operating temperature of polymer electrolyte water electrolyzers to 90-95°C and introduce relevant modifications to the polymer membrane to enable cost reduction of the produced hydrogen by increasing the cell current density and/or improve the efficiency by reducing the cell voltage. The challenges of chemical and mechanical stability of membrane and electrodes under the more demanding conditions will be investigated and approaches for mitigating lifetime limitations identified and implemented.

Your profile:

- Bachelor's degree in chemistry, material science, engineering or physics
- Good command in English

Compensation: 600 CHF / Month

Starting period: January – April 2019

If you are interested in a detailed explanation and/or a lab tour, please contact Steffen Garbe or Lorenz Gubler.