Sustainable Process Engineering
Chemical Reactor Engineering

EINDHOVEN UNIVERSITY OF TECHNOLOGY

Alkaline water splitting in 3D printed electrolyzers

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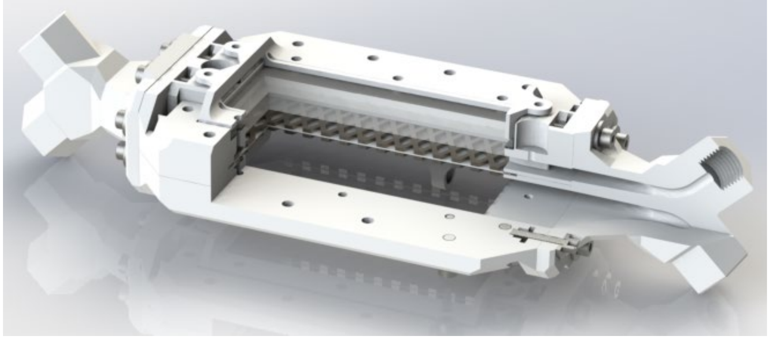
Introduction

In order to make the hydrogen economy a reality it is necessary to find a sustainable source of hydrogen. Electrolysis offers a clean, carbon neutral method of producing hydrogen. Though, a major challenge lies in building cost-efficient electrolyzers. For alkaline water electrolysis the challenge is to reach higher current densities (>20 kA/m2) and pressures (>30 bar).

Project summary

Achieving intensified water electrolyser will require a better understanding of the internal workings of the electrolyser. This project will focus on elucidating some of the mysteries related to bubble formation, growth and separation, energy consumption, and mass transfer in the presence of bubble evolution. In a first step the goal is to measure the performance of a water electrolyser. Here the cell voltage as a function of increasing current density is determined. The effect of geometry, cell internals and different types of membranes is investigated here. Here 3D printing can be used to build various cell geometries. The ultimate goal is to create an improved alkaline water electrolyser that can produce hydrogen more efficiently.



Project goals

Use 3D printing to create new geometries and internals for the electrolyser
Investigate the hydrogen bubble separation and geometries that enhance it
Measure the current-voltage performance of a zero gap water electrolyser
Design an improved water electrolyser based on the findings

Contact information

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