

**PEM ELECTROLYZER**  
by HIAT



Energiezukunft made in Schwerin

- Organisation
- Innovation
- Product Realisation
- Technology

HIAT gGmbH / Hydrogen Innovation GmbH

Formation 2002 / 2020

Location Technology and Commercial Centre Schwerin (TGZ)

Hydrogen Centre in the Hamburg metropolitan

Companies  
1. Non-profit research Institution  
2. Profit-oriented Company



Organisation

Innovation

Product Realisation

Technology

Foundations

Research and Development

Concepts, Innovations, Applications

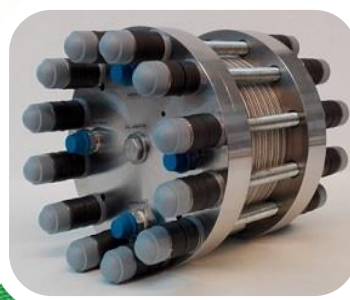
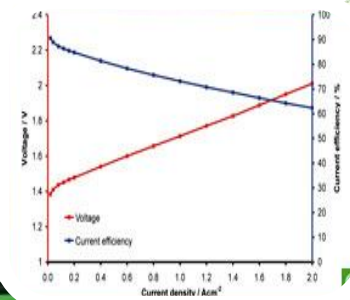
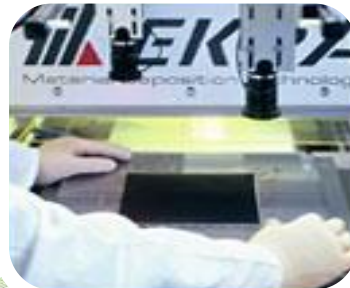
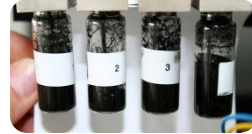
Contract Research

Meterings, Tests, Verifications

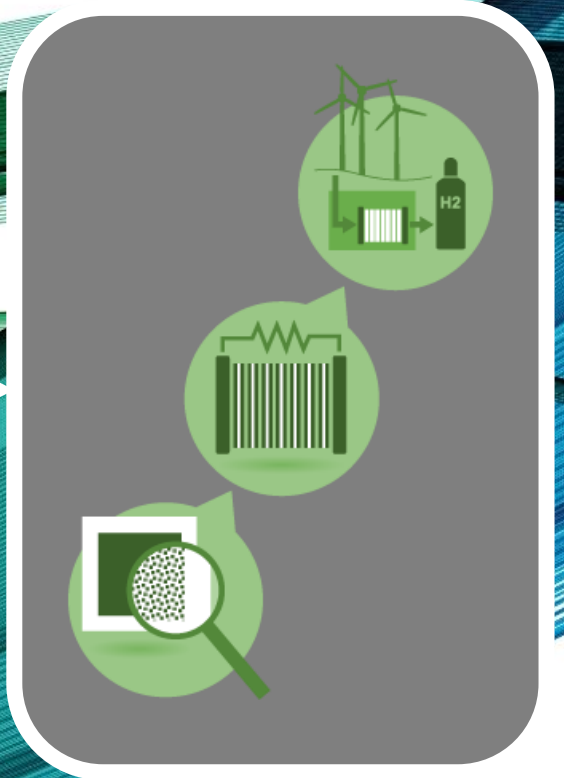
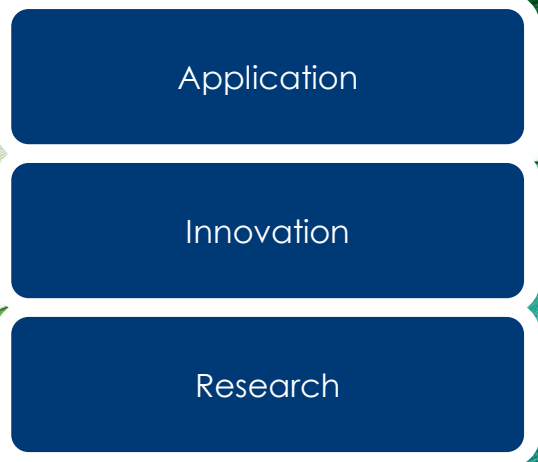
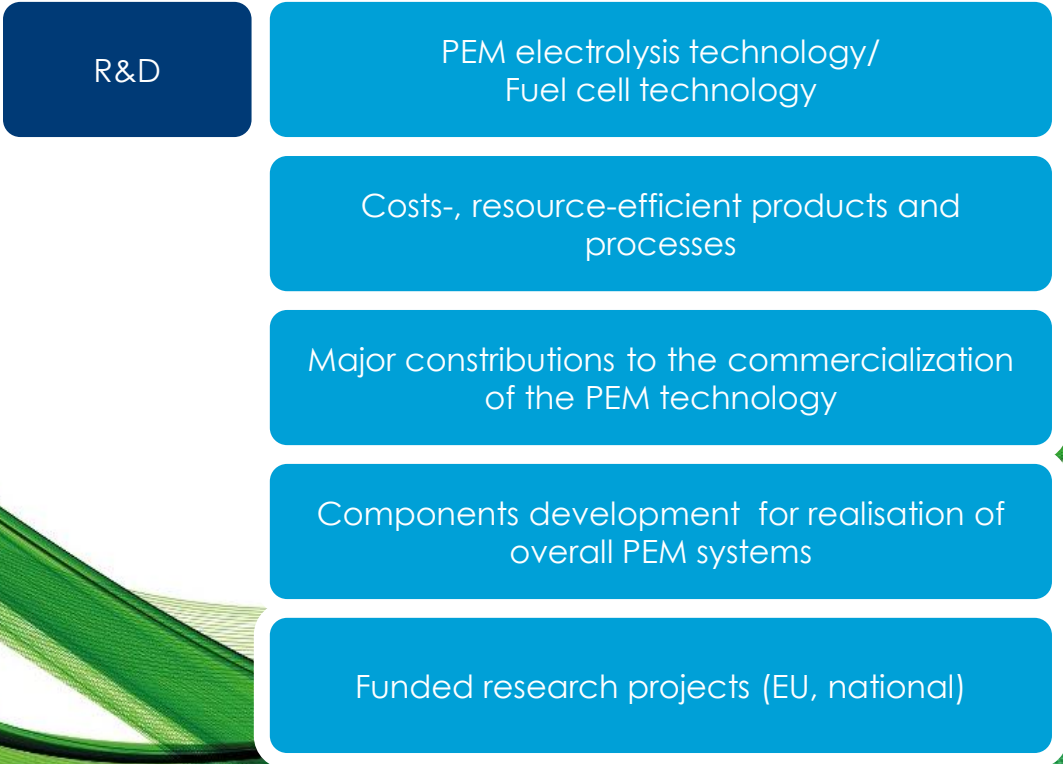
Products (Electrolysis Stacks, MEAs, CCMs, GDEs)

Implements in real environments

Prototyping, Patents, Licences



- Screen Printing
- Drying Cabinets/Vacuum Ovens
  - Compression Moulding
- Catalyst Preparation Technology
  - Sealing Technology
  - Centrifuges
- quickCONNECT (qCf) Fixtures
  - Impedance Spectroscopy
  - Conductivity Measurement
    - Cyclic Voltammetry
- Physisorption/Chemisorption Measurements
  - Thermogravimetric Analysis (TGA)
  - Energy Dispersive X-ray Spectroscopy
- Non-dispersive Infrared Sensor
  - FTIR-Spectrometer
  - REM/TEM Studys
  - Refractometer

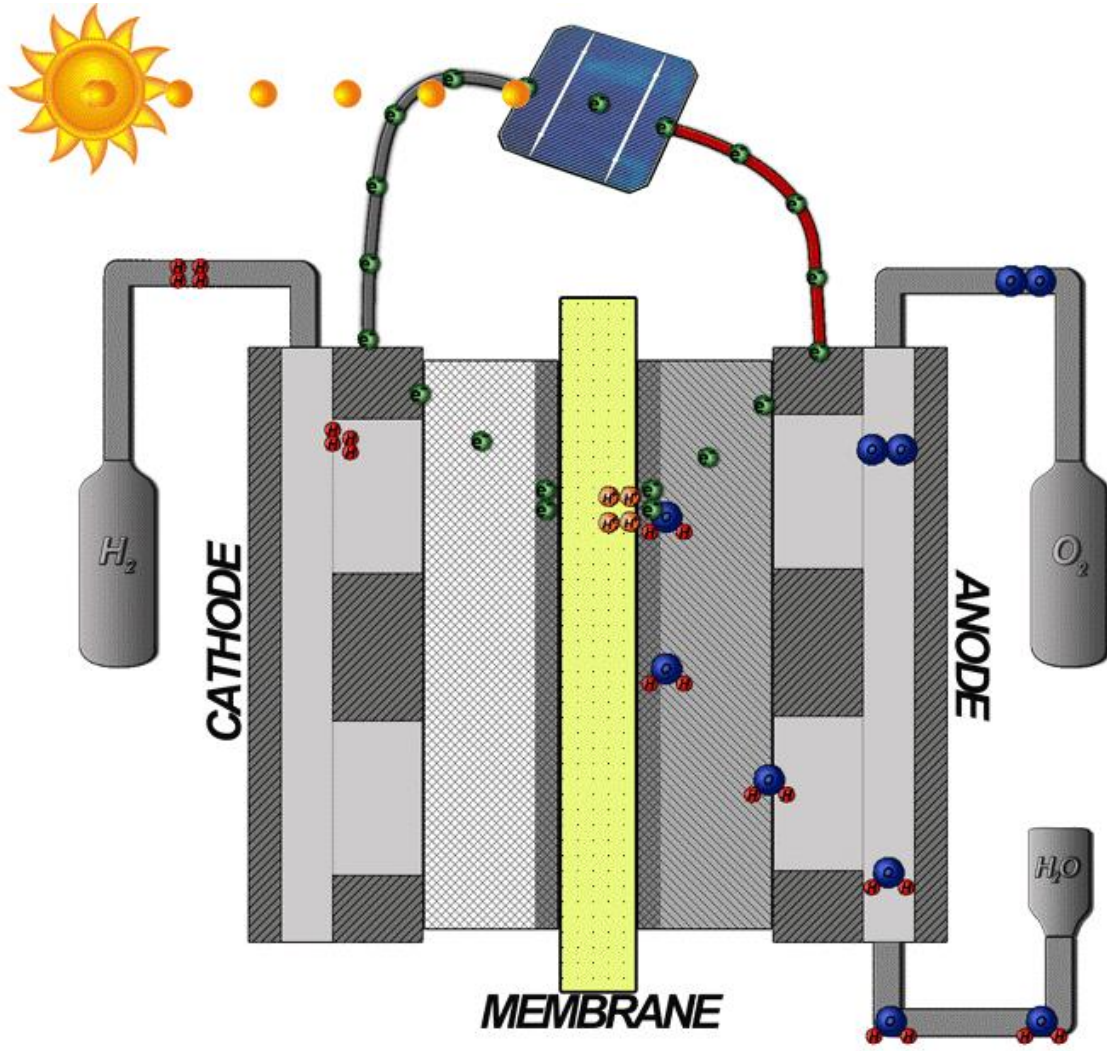


Organisation

Innovation

Product  
Realisation

Technology



Organisation

Innovation

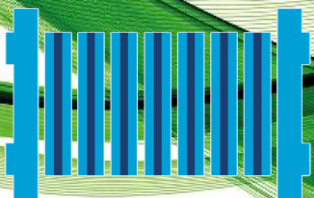
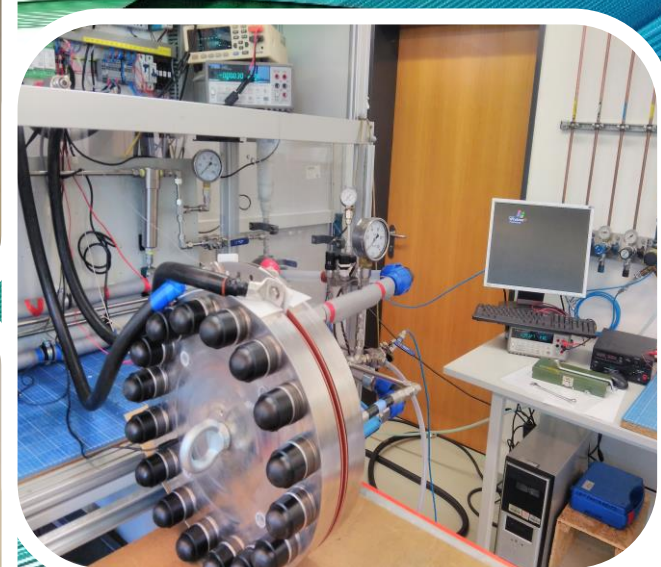
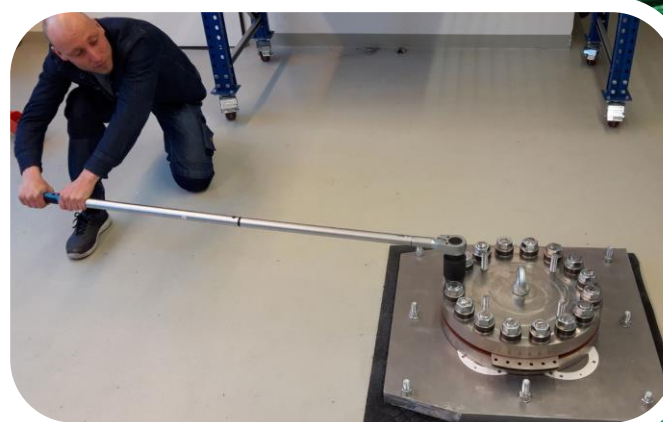
Product  
Realisation

Technology

HYDROSTEAM

HIAT: Development of a PEM electrolysis stack  
(production: 20 Nm<sup>3</sup>H<sub>2</sub>/h) up to 100 bar

- Increasing the efficiency of steam engines
- Increasing the efficiency > 90%
- reduction of CO<sub>2</sub> emissions



Organisation

Innovation

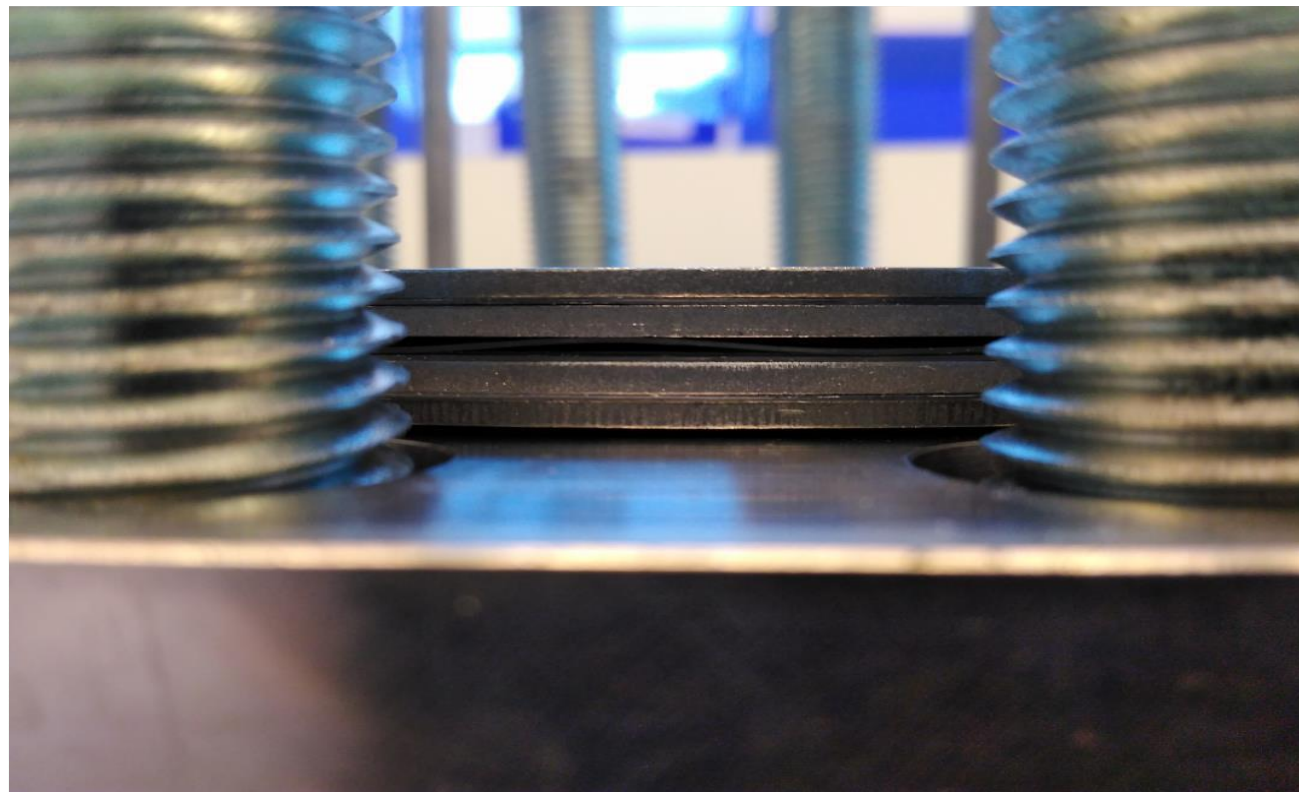
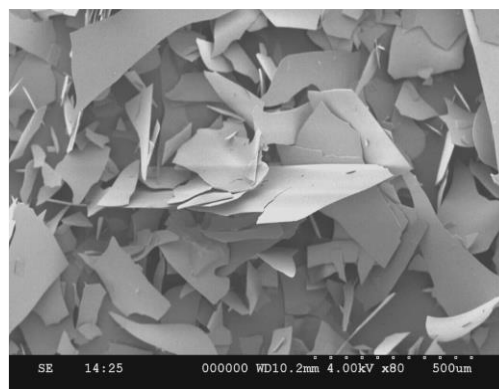
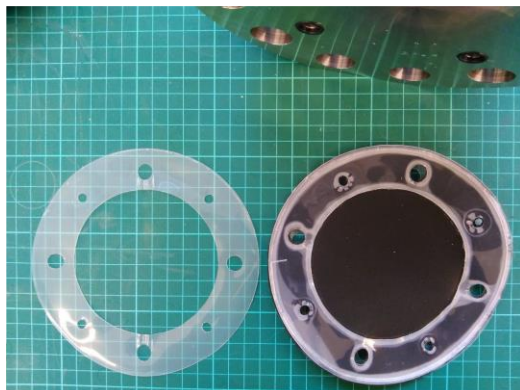
Product  
Realisation

Technology

SELYSIS

Cost-efficient and optimized Sealings for  
Electrolysis Applications

Development of a physically stable and chemically resistant Special seal for use in  
PEM electrolysis applications



Organisation

Innovation

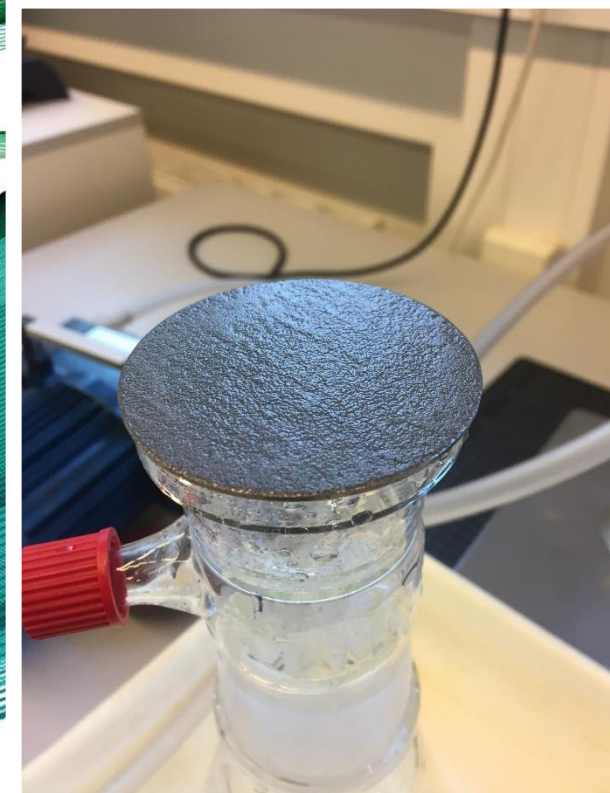
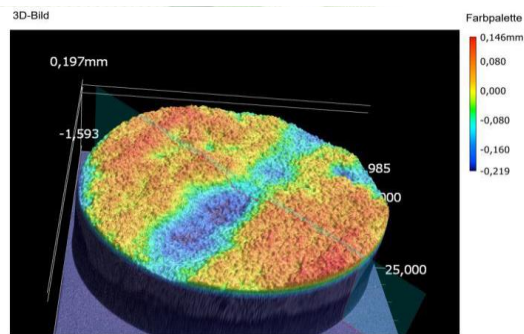
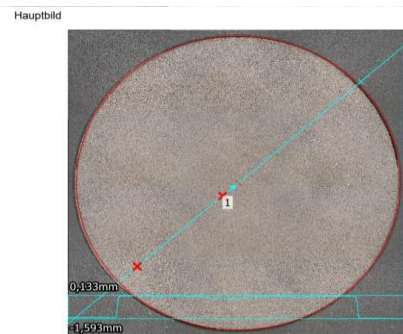
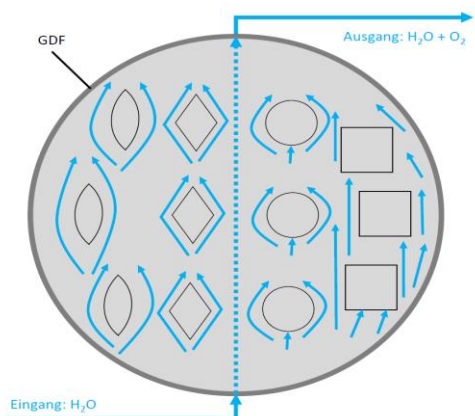
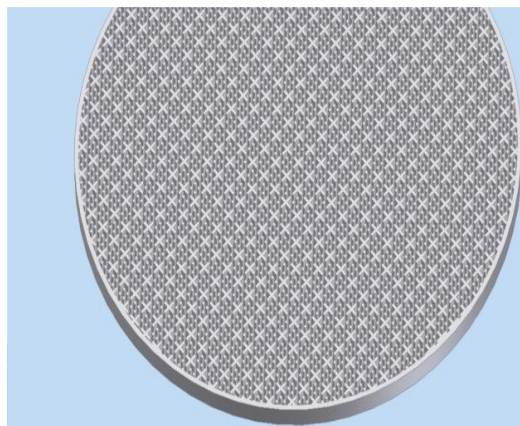
Product  
Realisation

Technology

GDFby3D-  
Print

Processing of Titanium Gas Diffusion Flow Fields  
for PEM Water Electrolysis by Innovative  
Additive Manufacturing

Development and integration of multifunctional flow field gas diffusion layers for  
PEM electrolysis made of titanium powder using an innovative additive  
manufacturing process





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## Products

CCMs, GDEs, MEAs

CCMs, GDEs, MEAs



PEM-Electrolysis-Stacks

- Max. hydrogen production rate: 20 Nm<sup>3</sup>/h
- Max. hydrogen output pressure: 40 bara



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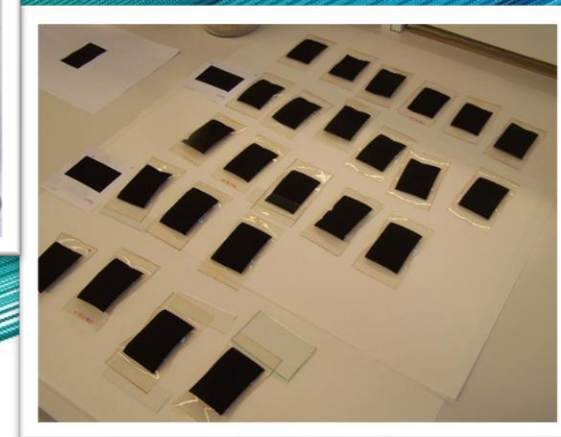
Product  
Realisation

Technology

CCMs, GDEs, MEAs

### Production method ./ → screen printing

- Doctor blade method, roller application, laser process, airbrush
- HIAT: Patented process for the production of MEAs by screen printing
- Advantages:
  - + very porous electrode layers
  - + homogeneous reproducible print layer
  - + precise positioning in multiple printing
  - + Layer thickness variable



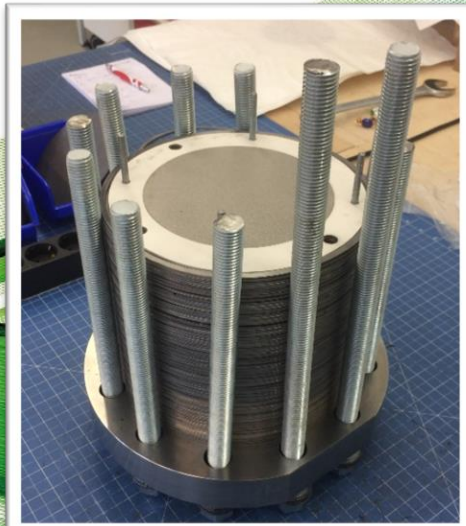
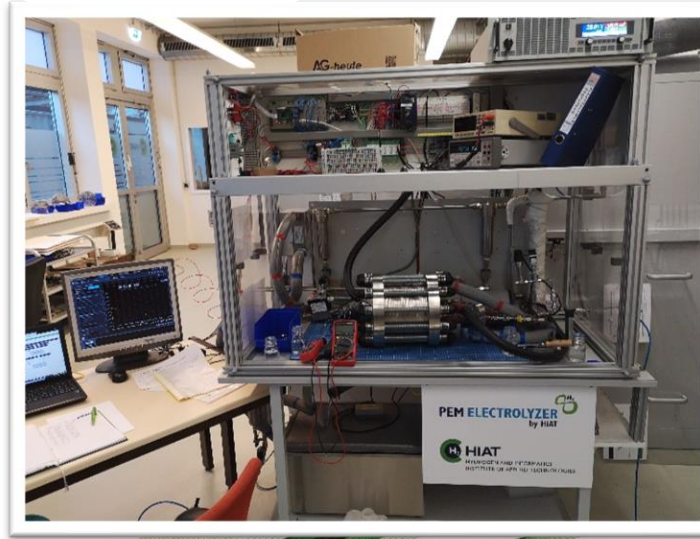
Organisation

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## PEM-Electrolysis-Stacks



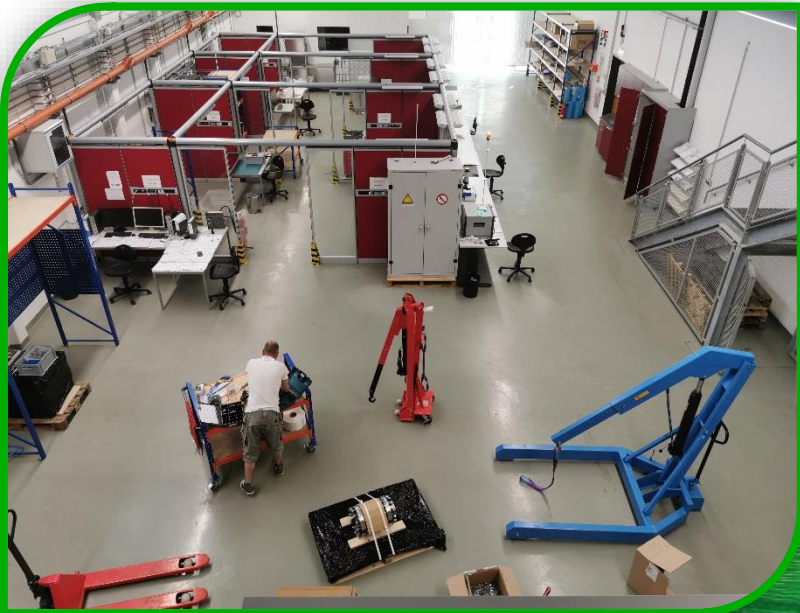
Organisation

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Product  
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PEM-Elektrolysis-Stacks



Organisation

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PEM-Elektrolysis-Stacks

# PEM ELECTROLYZER by HIAT



developed by



## SUPPLIER

up to 8 m<sup>3</sup>/h  
max. 47 kW

## STORAGER

up to 20 m<sup>3</sup>/h  
max. 120 kW

## CUSTOMIZER

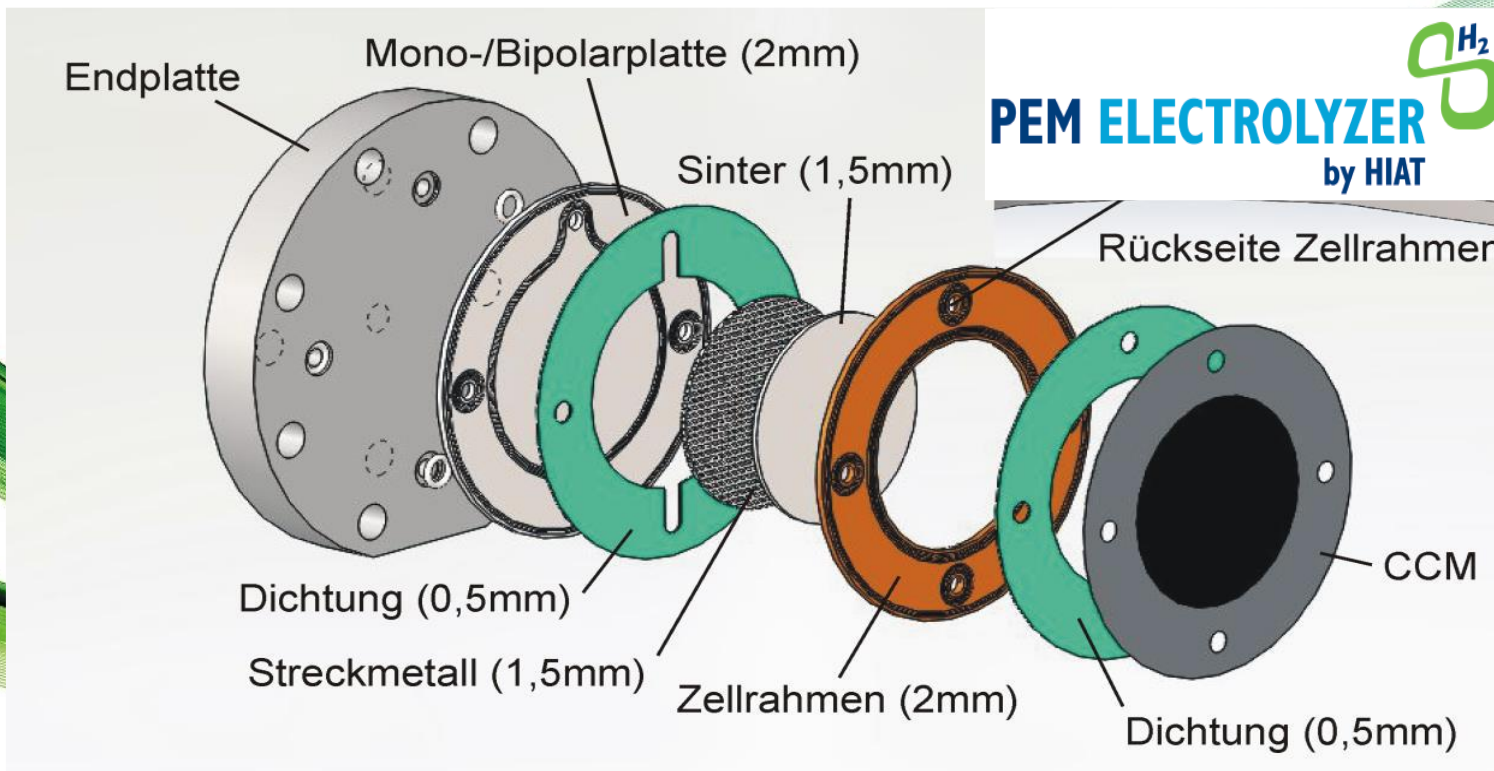
up to 3 m<sup>3</sup>/h  
max. 17 kW

## PURIFIER

up to 1 m<sup>3</sup>/h  
max. 7 kW



PEM-Electrolysis-Stacks internal



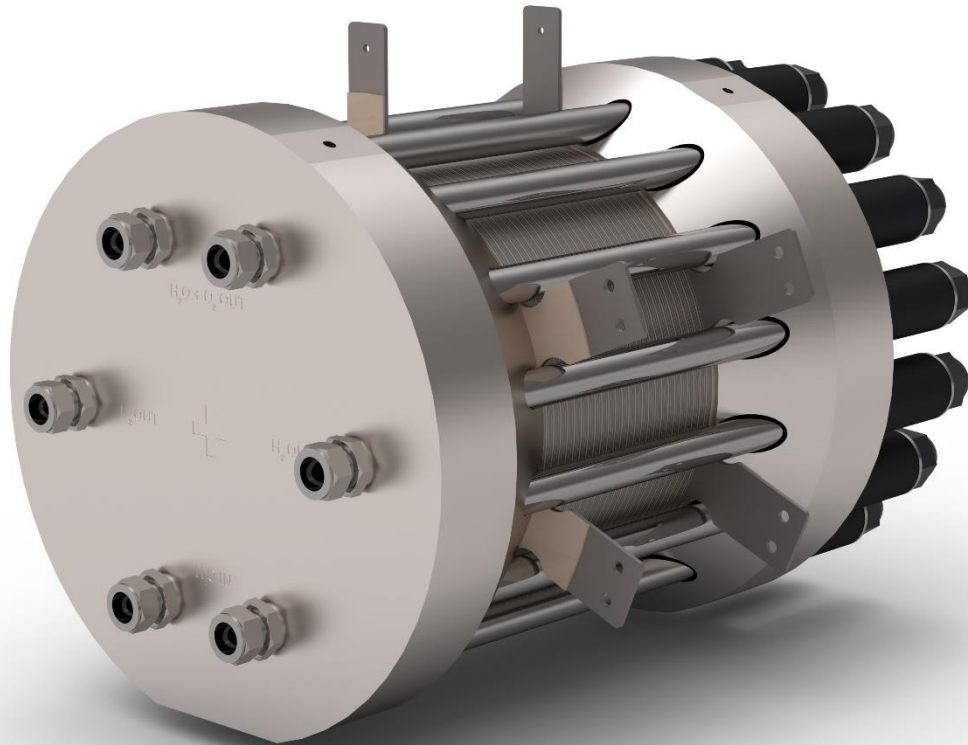
Organisation

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Product  
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Technology

Your project / your Stack ?



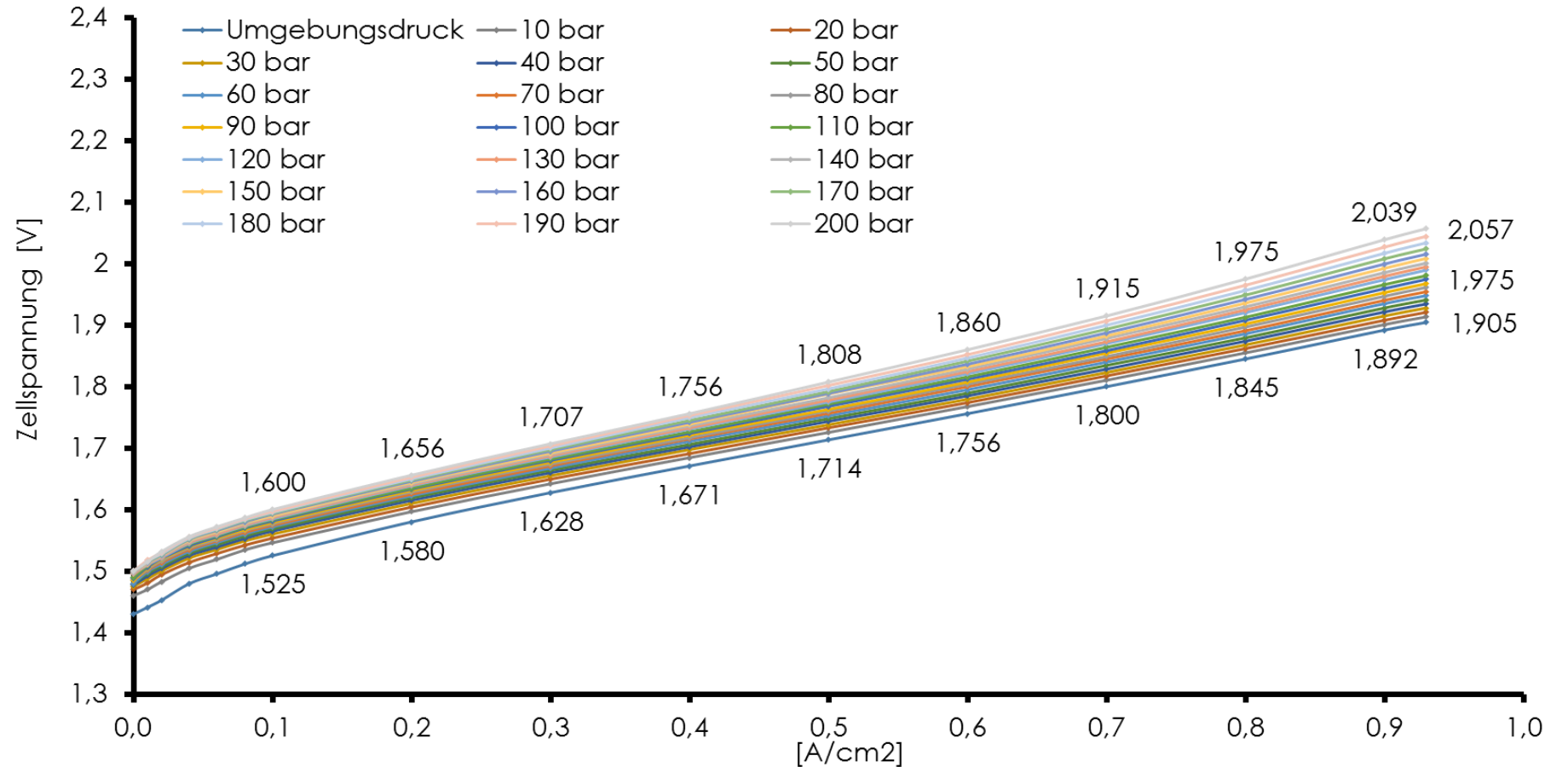
Pos.	Beschreibung
1	<p><b>Storage (HYP40/323,3K/45/250)</b>            Aktive Elektrodenfläche: 490,9 cm<sup>2</sup> (ø 250 mm)            Zellenanzahl: 45            H<sub>2</sub>-Produktion: 323.344 Nm<sup>3</sup>/min (19,40 Nm<sup>3</sup>/h)            O<sub>2</sub>-Produktion: 161.672 Nm<sup>3</sup>/min (9,70 Nm<sup>3</sup>/h)            Betriebstemperatur: 65 - 80 °C  <u>Stackspannung @ 40 bar @ 70 °C:</u>  <b>ca. 73,5 - 98,9 V @ BOL</b>            Stromstärke @ 40 bar @ 70 °C:  <b>49,1 - 1.030,8 A (DC)</b>            Anschlussleistung @ 40 bar @ 70 °C:  <b>ca. 3,61 - 101,97 kW @ BOL</b>            H<sub>2</sub>-Ausgangsdruck: 40 bar            O<sub>2</sub>-Ausgangsdruck: ambient            2x H<sub>2</sub>-Anschluss: 1"            4x H<sub>2</sub>O-Anschluss: 1"            H<sub>2</sub>O-Eingangsdruck: max. 2,5 bar            min. H<sub>2</sub>O-Volumenstrom: 127 l/min @BOL            min. H<sub>2</sub>O-Volumenstrom: 179 l/min @EOL            Wasserqualität: <b>DIN ISO 3696 type 1</b></p>

PEM-Electrolysis-Stacks performance

PEM differential pressure electrolysis

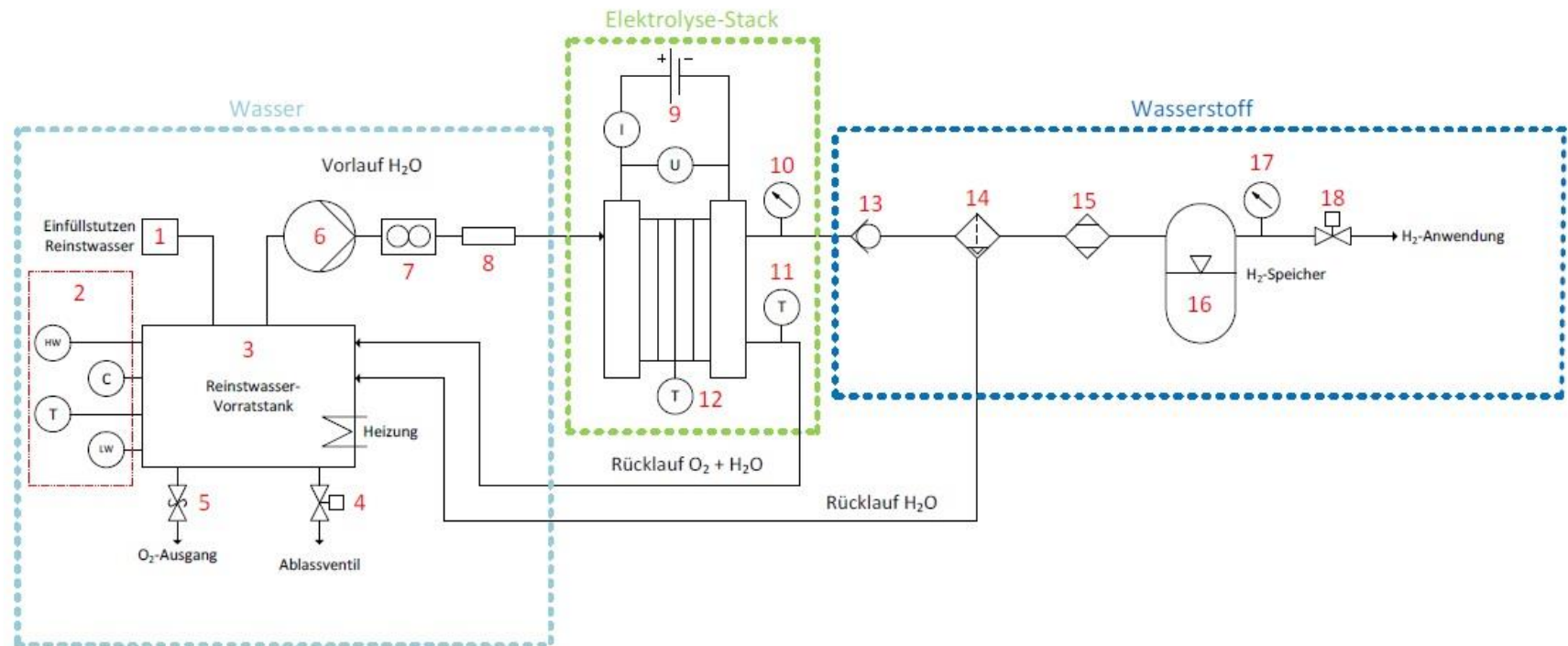
(0,13 W/cm<sup>2</sup> 1 → 200 bar)

HYP200\_Zweizeller  
T: 60°C / 20h





System technology



-  min. Füllstand
-  max. Füllstand
-  Leitfähigkeit
-  Temperatur

Thanks for attention



[www.hiat.de](http://www.hiat.de)