



//EU HYDROGEN
RESEARCH DAYS
15-16 NOVEMBER

NEWELY

Next Generation Alkaline Membrane Water Electrolysers with Improved Components and Materials

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Co-funded by
the European Union

Project Overview

- Call year: 2019
- Call topic: FCH-02-4-2019 New Anion Exchange Membrane Electrolysers
- Project dates: 1st January 2020 - 30th June 2023
- % stage of implementation 01/11/2023: 100 %
- Total project budget: 2,597,414 €
- Clean Hydrogen Partnership max. contribution: 2,204,846 €
- Other financial contribution: 392,568 €

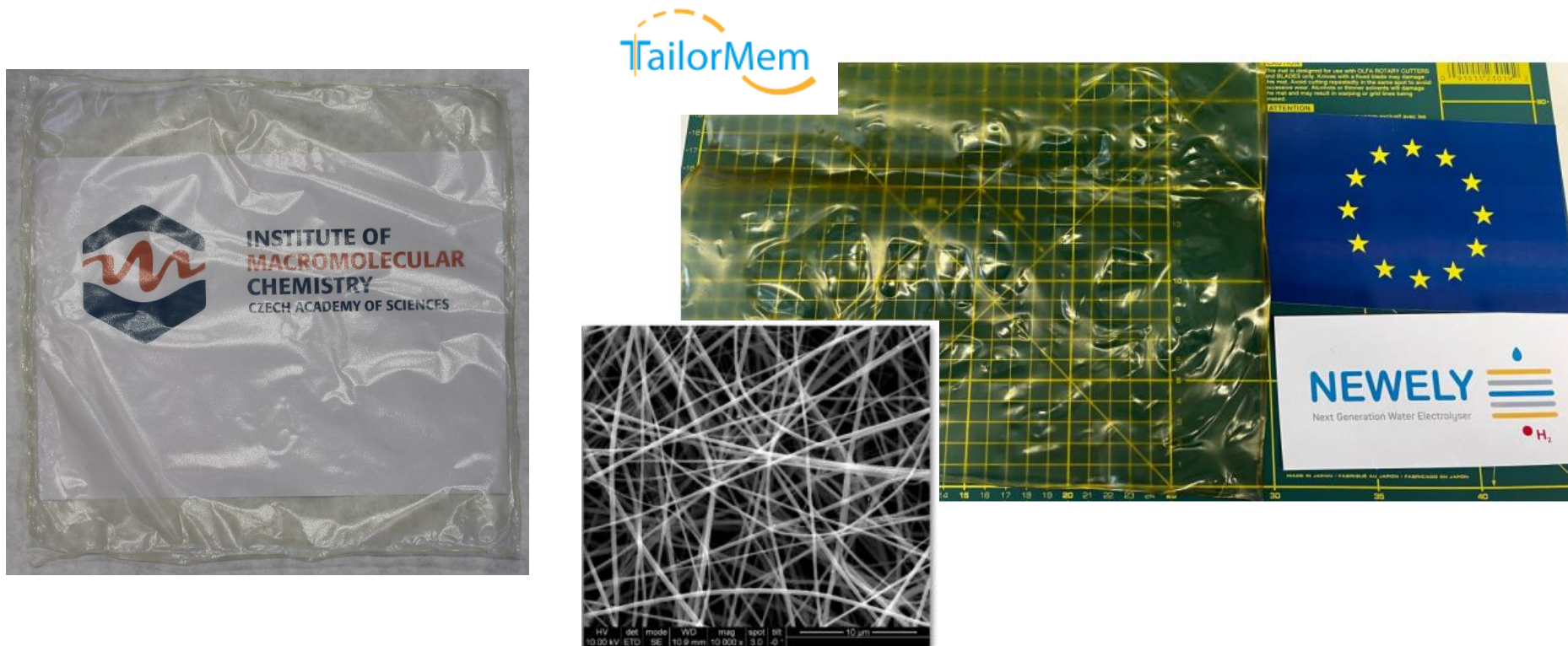
- Partners:           

Project Summary

- NEWELY project aims to redefine AEMWE, surpassing the current state of AWE and bringing it one step closer to PEMWE in terms of efficiency but at lower cost. The main developments include:
- Stable AEMs and ionomers, highly active non-PGM nanostructured catalysts, catalyst coated substrates (CCS - electrodes)
- 200 cm² active area AEMWE 5-cell stack with hydraulic compression technology and output hydrogen pressure up to 40 bar.
- The stack will reach 2 V @ 1 A cm⁻² with pure water feedstock only or diluted KOH. The targeted performance of the NEWELY prototype will be validated in a 2,000 hours endurance test with < 50 mV degradation.

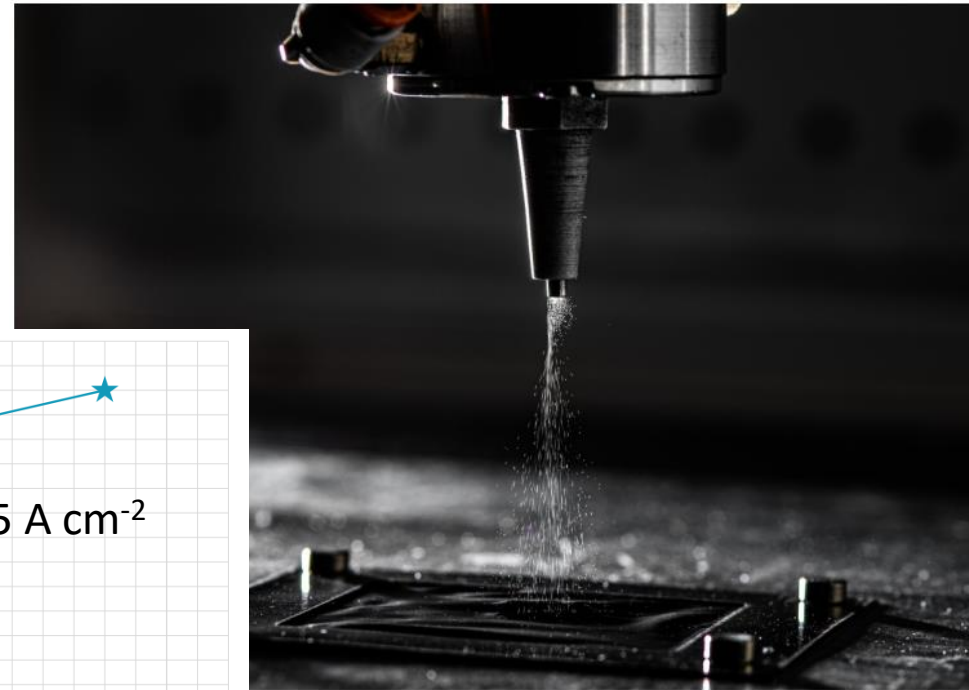
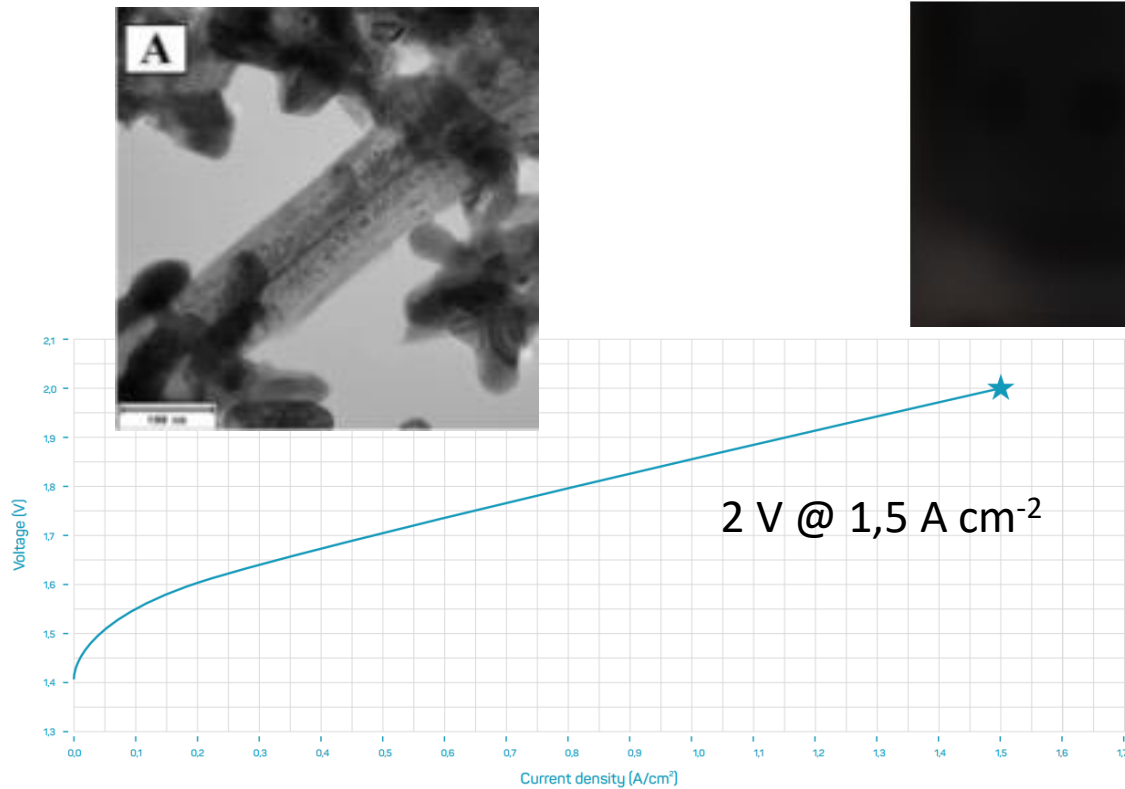
Achievements - Highlights

Membranes: high conductivity, reinforcement, upscaling and stability. Commercialization of project membrane started via start-up company of project partner IMC-CAS:



Achievements - Highlights

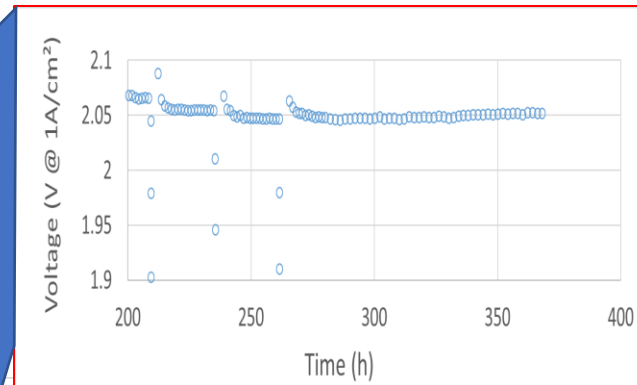
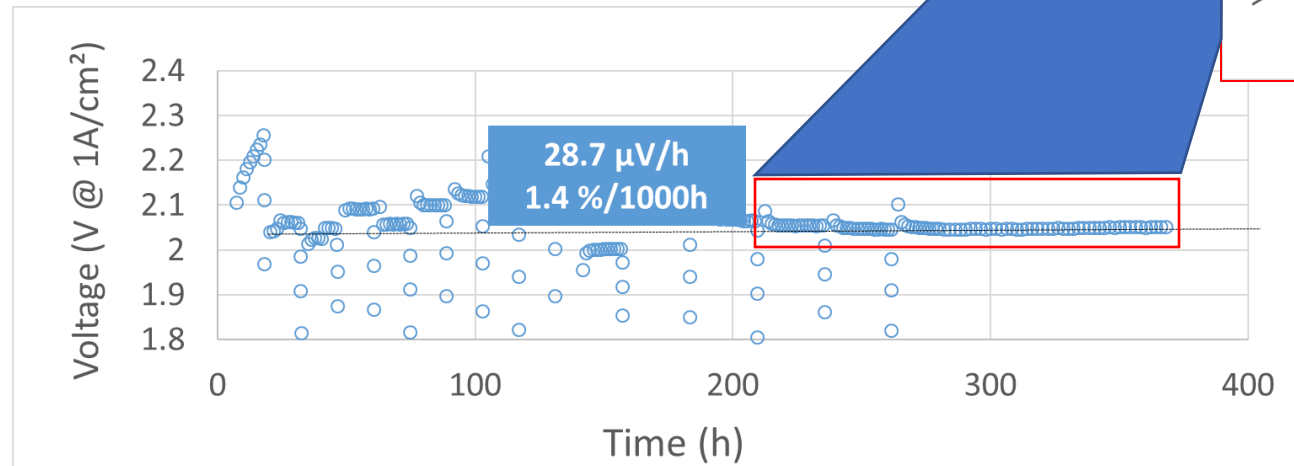
Catalyst and Electrodes: Non-PGM, low overpotential, catalyst coated substrates (CCS)



Achievements - Highlights

Single cell long term stability

The test validates the test cell hardware from the company ProPuls for its use in AEMWE



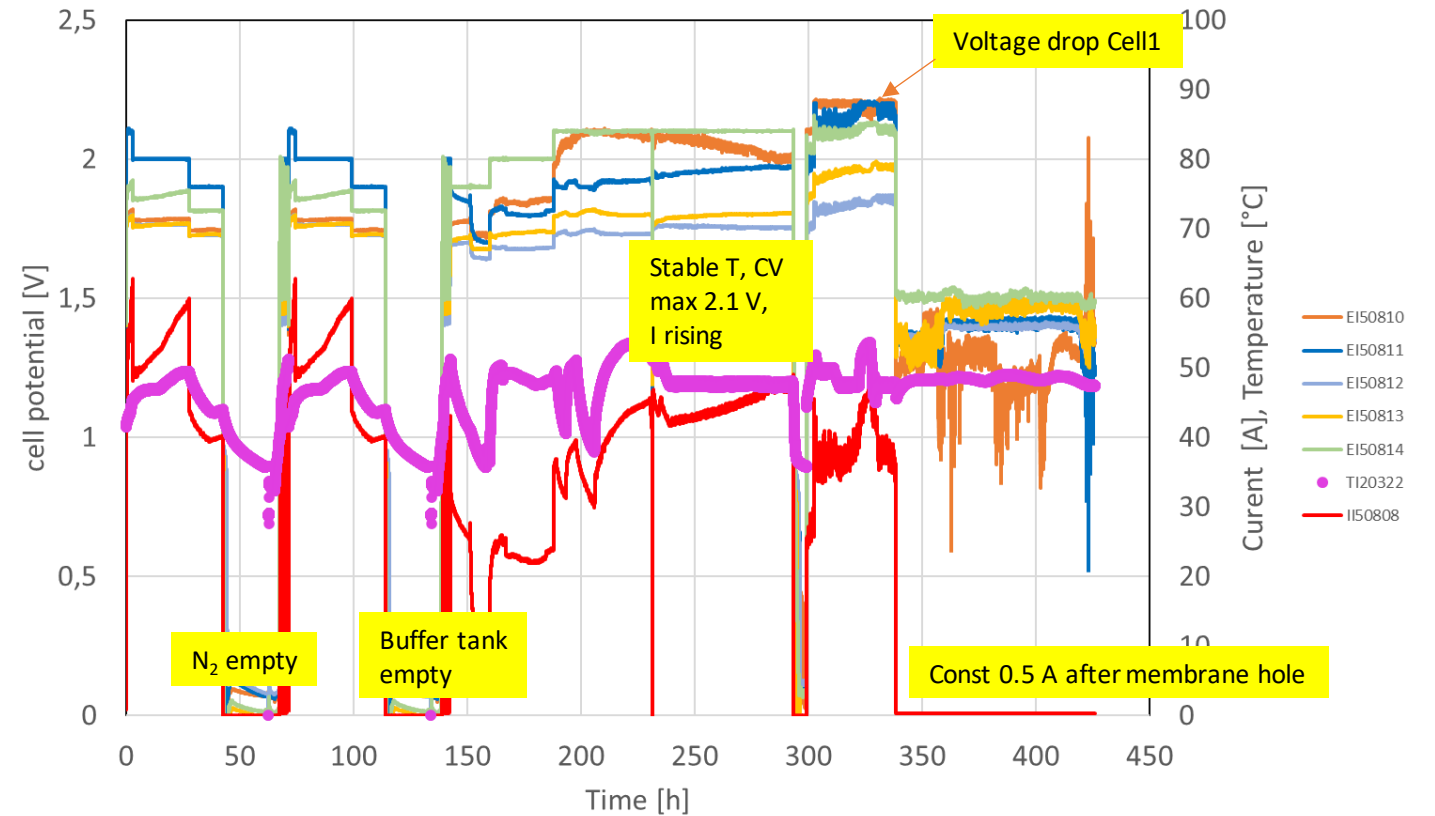
ProPuls

Achievements - Highlights

Stack with hydraulic compression technology



Long term test





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Lessons Learned

- Small issues of availability of commercial materials at the right specification and delivery times can cause major delays
- Covid situation did slow down the work because of the long periods when the labs were closed, and often personal interaction solves problems much faster than web meetings
- Constant exchange of technical information among the partners greatly helps to solve the technical issues and achieve success (e.g. Tests in ProPuls cell)

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Exploitation Plan/Expected Impact

Exploitation

- Several patents filed by partner KIST
- Star-tup company TailorMem, which sells some of the ionomers and AEMs developed in the project
- AEMWE single cell validated for commercialisation by partner ProPuls

Impact

- Cost reduction of electrolyser CAPEX
- Stack materials steel and PEEK are dominating materials impact
- LCA: electricity dominates the environmental impact of electrolytic hydrogen, independently of electrolyser technology



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Thank you for your attention!

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