Perspectives

Integration of the in-situ diagnostics tool enables:

- Monitoring of performance and local anomalies during operation
- Revealing systematical deficiencies not detectable offline
- Correlating degradation mechanisms and system parameters
- Identifying and preventing critical operation
- Systematically improving the efficiency of water electrolysis
- Recommendations for use of present and for design of future water electrolysers

Challenges

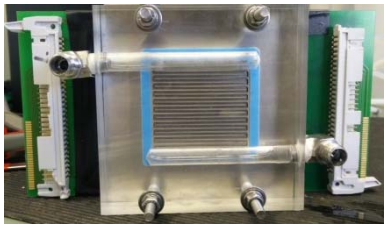
Adaptation of segmented PCB to electrolysis:

- pH and non H^+ ions
- Pressure
- Bubble formation
- Dimension
- Sealing

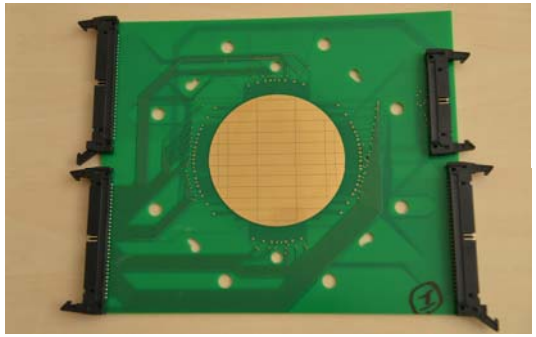
Industrial size water electrolyser stack by NEL Hydrogen

Achievements

The technology concept has been successfully verified in a PEMWE single test cell.



The 1st prototype for AE stacks has been designed and the 1st prototype for AEMWE stacks is ready.



An electrochemical near-ambient-pressure XPS cell for spectroscopic in-situ degradation studies on PEMWE is operable.

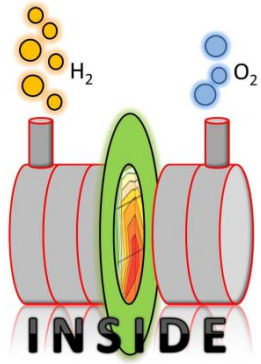
Financial support by

European Commission

FCH FUEL CELLS AND HYDROGEN JOINT UNDERTAKING

INSIDE

In-situ Diagnostics in Water Electrolysers

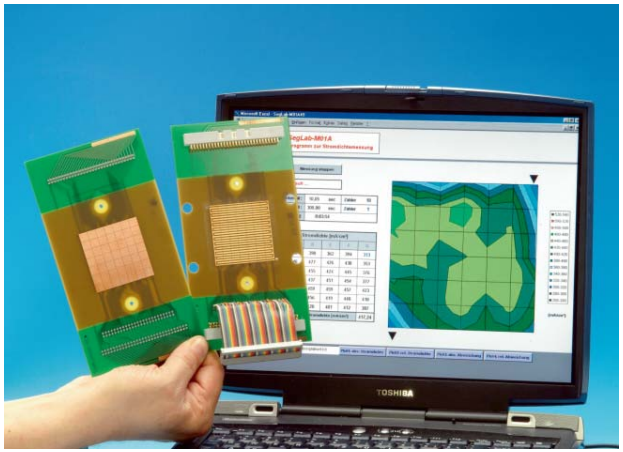


Objectives

An electrochemical in-situ diagnostics tool for monitoring of locally resolved current densities, originally developed for application in PEM fuel cells, is adapted to water electrolysis:

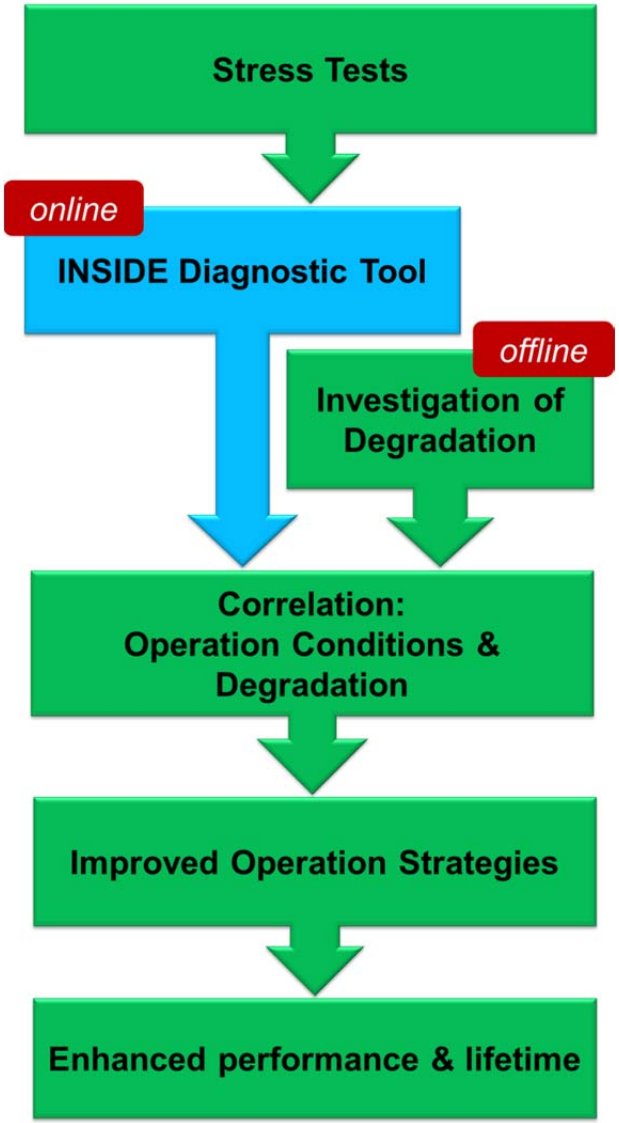
- PEMWE: based on proton exchange membranes
- AE: Alkaline water electrolysis
- AEMWE: based on anion exchange membranes

The developed tools allow correlating performance issues and ageing processes with local anomalies. Corresponding mechanisms are investigated with ex-situ analytics.



DLR´s patented segmented printed circuit board (PCB) for the monitoring of current density distributions in PEM based fuel cells

Strategy



Consortium

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- NEL Hydrogen AS, Notodden, Norway
- Heliocentris Italy S.r.l., Crespina, Italy
- Centre National de la Recherche Scientifique, France
- Université de Strasbourg, Strasbourg, France
- Hochschule Esslingen, Esslingen, Germany

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