European Institute
for Energy Research
by EDF and KIT

ARCADE

Advanced and robust metal supported cells with proton conducting ceramics for steam electrolysis and its use in low-carbon energy systems

ARCADE

Key Facts

Funding Agency
Federal Ministry of Education and Research (BMBF) and French National Research Agency (ANR)

Project Call
French-German joint call on sustainable Energy

Duration
10/2019 – 09/2022

Coordinator
DLR

Partners
- ceraco ceramic coating GmbH
- CNRS (IMN, AIME, Femto-St)
- Air Liquide

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Project Objectives

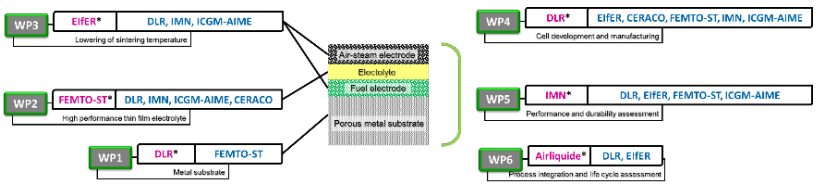
ARCADE aims at a pioneer work to fabricate and demonstrate with industrial manufacturing processes, an innovative flexible cost effective electrochemical reactor intended primarily for electrolysis application in energy systems. Low cost will be achieved owing to an innovative metal supported cell architecture that reduces the need for expensive ceramics and improves thermal conductivity. The implementation of high temperature proton conducting ceramics will allow cell operation at about 600°C reducing degradation issues. Gas tight thin film electrolyte, which is a key challenge to develop metal supported cells, will be produced by a unique method combining wet ceramic processing and Physical Vapor Deposition (PVD) techniques that allow manufacturing at mild condition. Engineering of composition, micro-structures and manufacturing will be the key enabling materials research. Cells with a footprint of about 100 cm² (required for industrial application) will be manufactured and tested in a laboratory environment simulating industrial application.

Finally, a techno-economic assessment of the proposed electrochemical reactor will be performed as a benchmark regarding alternative electrolysis technologies and for its integration into relevant Power-to-X scenarios.

EIFER's Contribution

EIFER will provide its expertise in the processing of PCCs, the electrochemical testing and in related Life Cycle Assessments (LCA).

The manufacturing of advanced cell layers and the cell testing contribute to the definition of test protocols and to the stack design.



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