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Fiaxell SOFC Technologies™

IMN INSTITUT DES MATÉRIAUX DE NANTES JEAN ROUXEL

VDM Metals

ACERINOX

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€ 3 880 641

36 MONTHS

11 PARTNERS

7 COUNTRIES

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Funded by the European Union

This project has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement N°101058784

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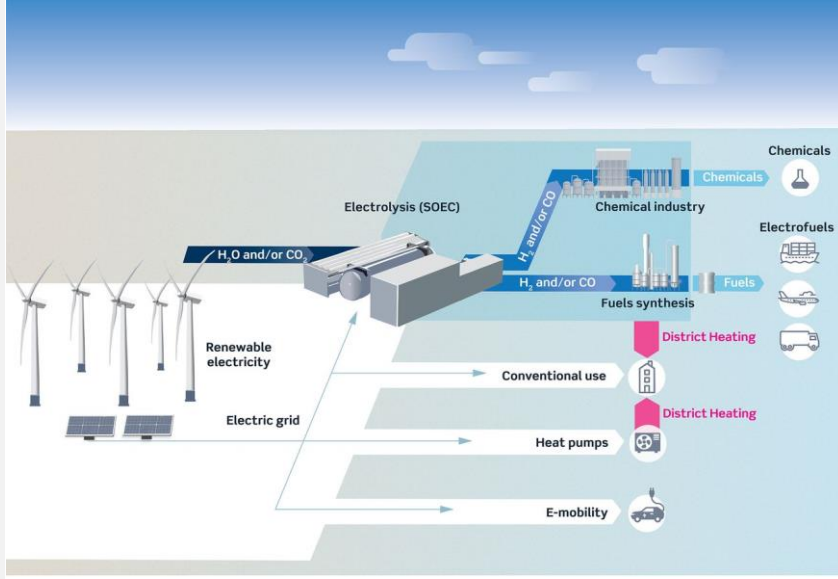

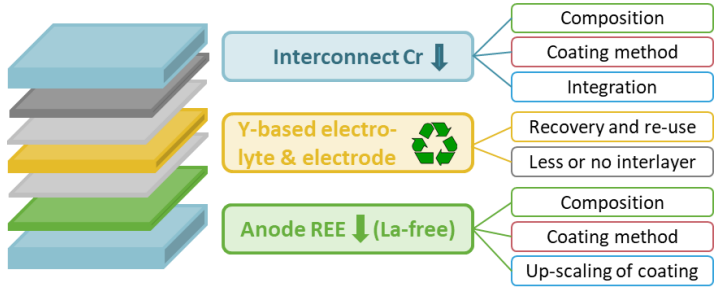

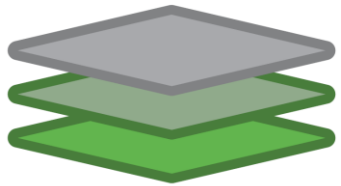

NOUVEAU

NOVEL ELECTRODE COATINGS AND INTERCONNECT FOR SUSTAINABLE AND REUSABLE SOEC

THE PROJECT

NOUVEAU focuses on making Solid Oxide Electrolysis Cell (SOEC) technology more sustainable and reusable by developing NOVEL ELECTRODE COATINGS AND INTERCONNECT. NOUVEAU will work on **alternative materials** to be used in SOEC and the **recycling of REE** for SOEC.
Besides the SOEC materials, the largest part of the cost of an SOEC stack is caused by the metal interconnects. These interconnects suffer also from corrosion and degrade the SOEC stack. To overcome these challenges NOUVEAU will work on a **lower-cost metal interconnect** with a **protective coating.**

The **NOUVEAU** project will **develop solid oxide cells with novel electrode materials and interconnects with a reduced amount of REE, PGM and Cr by employing innovative coating methodologies and modelling, in combination with sustainable-by-design aspects and recycling options up to TRL 5**.

Materials breakthrough: 20% reduced amount of Cr, recycling target of 50 to 70%, 30% reduced amount of REE (La).

Materials modelling: NOUVEAU virtual database on electrode materials; guidelines for electrode material selection in line with the 'safe and sustainable by design' (SSbD) approach.

Materials sustainability: ecodesign and circularity concepts in the design of the new metal coatings, with focus on reduced toxicity; recommendations for the end-of-life of the new material.

WORK PLAN

Materials development: In NOUVEAU, three different types of materials will be developed: i) La-free or REE-reduced oxygen electrode material, ii) Cr-reduced interconnect steel and iii) a protective material to be applied as coating on the interconnect.

Coating: Different coating methodologies will be employed for the electrodes and the interconnect material. Concerning the electrodes, screen printing as reference, spray coating as advanced technique to create electrodes with a fine-tuned microstructure and slot die coating as scalable coating technique. For the protective coating on the interconnect atmospheric, plasma spraying will be employed.

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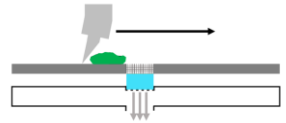
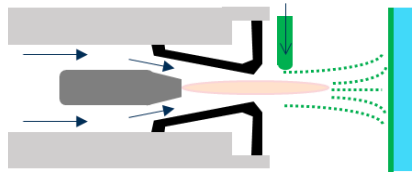
Coating techniques

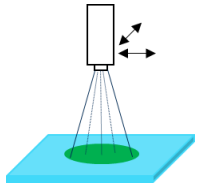


Screen printing

Slot die coating



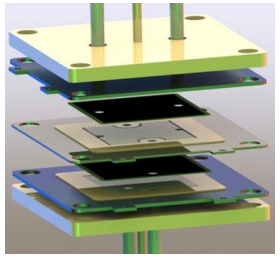
Atmospheric plasma spraying



Spray coating

Cell testing: Test protocols for SOEC testing will be developed and standardized to assess the performance and microstructure of the coated layers under operating conditions. The cells and interconnects will be tested in the Fiaxell SOFC/SOEC test setup which is now used in labs all around the world.

Fiaxell SOFC Technologies™



Materials Modelling and Predictive Models: to develop and implement multiscale bottom-up methods for virtual screening, predictive models' development, SSbD tools implanted for alternative materials and novel compositions design.

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