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New Anion Exchange Membrane Electrolysers

GRANT AGREEMENT No. 875024

Anion Exchange Membrane Electrolysis for Renewable Hydrogen Production on a Wide-Scale

ANIONE – Deliverable Report

D4.2 – Manufacturing Catalysts Meeting the Specifications and Provisions for Large Area MEAs and Stack

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Publishable summary

The deliverable 4.2 concerns the catalyst scaling-up activity addressed during the ANIONE project to provide sufficient amounts for large area MEA preparation. The ANIONE project focuses on tailoring anode and cathode catalysts for stable operation at high current density with low overpotential. Advanced non-PGM and non-CRM electrocatalysts for cathode and anode that have a high active surface area and are stable (low degradation rate) are developed and optimized in terms of composition structure and morphology. The activity is addressed to achieving high catalyst activity and stability by producing nanostructured Ni-Fe oxide for the anode and nanosized carbon supported Ni-Mo alloys for the cathode. Synthesis procedures involved scalable, low temperature routes carried out in CSTR reactors followed by thermal annealing in air or hydrogen reduction, and ball milling. Scaling-up of the down-selected catalyst formulations is carried out in the project for the supply of catalyst batches appropriate for the manufacturing of AEM electrolysis stack. A wide set of physico-chemical analyses are used to study the chemistry, morphology, structure and surface properties of the electro-catalysts. These include XRD, XPS, LE-ISS, TEM-EDX, SEM-EDX, BET, XRF etc. characterisations. Electrochemical properties are assessed in both half-cell and in a single cell AEM electrolyser by polarisation methods, cyclic voltammetry, impedance spectroscopy, time studies etc. The selected methods and formulations are easy to scaling-up catalysts to large batch production and provide materials capable of achieving the targeted performance and stability.

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Project partners:

#	Partner	Partner Full Name
1	CNR-ITAE	CONSIGLIO NAZIONALE DELLE RICERCHE
2	CNRS	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE
2.1	UM	UNIVERSITE DE MONTPELLIER
3	POCELLTECH	POCELL TECH LTD
4	TFPH (PV3)	TFP HYDROGEN PRODUCTS (FORMALLY PV3 TECHNOLOGIES LTD)
5	IRD	IRD FUEL CELLS A/S
6	HYDROGENICS	HYDROGENICS EUROPE NV
7	UNR	UNIRESEARCH BV

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