

## EUROPEAN COMMISSION – FCH JU

HORIZON 2020 PROGRAMME - TOPIC H2020-FCH-02-4-2019

New Anion Exchange Membrane Electrolysers

GRANT AGREEMENT No. 875024



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

## **ANIONE – Deliverable Report**

D3.3 Data-set on membranes and ionomer  
dispersions. Supply of down-selected membranes and  
ionomer dispersions manufacturing large area MEAs



*This project has received funding from the Fuel Cells and Hydrogen 2 Joint Undertaking (now Clean Hydrogen Partnership) under Grant Agreement No 875024. This Joint Undertaking receives support from the European Union's Horizon 2020 Research and Innovation program, Hydrogen Europe and Hydrogen Europe Research.*



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## **Publishable summary**

CNR-ITAE developed fluorinated anion exchange ionomer with quaternary ammonium functional groups. The ionomer was characterized in terms of ion exchange capacity and anion conductivity. In addition, a composite membrane based on polyaromatic FUMATech ionomer, containing radical scavenger as a filler, was developed and characterized. The composite membrane, in accordance with the chemical-physical data, reaches higher conductivity in the whole temperature range, maintaining values higher than the target (50mS/cm). The highest value corresponds to 60mS/cm. A scale-up procedure was carried out for membrane preparation to reach the dimension requested for stack realization.

Hydrolite performed a systematic study based on thermogravimetric analysis, ion exchange capacity and through-plane ion conductivity measurements on the ionomer it developed in comparison with a commercial benchmark. A new batch of reduced thickness (25  $\mu\text{m}$ ) was developed and no more than 0.2% of crossover was measured, meaning that the target of the project <1% vol. H<sub>2</sub> crossover, indicated in the MS2, is reached.

CNRS developed different types of reinforcements using a range of thermostable polymers and different fibre functionalisation approaches (bulk and surface) allowing different levels of interaction with the AEI using procedures such as casting or dual electrospinning. Different reinforced membranes were prepared. The most important result is that the hydrogen crossover through the membrane is 5 times lower in the reinforced membrane than in the corresponding non-reinforced membrane

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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	HYDRO	HYDROLITE
4	PV3	PV3 TECHNOLOGIES LTD
5	IRD	IRD FUEL CELLS A/S
6	HYDROGENICS	HYDROGENICS EUROPE NV
7	UNR	UNIRESEARCH BV



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