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REDHY

Redox-Mediated economic, critical raw material free, low capex and highly efficient green hydrogen production technology

REDHY - Deliverable report

D1.3 – Annual Reporting for the Clean Hydrogen JU

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Public Summary

The REDHy project tackles the limitations of contemporary electrolyser technologies by fundamentally reimagining water electrolysis, allowing it to surpass the drawbacks of state-of-the-art (SoA) electrolysers and become a pivotal technology in the hydrogen economy. The REDHy approach is highly adaptable, enduring, environmentally friendly, intrinsically secure, and cost-efficient, enabling the production of economically viable green hydrogen at considerably increased current densities compared to SoA electrolysers. The REDHy method is based on the findings of numerous EU-funded initiatives and patented by the DLR (TRL2). It is uniting academic and industrial entities across a broad spectrum of expertise. Unlike SoA electrolysers, REDHy is entirely free of critical raw materials and doesn't require fluorinated membranes or ionomers, while maintaining the potential to fulfil a substantial portion of the 2024 KPIs. In accordance with Europe's circular-economy action plan, a 5-cell stack with an active surface area exceeding 100 cm^2 and a nominal power of 1.5 kW will be developed, capable of managing a vast dynamic range of operational capacities with economically viable and stable stack components. These endeavors will guarantee lasting and efficient performance at elevated current densities (1.5 A cm^{-2} at E_{cell} 1.8 V/cell) at low temperatures (60 °C) and suitable hydrogen output pressures (15 bar). The project's ultimate objective is to create a prototype, validate it in a laboratory setting for 1200 hours at a maximum degradation of 0.1%/1000 hours and achieve TRL4. This final phase will emphasize the potential of the REDHy approach and its crucial role in the upcoming hydrogen economy, secure subsequent investments, and showcase the necessity for ground-breaking, innovative thinking to reach climate objectives in a timely fashion.

11 Acknowledgement

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Project partners:

#	Partner short name	Partner Full Name
1	DLR	DEUTSCHES ZENTRUM FUR LUFT – UND RAUMFARHT EV
2	CNRS	CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIC
3	UNR	UNIRESEARCH BV
4	UPV	UNIVERSITAT POLITECNICA DE VALANCIA
5	IDN	INDUSTRIE DE NORA SPA-IDN
6	CENMAT	CUTTING-EDGE NANOMATERIALS CENMAT UG HAFTUNGSBESCHRANKT
7	CNR	CONSIGLIO NAZIONALE DELLE RICERCHE

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