NewSOC

NEXT GENERATION SOLID OXIDE FUEL CELL AND ELECTROLYSIS TECHNOLOGY

Project ID:	874577
PRD 2023:	Panel 1 – H2 production
Call topic:	FCH-02-6-2019: New materials, architectures and manufacturing processes for solid oxide cells
Project total costs:	EUR 4 999 726.25
Clean H_2 JU max. contribution:	EUR 4 999 726.25
Project period:	1.1.2020–30.6.2023
Coordinator:	Danmarks Tekniske Universitet, Denmark
Beneficiaries:	Aktsiaselts Elcogen, Ceres Power Limited, Commissariat a l'énergie atomique et aux énergies alternatives, École polytechnique fédérale de Lausanne, Ethniko Kentro Erevnas Kai Technologikis Anaptyxis, Fundacio Institut de Recerca de L'energia de Catalunya, Hexis AG, Idryma Technologias Kai Erevnas, Instytut Energetyki, Nederlandse Organisatie voor Toegepast Natuurwetenschappelijk Onderzoek TNO, Politecnico di Torino, SolydEra SpA, Sunfire GmbH, Teknologian tutkimuskeskus VTT Oy, Università degli Studi di Salerno

http://www.newsoc.eu/

PROJECT AND OBJECTIVES

NewSOC aims to significantly improve the performance, durability and cost competitiveness of solid oxide cells and stacks compared with the state of the art, focusing on (i) structural optimisation and innovative architectures, (ii) alternative materials and (iii) innovative manufacturing. The project succeeded in improving the cells, yielding a 25 % increase in applicable current density and a 25 % lower area-specific resistance (ASR), which marked the first milestone. Progress was achieved for all proposed concepts, and specific plans were agreed with the industry partners for integration into their commercial platforms.

NON-QUANTITATIVE OBJECTIVES

- Achieve redox stability in the cells.
- Produce a cell/stack with improved cycling stability.
- Reduce toxic organics/materials during manufacture.

PROGRESS AND MAIN ACHIEVEMENTS

- The integration of NewSOC development concepts into industrial platforms (cells and stacks) was achieved and tests were carried out.
- Quantities of toxic organics/materials were reduced through the development of a Co-free oxygen electrode. Cobalt was reduced in the protective coating for interconnects, and toxic solvents were removed for the deposition of sealants.
- A redox-stable cell with doped lanthanum chromite fuel electrodes was developed.

FUTURE STEPS AND PLANS

- The development of NewSOC concepts will be completed.
- Validation tests integrating the NewSOC developments into industrial cells and stacks will be completed.
- The 5 000-hour test is to be completed.

QUANTITATIVE TARGETS AND STATUS

Target source	Parameter	Unit	Target	Achieved to date by the project	Target achieved?
Project's own objectives	ASR (80 × 120 mm² solid power anode electrolyte half-cell)	ohm.cm² at 650 °C	0.4	0.5	⚙
	ASR (Co-free cell, LSF oxygen electrode with improved microstructure)	ohm.cm² at 650 °C	0.4	0.4	✓
	Electrolysis current for operation with a degradation rate below 1 %/1 000 h	A/cm²	0.75–1	0.5 … 0 %/1 000 h	
	Electrolysis current for operation with a degradation rate below 1 %/1 000 h	A/cm²	0.75–1	0.3 … 0.5 %/1 000 h	
	Operating temperature	°C	650	650–700	

Clean Hydrogen Partnership
Co-funded by the European Union