SOCTESQA - Solid Oxide Cell and Stack Testing

Auer, C. ; Lang, M. ; Couturier, K. ; Ravn Nielsen, Eva; McPhail, S.J. ; Tsotridis, G.; Fu, Q.

Publication date:
2014

Link back to DTU Orbit

Citation (APA):
Partners
Deutsches Zentrum für Luft- und Raumfahrt e.V. (Coordinator)
Commissariat à l'énergie atomique et aux énergies alternatives
Danmarks Tekniske Universitet
Agenzia nazionale per le nuove ecologie, l'energia e lo sviluppo economico sostenibile
Joint Research Centre – European Commission
European Institute for Energy Research
Nanyang Technological University

Project Duration: Mai 2014 – April 2017

Concept and Objectives
- Complex solid oxide cell (SOC) test systems (Fig. 1) require detailed test schemes, procedures and protocols.
- Main project objective: Development of uniform and industry wide test protocols for high temperature solid oxide cells/stacks.
- Three different operating modes in steady state and dynamic operation:
  - Solid oxide fuel cell (SOFC)
  - Solid oxide electrolysis cell (SOEC)
  - Reversible SOFC/SOEC operation.
- Applications: Micro-combined heat/power generation, auxiliary power unit, combined SOFC/SOEC energy conversion systems.
- Test specimen: Stack relevant solid oxide assembly units (e.g. short stacks with 3 to 5 cells).

Scientific and technical methodology

Work packages
- WP 1: Coordination: Monitoring the project progress, administrating the budget and financial issues.
- WP 2: Specification and Procurement: Definition of specifications and procurement of testing samples.
- WP 3: Testing Procedures: Definition of the overall test matrix and test procedures.
- WP 5: SOEC: Testing and validation of the cell/stack assembly unit in electrolysis operation.
- WP 6: Combined SOFC/SOEC: Testing of the cell/stack assembly unit in combined fuel cell/electrolysis mode.
- WP 7: Dissemination and Liaison: Dissemination of project results and interaction with standard developing organizations and industrial stakeholders.

Consortium as a whole

Fig. 1: Schematic graph of a test system for high temperature solid oxide assembly unit

Fig. 2: Overview of the project work packages

Fig. 3: Overall project consortium