SOCTESQA - Solid Oxide Cell and Stack Testing

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Agenzia nazionale per le nuove ecnologie, 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)
  - Solide 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).

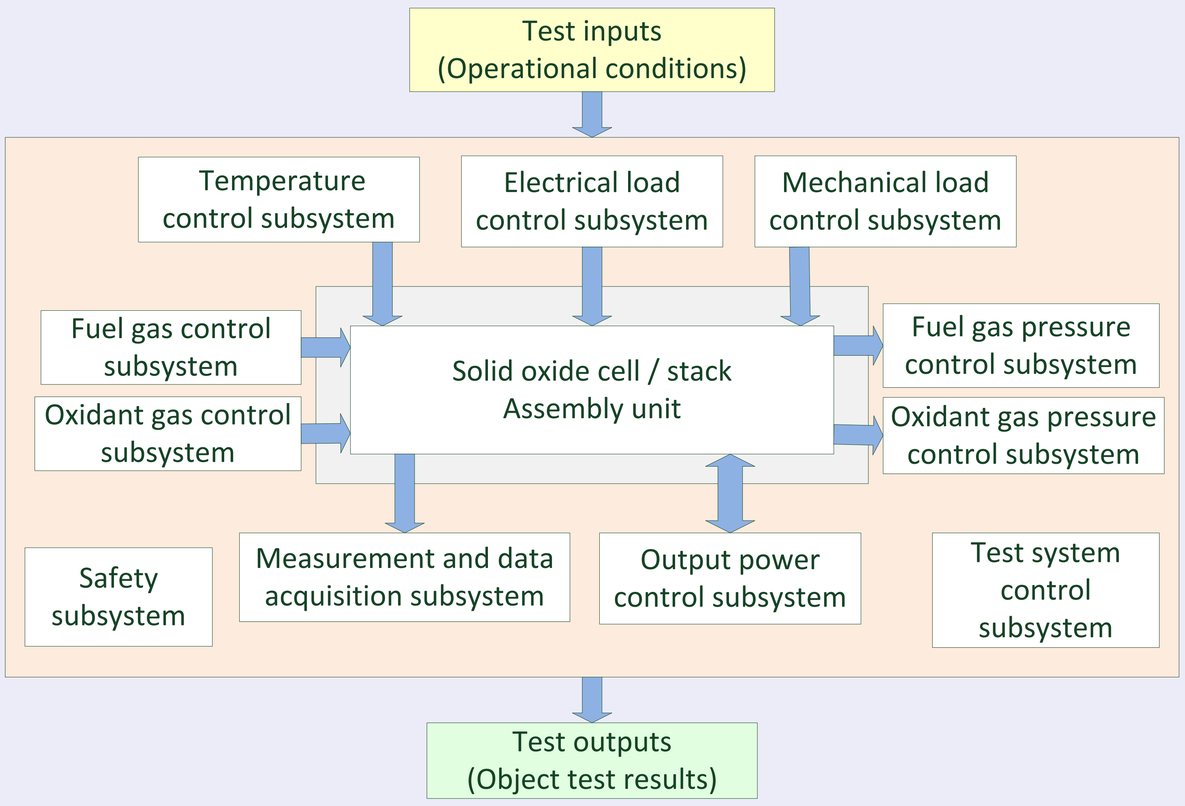

Fig. 1: Schematic graph of a test system for high temperature solid oxide assembly unit

Scientific and technical methodology

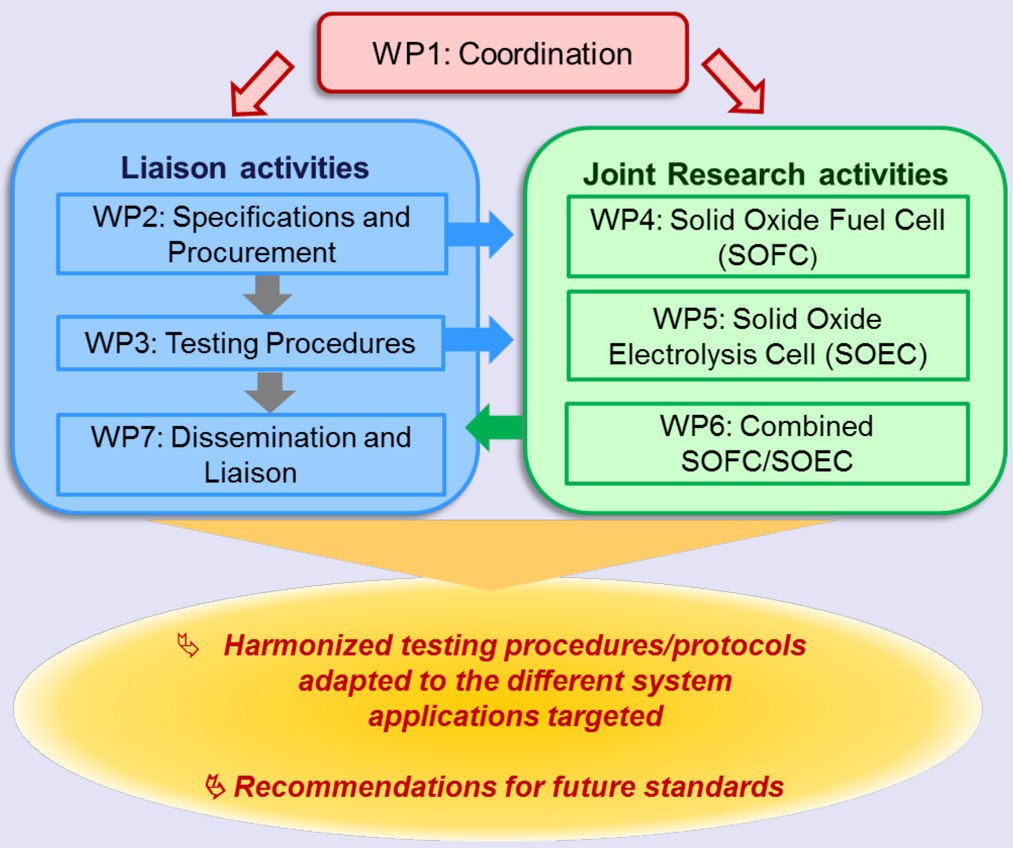

Fig. 2: Overview of the project work packages

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 4: SOFC:** Testing and validation of the cell/stack assembly unit in fuel cell operation.
- **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. 3: Overall project consortium

Deutsches Zentrum für Luft- und Raumfahrt
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