StackTest - Development of PEMFC Stack Reference Test Procedures for Industry

Jens Mitzel

Second Act - Public Workshop on Durability Issues in PEMFC and DMFC Stuttgart, 30.1.17
General approach of Stack-Test

11 partners:

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<td>Powercell Sweden AB</td>
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<td>Proton Motor Fuel cell GmbH</td>
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<td>BAXI INNOTECH GmbH</td>
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General approach of Stack-Test

3 technical work packages regarding:
- functional and performance testing
- endurance testing
- safety and environment testing

All test procedures acquirable: stacktest.zsw-bw.de
Conclusion – Functional and Performance Tests

• Complex TIP interaction for stack testing demands definition of critical TOCs, sensor positions and procedures

• TMs defined and validated for TIPs influencing the stack performance:
  - All test procedures for performance characterization covered
  - Performance influenced by:
    - Test equipment (e.g., humidification)
    - Sensor positions for parameter control
    - Direction of parameter variation

• TMs can be combined to different TPs:
  - Sequential approach
  - Nested approach

• Representative test operating conditions for all applications
Conclusion – Durability and Endurance Tests

• Different procedures for 3 types of degradation tests:
  ➢ Constant load
  ➢ Load cycling (different cycles defined)
  ➢ Start/Stop cycling

• High impact of test parameter and test bench dynamic on test results:
  ➢ Humidification
  ➢ Reactant supply (pilot time)
  ➢ Electrical load (current transients)

• Definition for determination of degradation rate required

• Impact of test blocks and performance recovery procedures on test results
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All TM and TP documents available → stacktest.zsw-bw.de