Quality Assurance of Solid Oxide Fuel Cell (SOFC) and Electrolyser (SOEC) Stacks

In the EU-funded project “Solid oxide cell and stack testing and quality assurance” (SOCTESQA) standardized and industry wide test modules and programs for high temperature solid oxide cells and stacks are being developed. These test procedures can be applied for the fuel cell (SOFC), the electrolysis (SOEC) and in the combined SOFC/SOEC mode. In order to optimize the test modules the project partners have tested identical SOC stacks with the same test programs in several testing campaigns. Altogether 10 pre-normative test modules were developed: Start-up, current-voltage characteristics, electrochemical impedance spectroscopy, reactant utilization, reactant gas composition, temperature sensitivity, operation at constant current, operation at varying current, thermal cycling and shut-down. The test modules were validated by comparing the results in terms of repeatability of the different testing campaigns and in terms of reproducibility among the different partners. Moreover, the results are discussed in context to the test input parameters.