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Solid Oxide Cell and Stack Testing, Safety and Quality Assurance (SOCTESQA)

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The market penetration of fuel and electrolysis cell energy systems in Europe requires the development of reliable assessment, testing and prediction of performance and durability of solid oxide cells and stacks (SOC). In order to advance in this field the EU-funded project "SOCTESQA" was launched in May 2014. Partners from different countries in Europe and one external party from Singapore are working together to develop uniform and industry wide test procedures and protocols for SOC cell/stack assembly. In this project new application fields which are based on the operation of the SOC cell/stack assembly in the fuel cell (SOFC), in the electrolysis (SOEC) and in the reversible SOFC/SOEC mode are addressed. This covers the wide field of power generation systems, e.g. stationary SOFC μ -CHP, mobile SOFC APU and SOFC/SOEC power-to-gas systems. The paper presents the results which have been achieved so far in the SOCTESQA project. Besides a summary of existing test procedures a so called "test matrix" was created. This document includes generic test modules, e.g. current-voltage curves, electrochemical impedance spectroscopy, thermal cycling, electrical current cycling and long term tests both under steady state and dynamic operating conditions. The application specific test programs are created by combining several of these test modules. In a next step defined test modules will be applied for the initial test bench validation, which will be improved by several validation loops. The final test protocols will be confirmed by round robin tests.