

Scale Up of a Multi-Functional Solid Oxide Fuel Cell to Multi-Tens of Kilowatt Level (MF-SOFC)

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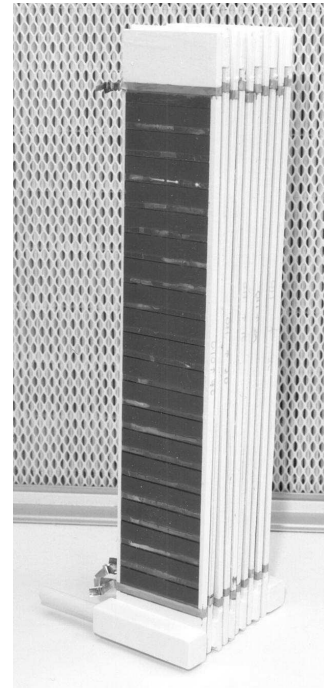


Figure 1. Bundle Manifolding Concept

The project MF-SOFC, partly funded by the European Commission, is aiming to scale up the Rolls-Royce SOFC technology from kW to tens of kW scale. The consortium brings together the wide range of skills and experience required to achieve this goal from fundamental materials science to end user knowledge. Due to a focus on the requirements of a commercial product, the first generation stacking concept was re-designed to achieve a higher power density. The manufacturing processes were refined and scaled to meet the increase in requirements for components. The cell development activity combines the experience of Rolls-Royce and Risø National Laboratory with the aim of improving the durability of the multi-cell module. Mechanical modelling to evaluate and predict the reliability of the ceramic structures is led by Imperial College London and has been carried out in parallel with the design process. Testing has been carried out in purpose-built test facilities, in France and the UK. Results from both locations are in good agreement and the high power density support module demonstrated performance that would meet the requirements of initial commercial products. measurements and materials properties (surface exchange coefficient and diffusion coefficient) will be undertaken.



Figure 2. Test Facilities at Gaz de France in Paris

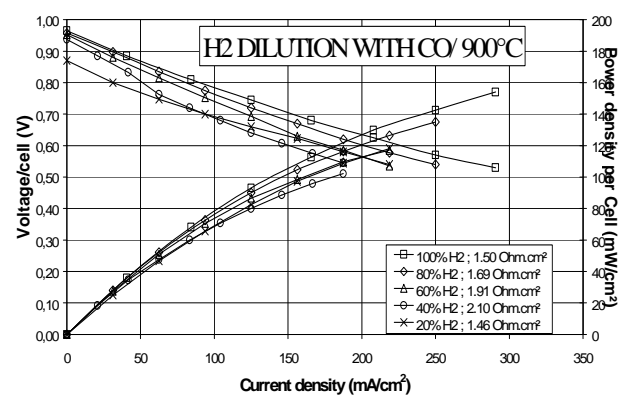


Figure 3. Graph Showing Effect of H₂ Dilution with CO