ASC-700

General description

SOFCpower-HTceramix provides anode-supported, thin-film electrolyte, solid oxide fuel cells produced in its pilot production line in Trento. The cells are composed of an electrolyte (YSZ) sandwiched between two electrodes, a porous perovskite cathode and the anode support structure. For low temperature cells, a ceria barrier layer separates the cathode form the electrolyte. Good mechanical stability is provided by the relatively dense anode structure; the thin anode hardly shows any gas diffusion limitations. Precise wet ceramic processing enables efficient use of raw materials. The cells are produced by anode and electrolyte co-casting and co-sintering followed by screen-printing of the cathode layer.

Operating range

The cells allow for a high fuel utilisation (>70 %) and demonstrate high power densities (>1 W/cm²)*. Cells can be operated in a temperature range of 600°C to 850°C under humidified hydrogen, reformed hydrocarbons or synthesis gas mixtures.

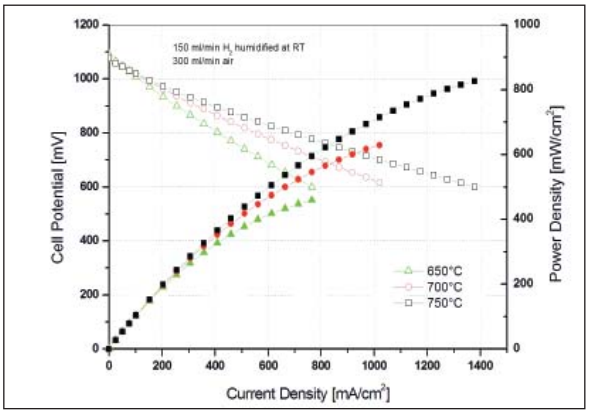
Production flexibility and quality

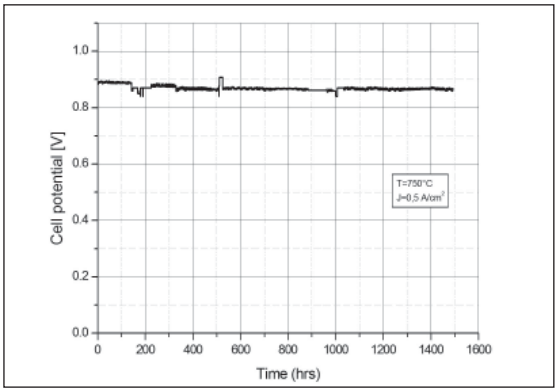
SOFCpower cells are produced in different configurations and according to customers' geometrical specifications. The cells have been tested for more than thousand hours in single cell tests and stack operations, showing stable performance. Quality control is one of the company's priorities: production statistics, mechanical and electrochemical tests are used to verify and optimise the quality and reproducibility of all production batches.

SOFC Anode Supported Cells designed for intermediate temperature application (~700°C)

Cell Architecture

layer	composition	thickness
anode	Ni/8YSZ	240 ± 20 µm
electrolyte	8YSZ	8 ± 2 µm
bilayer cathode	GDC+LSCF	50 ± 10 µm





properties	650°C	700°	750°C
ASR @ 0.7 V [Ωcm2]*	0.57	0.39	0.28
j @ 0.7 V [mA/cm2]	580	800	1025
P @ 0.7 V [mW/cm2]	405	560	715

*calculated in the range 0.75-0.65V

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ASC-800

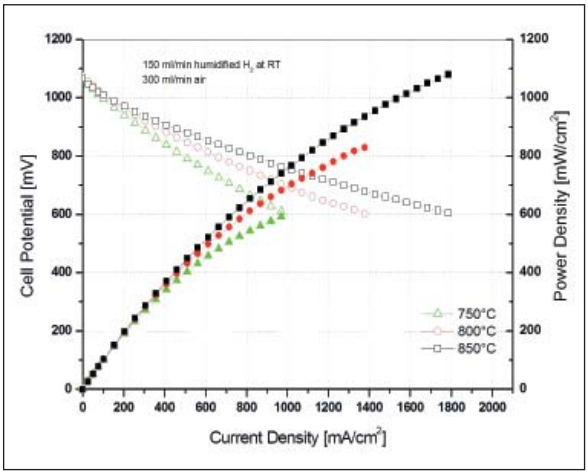
SOFC Anode Supported Cells designed for intermediate temperature application (~800°C)

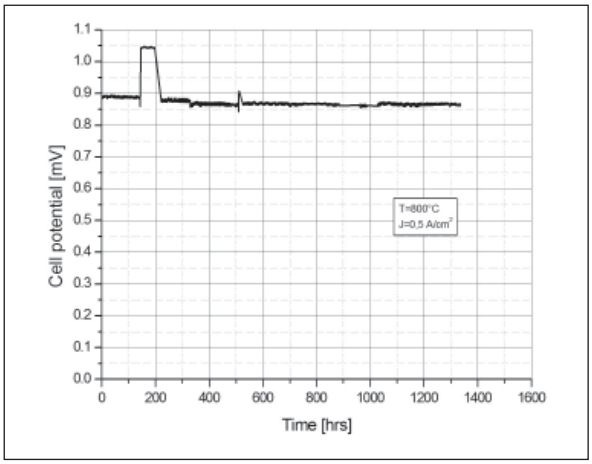
Cell Architecture

layer	composition	thickness
anode	Ni/8YSZ	240 ± 20 µm
electrolyte	8YSZ	8 ± 2 µm
bilayer cathode	LSM/8YSZ	40 ± 10 µm

Any shape available by laser cutting. Max size 120 mm x 120 mm (tolerance ± 0.25 mm).

Typical Button-Cell Performance

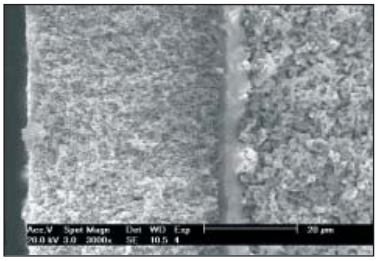


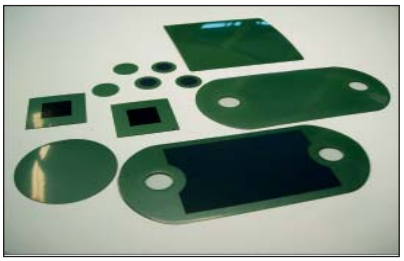


properties	750°C	800°	850°C
ASR @ 0.7 V [Ωcm2]*	0.40	0.29	0.20
j @ 0.7 V [mA/cm2]	730	970	1275
P @ 0.7 V [mW/cm2]	510	680	890

*calculated in the range 0.75-0.65V

Shown results are obtained by using our own testing apparatus and cell start-up procedure and cannot be guaranteed when other equipments and test conditions are considered.





* These results were obtained under our ideal laboratory conditions. HTceramix-SOFCpower offers no guarantee of identical performance under other laboratory conditions.

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