Status of Elcogen unit cell and stack development

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Introduction

- Elcogen concentrates on solid oxide fuel cell (SOFC) technology
- Elcogen AS was founded in 2001 to Estonia as *unit cell manufacturing company*
- Elcogen Oy was founded in 2009 to Finland as *stack manufacturing company*
- Own production facilities both in Estonia and Finland
- Currently more than 30 active customers worldwide
- Elcogen AS and Elcogen Oy are privately owned limited companies

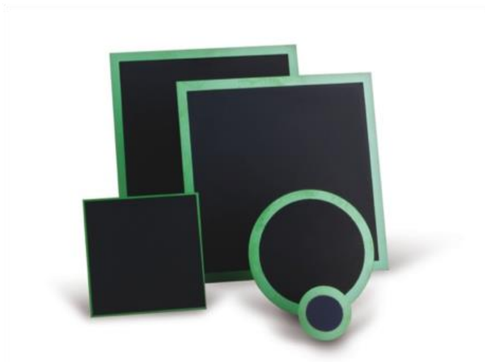
Elcogen unit cells

From powders to power

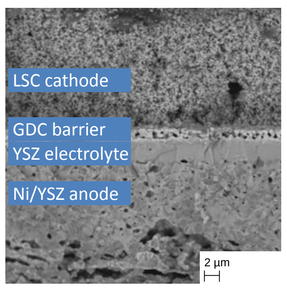
- Proven manufacturing processes for mass production
- Currently investing into production scale-up
- Continuos investments in R&D

Product

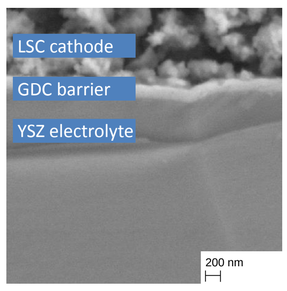
- Anode supported cell
- Working temperature optimized to 650 °C
- Different shapes, thicknesses and sizes up to 200x200 mm



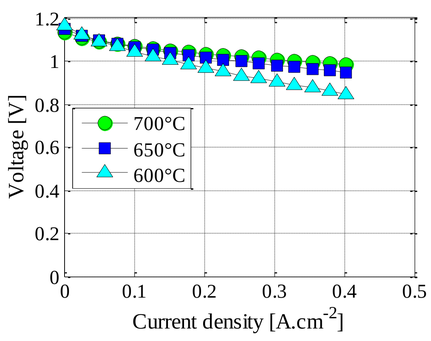
Elcogen ASC10



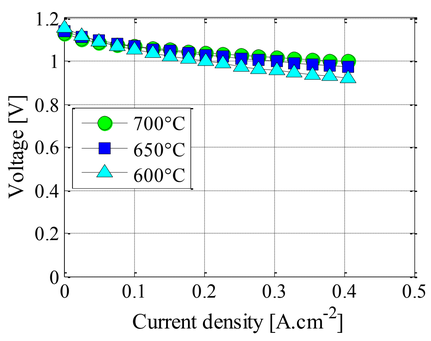
Elcogen ASC12



Elcogen ASC10

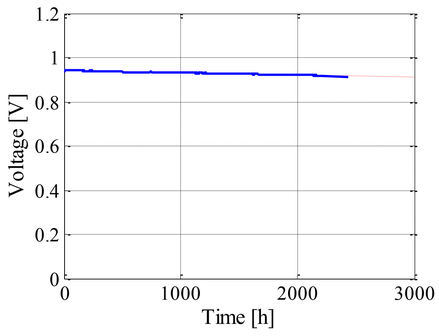


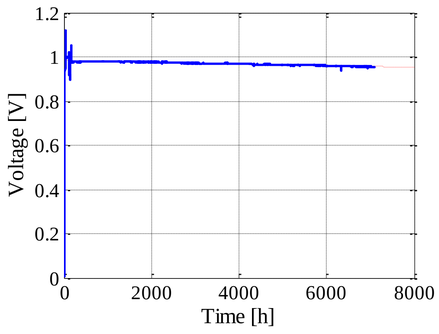
Elcogen ASC12



TEST CONDITIONS

Furnace temperature	600, 650, 700 °C
Fuel utilization [H_2]	20 % at 0.4 A.cm^{-2}
Oxygen utilization [air]	20 % at 0.4 A.cm^{-2}





TEST CONDITIONS

Furnace temperature	650 °C
Fuel utilization [H_2]	20 % at 0.4 A.cm^{-2}
Oxygen utilization [air]	20 % at 0.4 A.cm^{-2}

Elcogen stacks

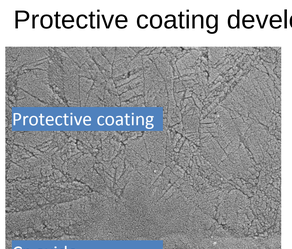
Stack design according to system requirements

- Optimized for stationary applications
- Operating temperature 600 - 700 °C
- Cost effective structure due to reduced temperature

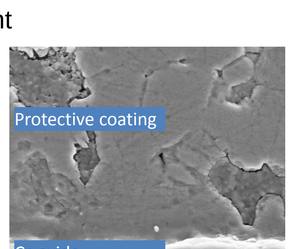
Product

- 1 kW stack design in internal testing (for commercial applications)
- Deliveries made with 500 W design (for technology evaluation purposes)

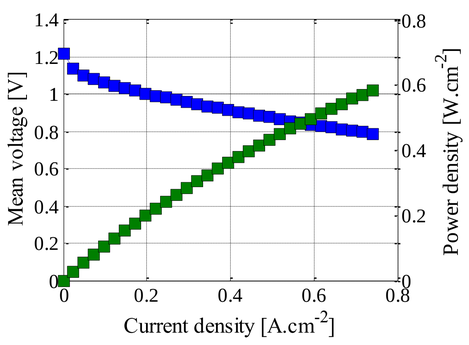
Protective coating development

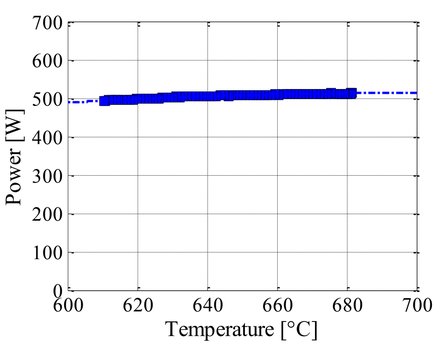


168 h in air @ 700 °C



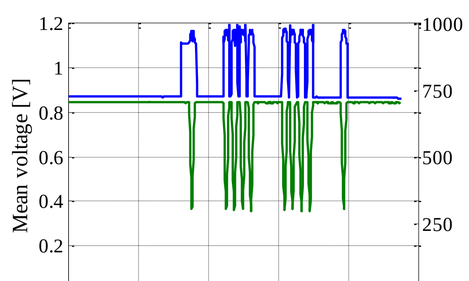
1000 h in air @ 700 °C

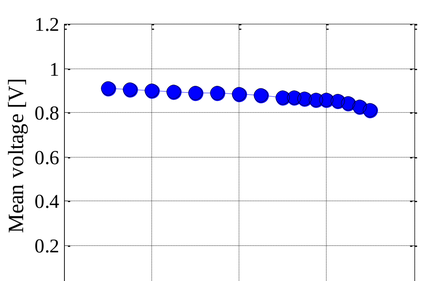




TEST CONDITIONS

Furnace temperature	700 °C	620 – 700 °C
Fuel utilization	20 % at 0.4 A.cm^{-2}	46 %
Fuel composition [H_2 in N_2]	100 %	51 %
Oxygen utilization [air]	20 % at 0.4 A.cm^{-2}	22 %
Type of unit cell	Elcogen ASC-10	Elcogen ASC-10





TEST CONDITIONS

Furnace temperature	700 °C	700 °C
Fuel utilization	46 % at 0.4 A.cm^{-2}	(varies)
Fuel composition [H_2 in N_2]	50 %	50 %
Oxygen utilization [air]	25 %	25 %
Type of unit cell	Elcogen ASC-10	Elcogen ASC-10

Acknowledgements

Financial support from Enterprise Estonia, Tekes and European Commission projects “High Efficiency Low Temperature SOFC Stack”, contract number 612431, and “New all-European high-performance stack: design for mass production”, contract number 621227, are greatly acknowledged. University of Tartu, the National Institute of Chemical Physics and Biophysics, Tampere University of Technology, and VTT Technical Research Centre of Finland are all gratefully acknowledged on the technical assistance in research and development of Elcogen unit cells and stacks.