Fuel Cells

Company Profile

The EBZ GmbH is an internationally operating specialist for SOFC / SOEC testing and high temperature components. Based on our strong dedication to research and development we combine mature technology with leading inventions into our customized SOFC test rigs and BOP components.

The Advantages

Stacks from several manufacturers have been tested and integrated by EBZ since the year 2002. This expertise is basis for the design of our SOFC / SOEC Test Rigs. Their configurations range from basic research to close-to-system environments including reforming, heat recuperation and after burner.

Specialised BOP components for heat and gas management are developed by EBZ and tested in the in-house laboratory. They offer solutions for high temperatures at small scale capacities. All components are optimised to work with minimal thermal and hydraulic losses. EBZ offers a wide range of standard products as well as customised solutions.

Specific Test Rigs

EBZ furthermore offers test rigs for thermoelectric generators (modules and elements) and for components and assemblies in process engineering especially for gas processing, heat transfer and burner technologies.

Process Technology

Fuel Cells

Fuel Cells

AST Gruppe
Angewandte System Technik

EBZ GmbH
Fuel Cells & Process Technology

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EBZ

Process Technology

Process Technology

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SOFC / SOEC System Research and Demonstration

EBZ integrates customer stacks into a demonstration system or offers the Demonstration System with hotboxes. Due to our consistent modular design and the in-house developed BOP components, numerous parameters can be adapted to customer's specification.

- ✓ Complete 1 ... 3 kW_{el} SOFC systems
- ✓ Integration of hotboxes from several suppliers
- ✓ Start-up and afterburner
- ✓ Evaporator for steam and autothermal reforming
- ✓ Including control and safety system

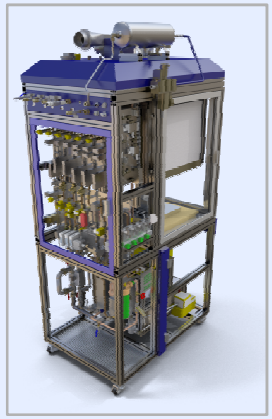
SOFC / SOEC Demonstration Unit	
Electrical power	500 W ... 20 kW
Electrical efficiency (with steam reforming)	Up to 45 % depending on stack performance
Fuel supply	Natural gas, LPG, biogas, synthetic gas mixtures
Air supply	Blower

SOFC / SOEC System Operation

- ✓ Compact design for testing of stack hotboxes
- ✓ Electrical gas heater
- ✓ Electrically heated reforming and evaporation unit
- ✓ Optional: recuperator and afterburner

Test Rigs

SOFC / SOEC Test Rigs



- ✓ Test rigs for tubular and planar design
- ✓ Modular concept to enable customized solutions
- ✓ Testing up to 1000°C using furnaces or hotboxes
- ✓ Energy efficient long term testing with heat recuperation
- ✓ Mechanical or pneumatical stack tensioning
- ✓ Available with power feed-in or electronic load
- ✓ Modular PLC with embedded real-time controller
- ✓ Six-stage safety management
- ✓ Configurable threshold monitoring
- ✓ Easy to operate with graphical user interface (GUI)
- ✓ Programmable process control: EBZ ProControl
- ✓ Remote access

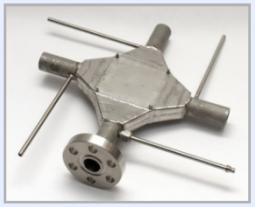
EBZ SOFC / SOEC Test Rigs

Single Cell	Stack	System alike
FZJ Licensed Cell Housing	Short Stack	Reformer
Customer Cell Housing	Stack	Afterburner
EBZ Cell Housing	Hotbox	Heat Recuperation

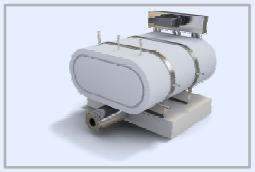
Process Technology

Heat & Gas Management

Heat Exchanger
- ✓ Compact counter-flow, co-flow or cross-flow plate design
- ✓ Maximum temperatures up to 950 °C



Gas Heater
- ✓ Heat up of air and process gases
- ✓ Gas temperatures up to 850 °C in a wide flow range



Humidification Unit
- ✓ Bubbler, evaporator (electrical or thermal) , membrane humidifier
- ✓ Homogenous steam generation

Reformer
- ✓ Precious metal or nickel catalysts
- ✓ Integrated evaporator for homogenous steam supply

Desulphuriser
- ✓ Two-parts vessel with permanent installation in the gas path
- ✓ Easy adsorbent exchange

All Gas Porous Media Burner
- ✓ Burning of low and high caloric gases
- ✓ 2-stage burning chamber for wide modulation range up to 1:10