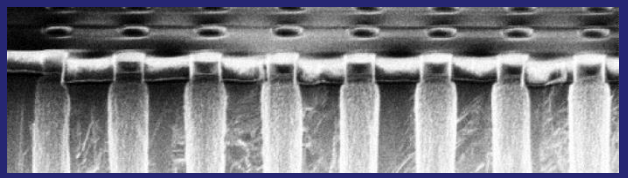


Short Information

Development of micro fuel cell systems

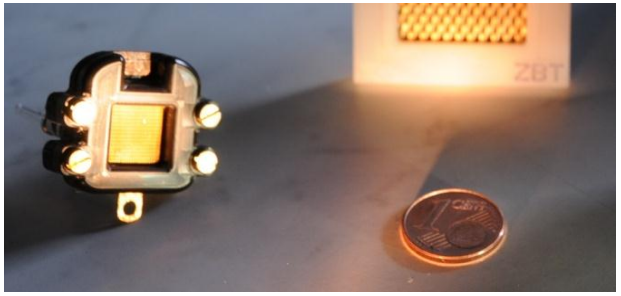
- Methanol & hydrogen powered
- Micro system technology
- Fluid mechanical design (CFD) & experimental analysis

Optimization of flow geometries

- Pressure drop
- Heat exchange
- Reactant distribution

Fuel cell manufacturing

- Micro production technologies
- Development of assembly strategies



Head of Department

Dipl.-Ing. Jens Wartmann
Phone: +49 (0)203 7598-3336
Email: j.wartmann@zbt-duisburg.de

Contact Fluid Mechanics

Dr.-Ing. Sebastian Burgmann
Tel.: +49 (0)203 7598-2350
Email: s.burgmann@zbt-duisburg.de

ZBT GmbH

Zentrum für **B**rennstoffzellen**T**echnik
Carl-Benz-Straße 201
47057 Duisburg

Phone: +49 (0)203 7598-0
Fax: +49 (0)203 7598-2222
info@zbt-duisburg.de
www.zbt-duisburg.de

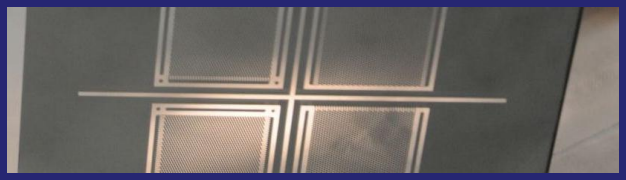
Dieses Projekt wird unterstützt durch den europäischen Fond für Regionale Entwicklung und das Land Nordrhein-Westfalen

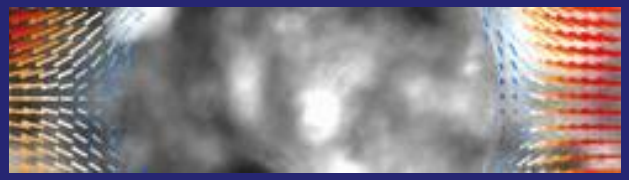
Department Microsystems and Fluid Mechanics

Portable Fuel Cells from Design to Production

ZBT GmbH
The Fuel Cell Research Center

Z B T
Zentrum für BrennstoffzellenTechnik

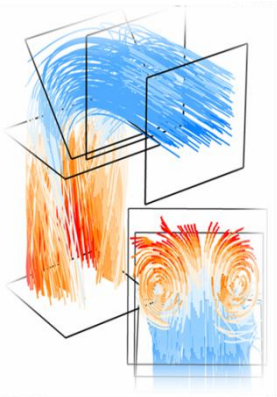


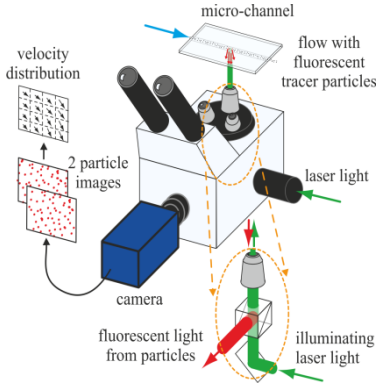


Main Focus

Development

- Micro fuel cells
- Portable fuel cell systems
- Assembly strategies
- Production technologies for micro bipolar plates
- Optimizing operations for fuel cell stacks
- Sensors for fuel cell systems
- Fluid mechanical optimization for fuel cell systems and components

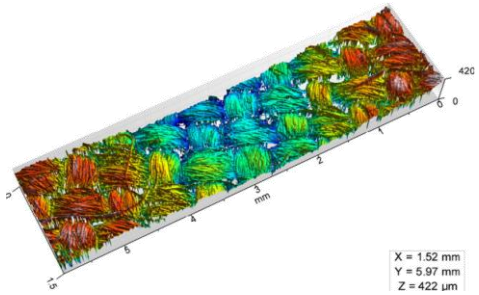




R&D Services

Customized portable fuel cells from design to production

- Stack design & manufacturing
- Development support
- Bonding processes for micro components
- Sealing concepts for micro components



Measurement and analysis

- Macro & micro scale flow examinations
- Analytics of fuel cells, In- and Ex-situ
- Computational fluid dynamics (CFD)
- Process engineering

Equipment

Design & engineering

- 3D CAD software
- CFD software (Ansys Fluent, ESI CFD-ACE- & AVL Fire)

Analysis & testing

- Testbench for micro fuel cells
- Confocal scanning microscopy
- Laser- optical flow measurement: PIV, µPIV, LDV
- Infrared thermography
- Pressure drop measurements

Prototyping & production

- Sodick HS 430 Micro Milling
- Assembly station for micro fuel cells
- Bonding equipment