

CHANGES, CHALLENGES, CHANCES.

ONE OF THE GREATEST CHALLENGES FOR MANKIND IS THE GLOBAL TRANSFORMATION OF THE ENERGY SYSTEM IN COMPLIANCE WITH THE PARIS AGREEMENT ON CLIMATE CHANGE.

The energy system, still largely based on fossil fuels, must be converted over the next three decades into a sustainable, carbon-neutral system with nearly 100% renewable energy. Hydrogen plays a key role as seasonal energy storage, as fuel for the three sectors electricity, heat and transport, and also as reactant in the chemical industry.

As an application-oriented institute, ZBT develops future technologies in the three main topics hydrogen, fuel cells and batteries.

ZBT, TOGETHER WITH ITS PARTNERS, IS WORKING ON TECHNICAL SOLUTIONS FOR OUR FUTURE ENERGY SYSTEM.

In addition to comprehensive basic research in collaboration with scientific partners, various projects in applied research and experimental development are carried out in cooperation with industry and science. Exclusive contract research as well as various services complete the portfolio of ZBT.

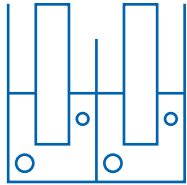


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THE HYDROGEN AND FUEL CELL CENTER

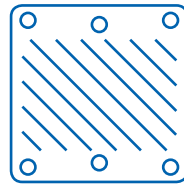
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HYDROGEN

Hydrogen is a key component in the future energy system. More than 15 years of experience in hydrogen generation by reforming, process and plant development, and safe handling of hydrogen and other fuels strengthens ZBT in further activities for the implementation of green hydrogen into the future energy system. Consequently, ZBT has expanded its hydrogen portfolio addressing the following topics:

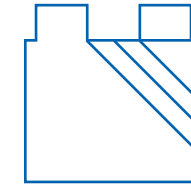
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|-----------------------------------|
| Electrolysis |
| Infrastructure and Quality |
| Chemical fuels |
| Reforming |
| Standardization |



FUEL CELLS

In PEM fuel cells, electrical energy is generated from hydrogen. They are used for many applications in clean mobility and logistics and also in secure energy supply. ZBT stands for comprehensive know-how in the design, development and qualification of components, materials and production processes, as well as for application-oriented system concepts. ZBT addresses all levels of the value chain:

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| Membrane-electrode assembly |
| Bipolar plates and gaskets |
| Stack technologies |
| Fuel cell systems |



BATTERIES

Electric vehicles and energy storage for fluctuating renewables as well as mobile devices are an integral part of everyday life and will continue to gain significance. With its substantial knowledge in electrochemical processes, materials, components and their design, ZBT focuses on research and development in the following technologies:

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| Lithium-ion batteries |
| Lithium-sulfur batteries |
| Redox-flow batteries |