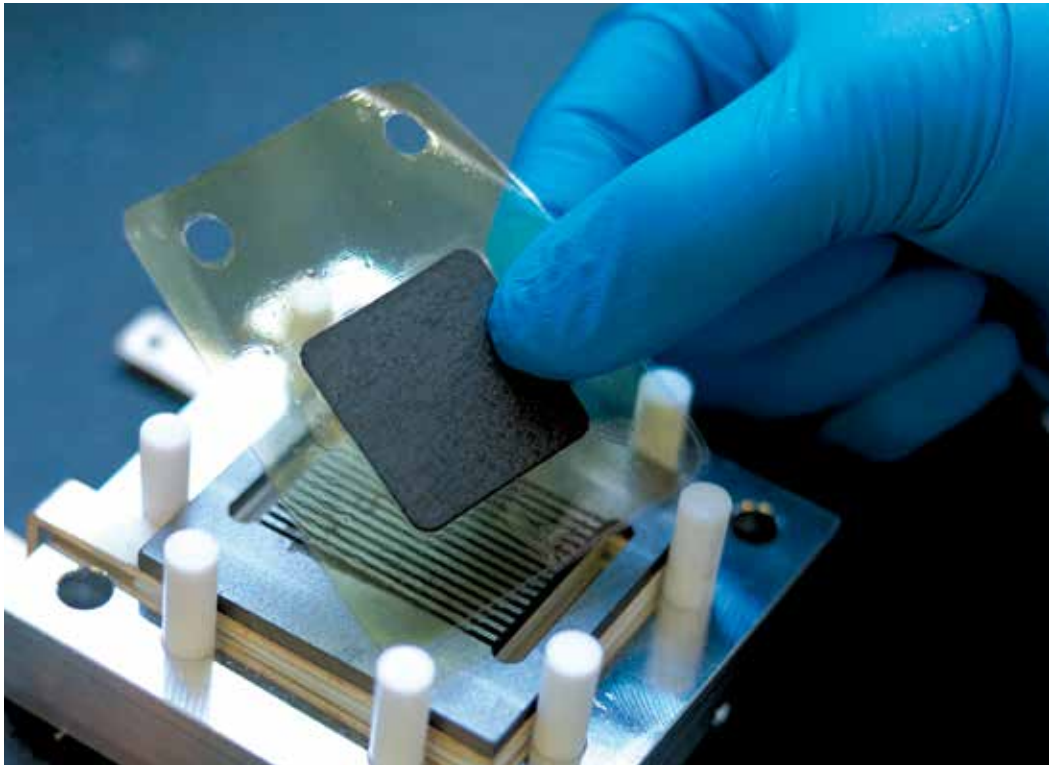


# PEM FUEL CELLS

- POWER FOR CARS AND HOUSES



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A fuel cell converts the chemically bound energy of a fuel directly into electricity. This allows fuel cells to have a higher efficiency than traditional generators and power plants. There are various types of fuel cells, each with a different area of application. Thus, solid oxide fuel cells have a high operating temperature and are well-suited for stationary applications, while polymer electrolyte membrane fuel cells (PEMFCs) have a lower operating temperature and can be used, for example, in cars. However, traditional PEMFCs can only use very pure hydrogen as a fuel and the low operating temperature of around 80 °C makes it hard to get rid of the surplus heat.

At the Department for Energy Conversion and Storage, we are working on high-temperature PEMFC (HT-PEMFC) for operation at approx. 160 °C. This has a number of advantages, including lower sensitivity to impurities in the hydrogen and easier heat management of the cells. This means the auxiliary components of the fuel cell system can be simpler and cheaper.

Two promising applications of HT-PEMFC are for transportation and for micro-CHP (combined heat and power) for single houses. Key research topics include the development of new and improved materials, synthesis of catalysts, studies of electrode structures, and tests of cells.

Uniquely, the entire value chain of the HT-PEMFC technology is present in Denmark: From fundamental research and development of materials and cells at DTU, through cell manufacture (Danish Power Systems A/S) and modules (Serenergy A/S, IRD Fuel Cells A/S) to systems integration (Dantherm Power A/S). The technology development is being carried out in the framework of a national strategy and roadmap for HT-PEMFC, drawn up by the Danish Partnership for Hydrogen and Fuel Cells in collaboration with the key actors.

### ABOUT THE DEPARTEMENT

We focus on functional materials and their applications for sustainable energy technologies

### FURTHER INFORMATION

[www.energy.dtu.dk](http://www.energy.dtu.dk)

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