UNIVERSITY OF BIRMINGHAM | Business with Birmingham

Fuel Cells and Hydrogen

The University of Birmingham is exploring the possibility of hydrogen as a future energy vector and is developing key technologies to support this ambitious vision. The Birmingham Centre for Fuel Cell and Hydrogen Research is facilitating the creation of technologies for sustainable production and storage of hydrogen, commercial utilisation and the efficient provision of electricity and heat from fuel cells.

The Birmingham Centre for Fuel Cell and Hydrogen research is both nationally and internationally recognised for its expertise and has developed partnerships with a range of global businesses and public institutions. The Centre's cutting-edge research and innovative approaches are changing the way we deliver, consume and think about energy.

Expertise

- Transforming biomass and waste into energy
- Low-cost fuel cell manufacture
- Low-carbon energy generation
- Low-cost fuel cell hybrid vehicles
- Low- and high-temperature fuel cell materials and systems
- Transition towards a hydrogen and zero-carbon economy

Success and impact

- In collaboration with British Waterways, engineers at the University have developed a zero-emissions canal boat, powered by an electric motor, polymer electrolyte fuel cell (PEFC) and metal hydride storage technology.
- A cross-disciplinary venture between a number of Birmingham Energy Institute academics and Birmingham Centre for Railway Research and Education, developed, designed and constructed the UK's first practical hydrogen-powered locomotive.
- Together with Unilever, various car makers and transport companies, the School of Chemical Engineering is developing novel approaches to low- and zero-carbon vehicles and implementing these concepts on prototype cars, taxis, buses, and light and heavy goods vehicles.
- The Birmingham Energy Institute together with the Supergen H2FC Hub project delivered the White Paper on the Impact of Fuel Cells and Hydrogen on the Energy Security for the UK.
- In collaboration with Climate Change Solutions, the University of Birmingham is organising the UK's leading industry and technical Fuel Cell and Hydrogen conference (FCH2) in March 2018.

Key projects

Small 4-Wheel Fuel Cell Passenger Vehicle Applications in Regional and Municipal Transport (SWARM): The Centre is part of a group of 17 SWARM project partners. The project aims to optimise and build 50 low-cost fuel cell hybrid vehicles. Our expertise will be leveraged for component and system optimisation resulting in improved efficiency. There are four industrial partners: Air Liquide, Microcab, Riversimple, and TUV.

New transportation refrigeration system: In conjunction with Unilever, we ran a research project called 'fuel cell integration for refrigeration applications', which focused on using fuel cell technology in a refrigerated vehicle (with a gross weight of seven tonnes and above). A solid oxide fuel cell (SOFC) provides energy allowing the refrigeration system to be on all the time – even when the truck's engine is switched off. This means no noise and no emissions. In addition to these environmental benefits, the SOFC system will reduce wear-and-tear on vehicles and cut diesel consumption.

Using fuel cell power systems to extend the flying time of drones: In collaboration with ten companies and universities from seven European countries, we developed mSOFC power systems for the next generation of unmanned aerial vehicles (UAVs). These vehicles are the first of their kind in Europe, and the use of propane fuel cells can considerably increase the flight duration of small drones, reduce mission costs, and simplify fuel infrastructure.

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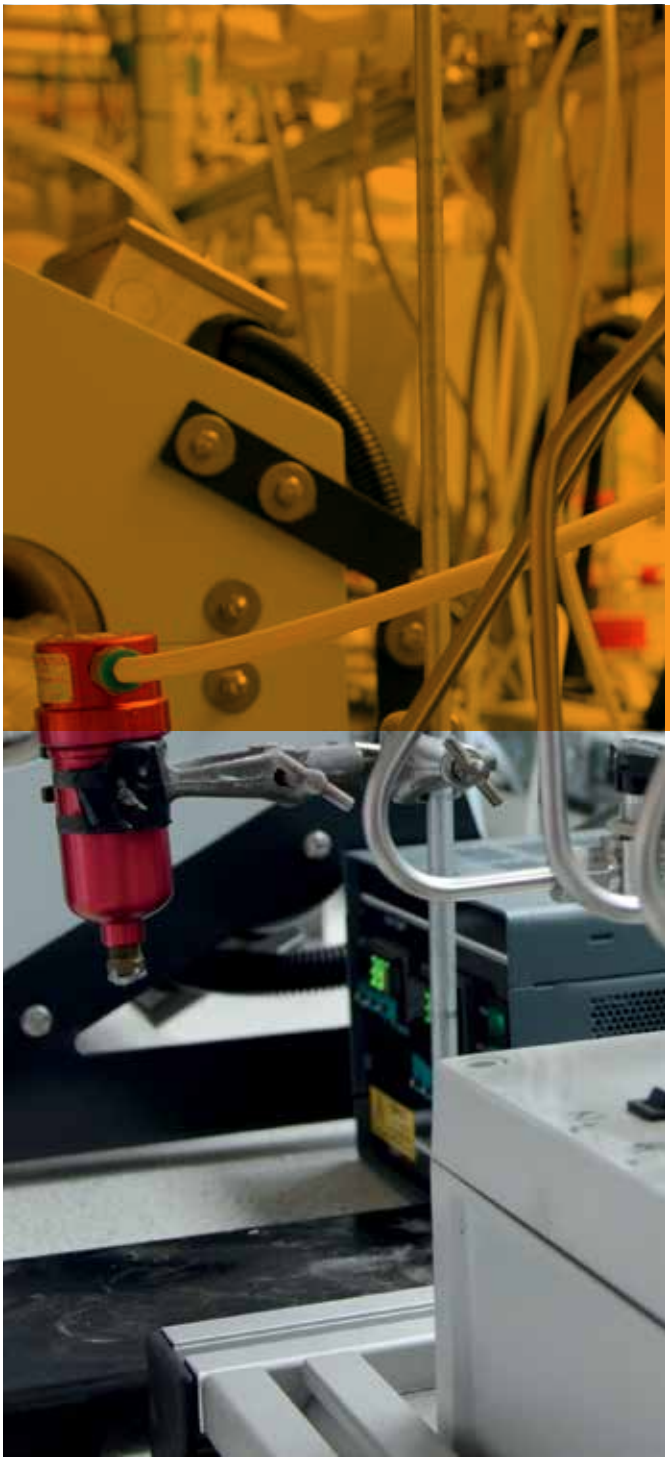

WE OPENED ENGLAND'S FIRST HYDROGEN VEHICLE REFUELLING STATION ON CAMPUS IN 2008. NOW, A FLEET OF HYDROGEN FUEL CELL CARS CAN BE SEEN OPERATING AROUND OUR CAMPUS

Getting in touch

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