

# Low temperature fuel cells: New clean, energy efficient technology to power cars and mobiles

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(PhysOrg.com) -- A new version of an environmentally friendly, energy efficient technology that could replace combustion engines in cars and batteries in mobile devices such as phones and laptops is being researched by Aberdeen experts.

Academics from the University of Aberdeen are investigating the possibility of a new type of low temperature fuel cell.

Fuel cells convert fuels into electricity directly without the need for combustion.

Low temperature fuel cells could be used to provide power for vehicles,

portable devices and small stationary power in a way that is less damaging to the environment than current powering methods.

Conventional low temperature fuel cells are on the verge of entering the market.

However making fuel cells as common and widely available as the conventional battery or engine is proving difficult because there are several significant challenges that still need to be overcome - including the high cost of the components and the low tolerance of the fuel cell to carbon.

Hydrogen is used as the main fuel in low temperature fuel cell technology, but as it is mainly produced from fossil fuels, it contains carbon-containing impurities.

In current models of low temperature fuel cells, the carbon forms carbon monoxide that will clog up the surface of the electrode part of the fuel cell making it less efficient in producing energy.

Researchers from the University's Chemistry department have been awarded £288,000 of funding from Scottish Enterprise's Proof of Concept Programme for a two year project to develop their idea of how the electrode can be modified to make it more efficient in dealing with carbon monoxide.

The innovative electrode design will enable the fuel cell to use either carbon-contaminated hydrogen or hydrocarbon fuels such as methanol, biofuels or natural gas without the need for upstream reforming - a costly and cumbersome process whereby hydrogen fuels are "cleaned" prior to use. This makes it a more cost effective option than the low temperature fuel cell systems that are currently on the market.

It is hoped if successful that the creation of a lower cost option will result in the fuel cell being introduced to the marketplace more quickly and more widely than expected.

Dr Angela Kruth, from the University of Aberdeen's Chemistry Department is leading the project. She said: "The aim is to create a new type of low temperature fuel cell, which is able to deal with carbon monoxide better than those currently on the market - and as a result is cheaper and more efficient in producing electricity.

"Our research will focus on the electrode part of the fuel cell and develop ways in which it can better cope with the carbon monoxide found in the fuel which it is converting into power.

"Although the long-term goal is zero emission production of ultra-pure hydrogen from renewable sources such as wind, solar or tidal power, currently carbon-containing fuels are still the dominating energy source.

"The new low temperature fuel cell will be able to use carbon-containing fuels directly and is expected to drastically accelerate fuel cell technology breakthrough into the current market."

Provided by University of Aberdeen

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