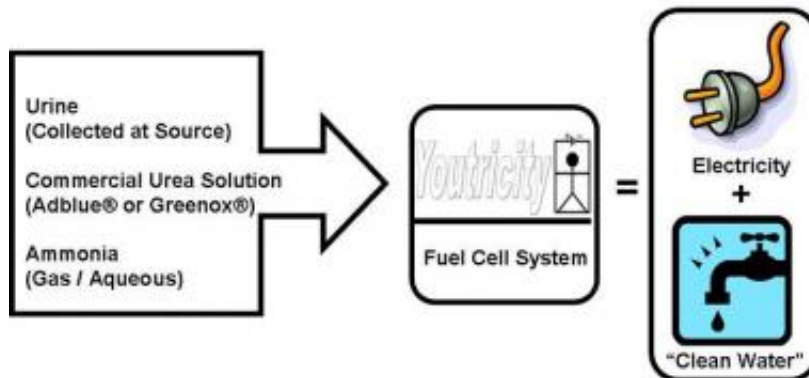


Could urine be a source of renewable energy?

August 22 2010



A research team at Heriot-Watt University, UK, is investigating whether urine could be used to create energy via new, low-cost fuel cells.

Dr Shanwen Tao and his research partner Dr Rong Lan have developed a prototype, the Carbamide Power System, and have now been awarded a £130,000 EPSRC grant to develop it.

Fuel cells are electrochemical devices which convert [chemical energy](#) into electricity with heat generated as a by-product, via an [electrochemical process](#) that does not require combustion. Traditional fuel cells usually involve hydrogen or [methanol](#) at one side and oxygen or air at the other, separated by a specialised ionic-conducting membrane.

The biggest obstacles to commercialising these proton exchange membrane fuel cells are cost, with the membrane and conventional, platinum-based catalysts, and challenges involving the transportation and storage of the highly flammable hydrogen or the toxic methanol.

The Carbamide Power System involves far cheaper membrane and catalysts, and can be run on urea (also known as carbamide), a mass manufactured industrial fertilizer and a major component of human and animal urine. Carbamide Power Systems would thus offer a non-toxic, low cost, easily transportable viable alternative to high pressure, highly flammable hydrogen gas or the toxic methanol currently used in fuel cells. As urea solution is increasingly being used in heavy goods vehicles to reduce [nitrous oxide emissions](#), a global fuelling infrastructure already exists.

Dr Tao believes that long term potential applications of the Carbamide Power System include in submarines, among the military, power generation in an isolated or remote areas such as deserts or on islands. As the process breaks the Urea or urine into water, nitrogen and carbon dioxide, it could also be used to reprocess waste water, with electricity as a by product.

Dr Tao said, "Growing up in rural eastern China I was aware of the use of urea as an agricultural fertiliser. When I became a chemist and was looking at [fuel cell](#) development I thought of using it in the process.

"We are only at prototype stage at present, but if this renewable material can be used as a commercially viable and environmentally friendly energy source then we will be absolutely delighted, and many people around the world will benefit."

More information: Visit the [Youtricity](#) page for more information on how the Carbamide Power Systems works.

Provided by Heriot-Watt University

Citation: Could urine be a source of renewable energy? (2010, August 22) retrieved 20 March 2024 from <https://phys.org/news/2010-08-urine-source-renewable-energy.html>

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