

Car fuel made from carbon dioxide and sunlight

New technology for "photosynthesising" fuel could lead to cars running on "petrol" made from carbon dioxide and sunlight.

By Tom Chivers

2 July 2010



The solar reactor at the Sandia National Laboratories, Albuquerque, New Mexico. Photo: SANDIA NATIONAL LABORATORIES

Solar-powered reactors can take carbon dioxide and turn it into carbon monoxide. The same reactors can also be used to turn water into hydrogen and oxygen. The two can then be reacted together with a catalyst to form hydrocarbon fuels, in a technique known as the Fischer-Tropsch process.

Fuels made in this way are sufficiently similar to those currently used in cars that major redesigns of engines and refuelling stations should not be necessary. If fuels can be made entirely from atmospheric carbon, running a car on that fuel would be carbon neutral.

One such machine, the Counter Rotating Ring Receiver Reactor Recuperator (CR5), created by a team of scientists at Sandia National Laboratories in Albuquerque, New Mexico, captures carbon dioxide from power plant exhaust fumes. In the future, however, they hope to extract it directly from the air.

The system uses a giant parabolic mirror, which concentrates sunlight on to two chambers separated by spinning rings of cerium oxide. As the rings turn, the cerium oxide is heated to 1500C and releases oxygen into one of the chambers. The oxygen is then pumped away. As the ring spins, the now de-oxidised cerium moves into the other chamber. Carbon dioxide is pumped in, and the deoxidised cerium steals one of the oxygen molecules, creating carbon monoxide and cerium oxide.

Another team, the Swiss Federal Institute of Technology, Zurich, uses a similar system, but with calcium oxide, zinc oxide and steam, which can create a stream of hydrogen and carbon monoxide. Their system can already use atmospheric carbon dioxide.

At the moment the two reactors have problems. The New Mexico team's system currently only works for a few seconds at a time, while the Swiss model runs at a mere 10 kilowatts. But both

hope to improve reliability and yield.

Creating usable fuel from solar energy is a promising way of keeping the world's energy demands satisfied while minimising carbon emissions, Ken Caldeira of the Carnegie Institution of Washington at Stanford University, California told New Scientist. "This area holds out the promise for technologies that can produce large amounts of carbon-neutral power at affordable prices, which can be used where and when that power is needed," he says.

"It is one of the few technology areas that could truly revolutionise our energy future."

Source: [Telegraph UK](#) .