# Improved redox flow batteries for electric cars

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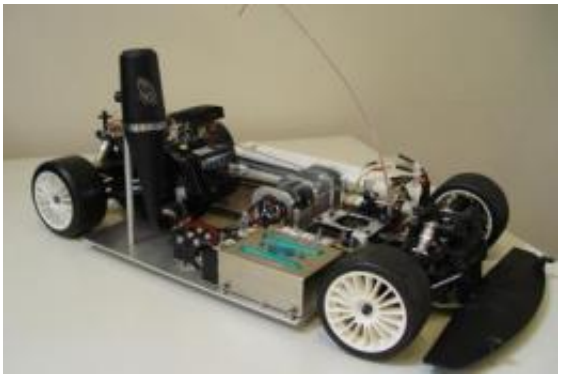

This is the test vehicle into which researchers are integrating a redox flow battery. Credit: Hochschule für Angewandte Wissenschaften Ostfalia

A new type of redox flow battery presents a huge advantage for electric cars. If the rechargeable batteries are low, the discharged electrolyte fluid can simply be exchanged at the gas station for recharged fluid -- as easy as refilling the petrol tank.

Electric mobility is becoming increasingly important. The German government's ambitious plan envisages one million electric cars being sold in Germany by the year 2020. Until then, however, researchers still have to overcome some hurdles, such as the question of energy storage. Lithium-ion batteries offer a possible solution, but it takes hours to charge them - time that an automobile driver doesn't have when on the road. Researchers from the Fraunhofer Institute for Chemical

Technology ICT in Pfinztal near Karlsruhe see an alternative in redox flow batteries.

"These batteries are based on fluid electrolytes. They can therefore be recharged at the gas station in a few minutes - the discharged electrolyte is simply pumped out and replaced with recharged fluid," says engineer Jens Noack from ICT. "The pumped-off electrolyte can be recharged at the gas station, for example, using a wind turbine or solar plant."

The principle of redox flow batteries is not new - two fluid electrolytes containing metal ions flow through porous graphite felt electrodes, separated by a membrane which allows protons to pass through it. During this exchange of charge a current flows over the electrodes, which can be used by a battery powered device.

Until now, however, redox flow batteries have had the disadvantage of storing significantly less energy than lithium-ion batteries. The vehicles would only be able to cover about a quarter of the normal distance - around 25 kilometers - which means the driver would have to recharge the batteries four times as often.

"We can now increase the mileage four or fivefold, to approximately that of lithium-ion batteries," Noack enthuses. The researchers have already produced the prototype of a cell. Now they must assemble several cells into a battery and optimize them. This further development is being carried out with colleagues from the University of Applied Sciences, Ostphalia, in Wolfenbüttel and Braunschweig. They are testing electric drives and energy storage units on model vehicles that are only a tenth of the size of normal vehicles. The research team has already built a traditional redox flow battery into a model vehicle.

A vehicle on a scale of 1:5 can be seen in action on a test rig set up at the eCarTech in Munich (Germany) from 13 to 15 October. In the coming

year the researchers also want to integrate the new battery, with four times greater mileage, into a model vehicle.

Source: Fraunhofer-Gesellschaft (news : web)