

Chemist's discovery of new salt jumpstarts extended-life battery research for electric vehicles

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A University of Rhode Island chemistry professor's discovery of a new salt has been received with enthusiasm by companies seeking to develop an advanced lithium ion battery for use in the next generation of hybrid and electric vehicles.

Brett Lucht, co-director of the URI Energy Center, recently received a \$731,000 contract from the Batteries for Advanced Transportation Technologies program, which is supported by the U.S. Department of Energy's Office of Vehicle Technologies. The URI professor and his research group have been studying the mechanism that causes lithium ion batteries to degrade over time.

"The lithium ion batteries that power laptops and cell phones and PDAs work well for those applications because those devices have short life spans, typically less than five years," Lucht said. "Now the push is on to make them effective for plug-in [hybrid vehicles](#) like the Chevy Volt. But to do that we have to make the batteries last twice as long."

Lithium ion batteries have greater energy density than the nickel metal hydride batteries currently used in hybrid vehicles, which means they can provide the same amount of power as batteries nearly twice their size and weight. Smaller, lighter weight batteries will help to extend the range and [gas mileage](#) of hybrid vehicles.

"Most of the problems associated with the aging of batteries are due to the electrolyte - the liquid in the battery that contains dissolved salts and that allows the lithium ions to go back and forth between the electrodes," explained Lucht.

The structure of salts in battery electrolytes is much more complex than typical table salt ([sodium chloride](#)), according to Lucht. The best salts for lithium ion batteries are those that have high conductivity and excellent stability. "Few molecular structures are both," he said, "and we have discovered a new one."

A patent is pending on the new salt.

"If this is the salt of the future for the [lithium ion battery](#) industry - which it could be - then it could mean millions of dollars in licensing fees to URI," Lucht said.

The researchers have been working closely on the salt with Yardney Technical Products of Pawcatuck, Conn., which makes specialty batteries for the military and the National Aeronautics and Space Administration. Several Fortune 500 companies will also be conducting tests on the salt.

In addition to his salt discovery, Lucht has also developed additives for lithium ion batteries that stabilize the salt in the battery electrolytes and inhibit its degradation due to heat. Patents are currently pending on this technology. These additives have been successfully tested in small lithium ion batteries, and testing in larger batteries is now under way.

Source: University of Rhode Island ([news](#) : [web](#))

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