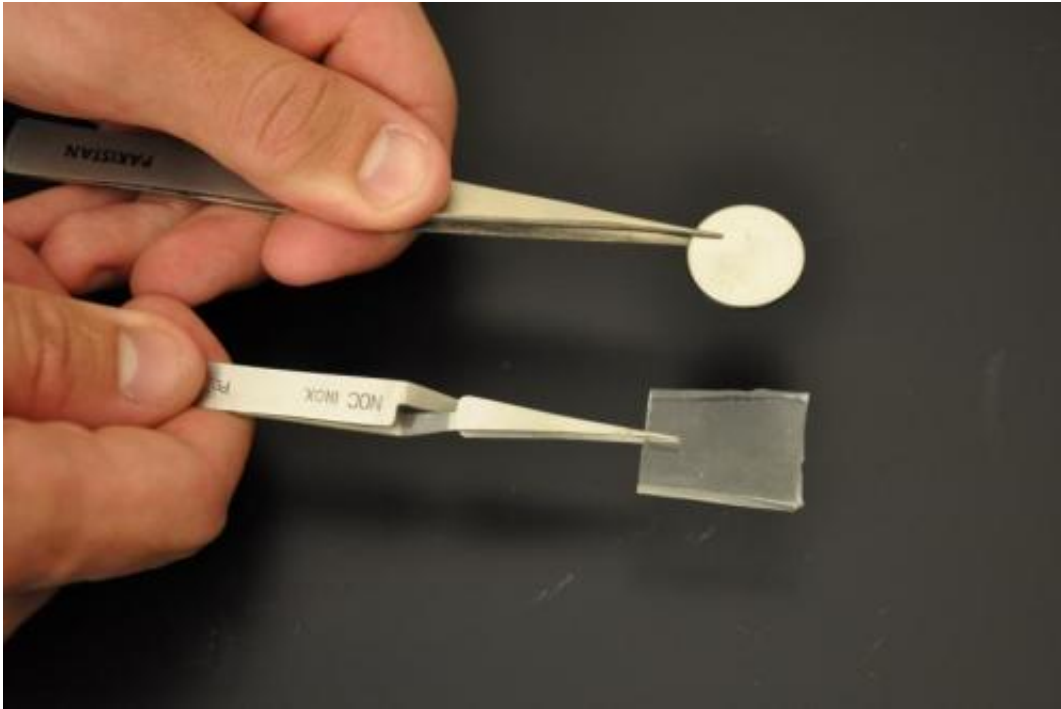


Silly Putty material inspires better batteries

May 15 2014, by Sean Nealon



This is the silicon polymer and battery used for the research. Credit: UC Riverside

Using a material found in Silly Putty and surgical tubing, a group of researchers at the University of California, Riverside Bourns College of Engineering have developed a new way to make lithium-ion batteries that will last three times longer between charges compared to the current industry standard.

The team created silicon dioxide (SiO_2) nanotube anodes for [lithium-ion](#)

[batteries](#) and found they had over three times as much energy storage capacity as the carbon-based anodes currently being used. This has significant implications for industries including electronics and electric vehicles, which are always trying to squeeze longer discharges out of batteries.

"We are taking the same material used in kids' toys and medical devices and even fast food and using it to create next generation [battery](#) materials," said Zachary Favors, the lead author of a just-published paper on the research.

The paper, "Stable Cycling of SiO₂ Nanotubes as High-Performance Anodes for Lithium-Ion Batteries," was published online in the journal *Nature Scientific Reports*.

It was co-authored by Cengiz S. Ozkan, a mechanical engineering professor, Mihrimah Ozkan, an electrical engineering professor, and several of their current and former graduate students: Wei Wang, Hamed Hosseinni Bay, Aaron George and Favors.

The team originally focused on silicon dioxide because it is an extremely abundant compound, environmentally friendly, non-toxic, and found in many other products.

Silicon dioxide has previously been used as an anode material in lithium ion batteries, but the ability to synthesize the material into highly uniform exotic nanostructures with high energy density and long cycle life has been limited.

There key finding was that the [silicon dioxide](#) nanotubes are extremely stable in batteries, which is important because it means a longer lifespan. Specifically, SiO₂ nanotube anodes were cycled 100 times without any loss in energy storage capability and the authors are highly confident that

they could be cycled hundreds more times.

The researchers are now focused on developed methods to scale up production of the SiO₂ nanotubes in hopes they could become a commercially viable product.

More information: Paper: www.nature.com/srep/2014/14041.../full/srep04605.html

Provided by University of California - Riverside

Citation: Silly Putty material inspires better batteries (2014, May 15) retrieved 10 April 2024 from <https://phys.org/news/2014-05-silly-putty-material-batteries.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--