

Dominica lithium-ion batteries

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Researchers at Jilin University in China have developed a stretchy and self-healing lithium-ion battery that can be stretched to 250 percent of its original size without dropping its operational capacity.

Lithium-ion batteries offer the highest energy density of any energy storage technology invented to date. This translates to a higher range for electric vehicles or longer battery life for laptops and smartphones while occupying a fraction of the space conventional technologies like lead-acid batteries would have taken.

However, as technology evolves further, devices such as soft robots, wearables, and electronic skin are being developed. For an unhindered user experience, these devices need flexible energy storage, and researchers have been working on developing these over the past few years using lithium-ion chemistries.

However, with flexibility, there is also the risk of the internal components of the battery cells breaking and triggering a short circuit. To avoid this, self-healing is an important characteristic that the battery needs to have, especially when they are made stretchy.

Researchers at Jilin University used an innovative approach to achieve this.

A research team led by Xiaokong Liu, a professor at Jilin University, made their lithium-ion battery using long polymer molecules connected to each other with carbon and nitrogen bonds, also known as imine bonds.

The polymer can bind to both the positive and negative electrodes of the battery and also serve as an electrolyte. The team then built a small lithium-ion battery using lithium iron phosphate and lithium titanate for electrodes.

Doing so, the team developed a battery with "all-in-one" configuration where the electrolyte and electrodes were fused together at the interface. The battery continued to deliver power even when it was stretched or even cut in half and put back together.

Researchers worldwide are attempting to build stretchable and self-healing batteries. However, according to the researchers, these batteries are more flexible rather than stretchable, and the stretchable batteries cannot self-heal.



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