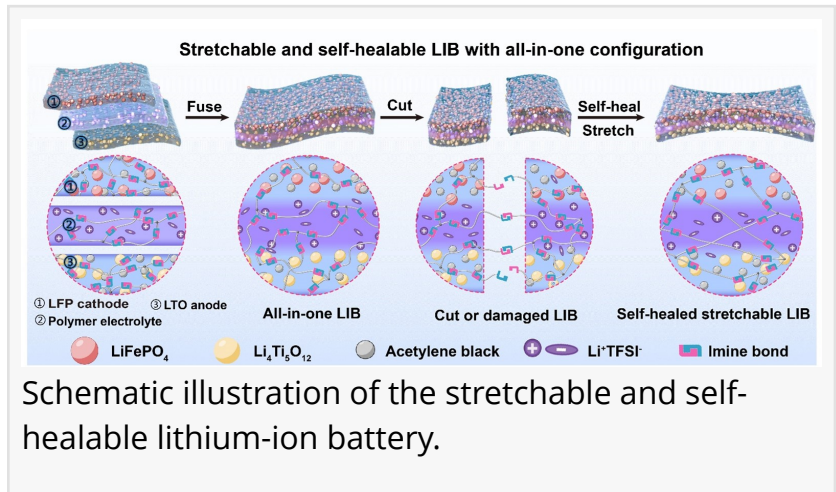


Stretchable and self-healable lithium-ion battery

GA, UNITED STATES, December 5, 2024 /EINPresswire.com/ -- Researchers have developed the first-ever stretchable and self-healable lithium-ion battery with all-in-one configuration. The battery can steadily provide power for a timer even after being stretched. Additionally, after being damaged and subsequently healed, the battery can still steadily serve as a power source to light up an LED.



Stretchable lithium-ion batteries ([LIBs](#)) are highly desirable as power sources of stretchable and wearable electronic devices, such as electronic skin, soft robotics and wearable mobile phones. Furthermore, endowing stretchable LIBs with self-healing properties can prolong their lifetime and enhance their reliability.

In a study (<https://doi.org/10.1016/j.supmat.2024.100073>) published in the KeAi journal *Supramolecular Materials*, a group of researchers from China present a novel strategy to fabricate both stretchable and self-healable LIBs with all-in-one configuration.

“We achieved this exploiting dynamic covalent polymers crosslinked by dynamic imine bonds as both the electrolyte and the binder of electrodes,” says senior and corresponding author Prof Xiaokong Liu from Jilin University.

Previously reported self-healable LIBs were flexible rather than stretchable, while the stretchable LIBs were unable to self-heal.

“Our achievement lies in the construction of a LIB with all-in-one configuration, wherein the electrolyte and electrodes can be fused together at the interface through the exchange of the dynamic imine bonds existing in both the electrolyte and electrodes,” explains Liu. “Such a design not only endows the battery with both stretchability and self-healing capability, but also overcomes the delamination problem of the LIB upon stretching.”

The LIB with all-in-one configuration possesses an elongation-at-break of $220 \pm 20\%$ and can steadily serve as a power source for a timer during stretching and releasing. Furthermore, the cut and then healed battery can still steadily provide power to light up an LED.

“Our work provides a novel and viable strategy for the design of stretchable and self-healable energy storage devices, showing high promise for the application in stretchable and wearable electronics,” adds Liu.

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