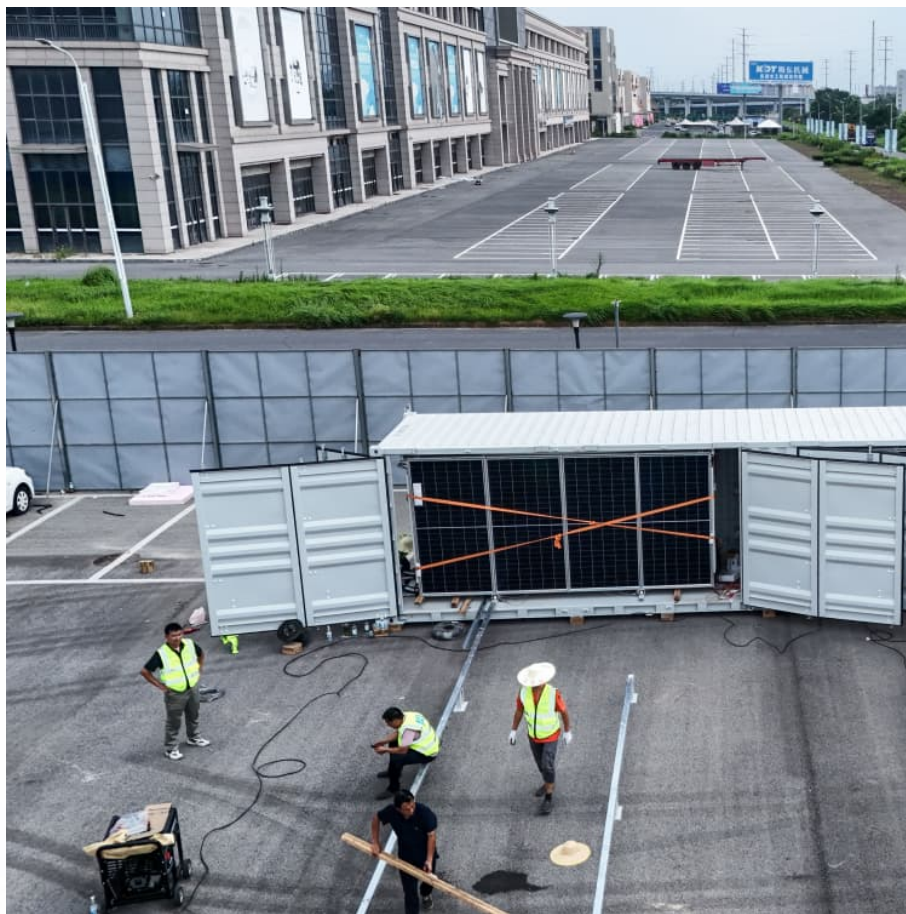


# Solid state batteries nsf





## Overview

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Awarded a \$480,000 National Science Foundation grant, Zhu and Joshua Gallaway, assistant professor of chemical engineering, are leading teams for a study of solid-state electrolytes, a key component that enables high energy density battery chemistries while providing safety and durability benefits. What is a solid-state battery (SSB)?

A solid-state battery (SSB) is an electrical battery that uses a solid electrolyte (solectro) to conduct ions between the electrodes, instead of the liquid or gel polymer electrolytes found in conventional batteries. Solid-state batteries theoretically offer much higher energy density than the typical lithium-ion or lithium polymer batteries.

What is a solid state battery?

In contrast to conventional lithium-ion batteries, which use liquid electrolytes, solid-state batteries use a solid electrolyte material to help ions travel between electrodes. Solid-state batteries naturally offer faster charging due to their superior ion conductivity compared to liquid electrolytes [194, 195, 196].

What is a thin-film solid-state battery?

This allows for improved overall energy efficiency and enables design flexibility for various applications. The earliest thin-film solid-state batteries is found by Keiichi Kanehori in 1986, which is based on the Li electrolyte. The technology was insufficient to power larger electronic devices so it was not fully developed.

Are solid-state batteries the future of energy storage?

The development of solid-state batteries in energy storage technology is a paradigm-shifting development that has the potential to enhance how batteries are charged and used.

Are solid-state batteries safe?



Additionally, it may raise the danger of oxidation and thermal runaway. Solid-state batteries must have reliable and effective sealing mechanisms to stop moisture and air from entering the battery compartment. The stability of the battery can be improved by using solid electrolyte materials that are less vulnerable to moisture and air exposure.

How can sulfide-based electrolytes help a solid-state battery charge fast?

The creation of innovative materials, such as sulfide-based electrolytes and cutting-edge cathode/anode pairings, is essential for enabling quick charging in solid-state batteries. The fast-charging application on SSE may be seen as being directly hampered by the comparatively low critical current density (CCD).



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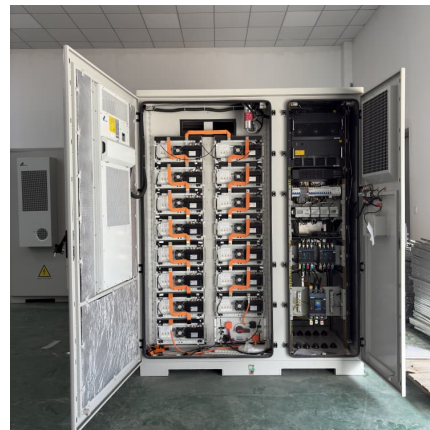


### UC San Diego nanoengineers receive \$2.7M NSF grant to make battery

A team led by nanoengineers at the University of California San Diego has been awarded a \$2.7 million grant from the National Science Foundation to develop an eco-friendly and low-cost ...

### [A comprehensive review of solid-state batteries](#)

Finally, this paper gives the direction of improvements to the challenges threatening solid-state battery commercialization. This comprehensive review study offers ...



### Reversible self-assembly of small molecules for recyclable solid ...

6 ???· Battery recyclability presents a sustainability challenge in materials design. Now it has been shown that aramid amphiphile self-assembly yields solid-state electrolytes with fast ion ...

### NSF Award to Improve Domestic Energy Security with Solid-State Batteries

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leading teams for a study of solid ...



### IUCRC Center for Solid-State Electric Power storage (CEPS)

Research Focus CEPS focuses on the next generation of energy storage: solid-state batteries that are safe, efficient, fast-charging, and cost-effective.



### [Researchers develop promising approach to smaller, ...](#)

A promising approach to making smaller, lighter, more powerful and safer batteries is to use solid-state cells with anodes made of metallic lithium instead of graphite.



### Solid-state battery

A solid-state battery (SSB) is an electrical battery that uses a solid electrolyte (solectro) to conduct ions between the electrodes, instead of the liquid or gel polymer electrolytes found in conventional batteries. [3] Solid-state batteries ...





### SBIR Phase I: Sodium-Based All-Solid-State Batteries for ...

This project will accelerate the adoption of solar and renewable energy generation, making the grid cleaner, more sustainable, and more resilient. This research ...

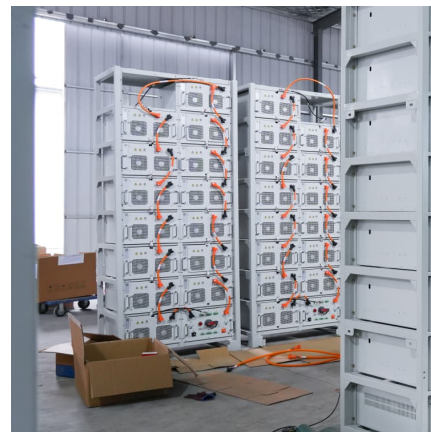


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### NSF Award Search: Award # 2132348

The combination of conformal 3D printing and solid polymer electrolytes offers a unique opportunity for developing a 3D customizable battery of practically any three dimensional shape.



### Researchers develop promising approach to smaller, more powerful

A promising approach to making smaller, lighter, more powerful and safer batteries is to use solid-state cells with anodes made of metallic lithium instead of graphite.

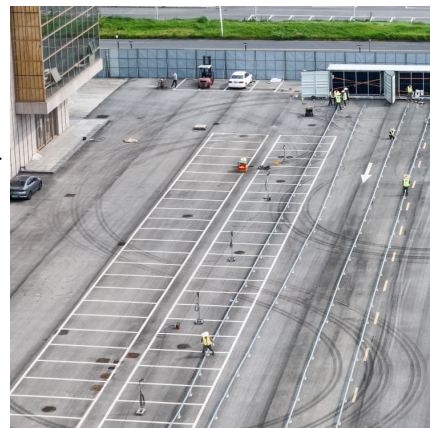


### NSF Award to Improve Domestic Energy Security with Solid ...

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### I-Corps: Solid-State Polymer Batteries Enabled by Conformal ...

The broader impact/commercial potential of this I-Corps project is the development of all-solid-state batteries, where a solid polymer electrolyte (SPE) and electrical ...





### **Solid-state battery**

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