

SolarInvert Energy Solutions

New solid-state silicon energy storage



Overview

The team demonstrated a laboratory-scale full cell that delivers 500 charge and discharge cycles with 80% capacity retention at room temperature, which represents exciting progress for both the silicon anode and solid-state battery communities. What is a solid state battery?

Solid-state batteries, using solid electrolytes instead of liquid ones, achieve much higher energy density (up to 500 Wh/kg) than traditional liquid lithium-ion batteries (200-300 Wh/kg). This provides more energy in the same volume and reduces battery size.

Can solid-state battery technology revolutionize energy storage?

Rapid advancements in solid-state battery technology are ushering in a new era of energy storage solutions, with the potential to revolutionize everything from electric vehicles to renewable energy systems.

What is a silicon solid-state battery (SSB)?

Learn more. For the first time, we demonstrate a silicon solid-state battery (SSB) architecture that achieves $>400 \text{ Wh kg}^{-1}$, approaching the theoretical limit for silicon-based SSBs. This configuration features a 99.9 wt% micro-Si, a thin sulfide solid electrolyte (SSE), and a high-loading NMC811.

What is a high-energy silicon solid-state battery?

A high-energy silicon solid-state battery exceeding 400 Wh kg^{-1} is demonstrated using a 99.9 wt% micro-Si anode, a thin sulfide electrolyte, and high-loading NMC811 cathode. Optimized dry/wet processing and interface engineering enable excellent cell cycling stability.

Are silicon-based all-solid-state batteries safe?

Silicon-based all-solid-state batteries offer high energy density and safety but face significant application challenges due to the requirement of high external pressure. In this study, a $\text{Li}_{21}\text{Si}_5/\text{Si-Li}_{21}\text{Si}_5$ double-layered anode is

developed for all-solid-state batteries operating free from external pressure.

When will solid-state batteries reach a large-scale application?

Sun Huajun, CTO of BYD's battery division, predicted that solid-state batteries would achieve a large-scale application around 2030. China's edge in mass-producing all-solid-state batteries lies in its vast industry and market scales.

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Apr 15, 2024 · The graphical abstract presents a Silicon solid-state battery that incorporates differently designed particles onto a solid electrolyte, ...

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Role of Pressure and Expansion on the ...

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operation of a solid-state Si battery is demonstrated by integrating particle ...

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Solid-state battery breakthrough promises 100x charging ...

May 20, 2025 · Liquid potassium anodes show 100x performance boost--but a new solid electrolyte is key to room-temperature use.

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Challenges and opportunities towards silicon-based all-solid-state

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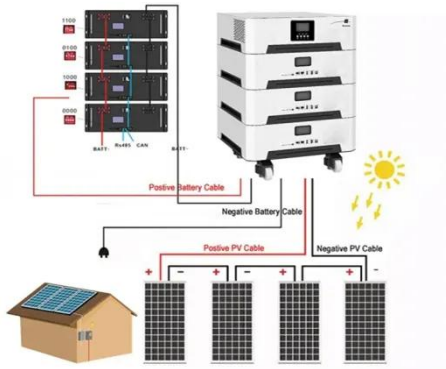
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Solid-state batteries designed with high ion conductive

Sep 12, 2021 · Solid-state batteries designed with high ion conductive composite polymer electrolyte and silicon anode, Energy Storage Materials - X-MOL

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Paving the way for the future of energy storage with solid-state



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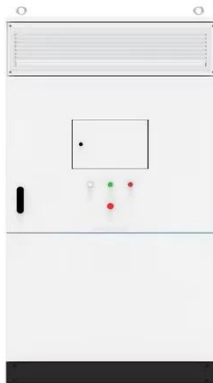
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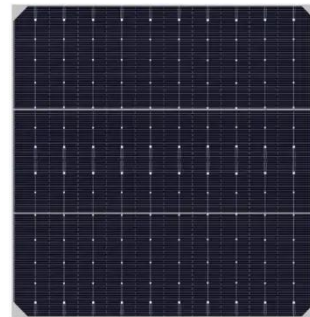
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