

SolarGrid Energy Solutions

High-performance hybrid solid-state energy storage battery



Overview

Compared with conventional supercapacitors and lithium-ion batteries, our hybrid device exhibits superior performance with both high energy density (180 W h kg^{-1}) and high power density (218 W kg^{-1}), and enhanced safety imparted by the quasi-solid-state gel electrolyte, representing one new direction for developing high-energy/high-power energy storage devices. What are solid-state lithium metal batteries?

Solid-state lithium metal batteries have become the leading contenders for the upcoming battery generation in this endeavor. These batteries can combine the safety advantages of solid-state technology with the high energy density potential of lithium metal.

Are all lithium batteries assembled with hybrid solid electrolytes?

All solid-state lithium batteries assembled with hybrid solid electrolytes. J. Electrochem. Soc. 162, A704–A710 (2015). Park, M.-S., Jung, Y.-C. & Kim, D.-W. Hybrid solid electrolytes composed of poly (1,4-butylene adipate) and lithium aluminum germanium phosphate for all-solid-state $\text{Li/LiNi}_{0.6}\text{Co}_{0.2}\text{Mn}_{0.2}\text{O}_2$ cells.

What are all-solid-state batteries?

All-solid-state batteries are highly promising energy storage devices that can simultaneously realize high energy density and superior safety [, ,].

Are solid-state sodium batteries sustainable?

Solid-state sodium batteries represent more sustainable options as they combine resource abundance with safety. This work advances their performance, particularly fast cycling lifespan, to an unprecedented level utilizing a hybrid electrolyte.

What are hybrid solid-state electrolytes?

Hybrid solid-state electrolytes (HSEs) may combine the advantages of

inorganic and polymer electrolytes while overcoming the disadvantages of each component when used separately, as shown in Figure 1. The main strategy of HSEs is to disperse high-surface-area inorganic fillers into a polymer matrix, which is the focus of this review.

What are hybrid solid electrolytes (HSEs)?

Among the various types of solid electrolytes, hybrid solid electrolytes (HSEs) demonstrate great promise to achieve high ionic conductivity, reduced interfacial resistance between the electrolyte and electrodes, mechanical robustness, and excellent processability due to the combined advantages of both polymer and inorganic electrolyte.

High-performance hybrid solid-state energy storage battery



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Hybrid electrolyte enables solid-

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18650 3.7V
Li-ion
RECHARGEABLE BATTERY

2000mAh



All-solid-state hybrid electrode configuration for high-performance

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Energy Storage Materials , Solid-State Battery

Feb 1, 2022 · LiF modified stable flexible PVDF-garnet hybrid electrolyte for high

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Sourav Bag, Chengtian Zhou, Patrick J.
Kim, Vilas G. Pol, ...



Solid-State Batteries: The Future of Energy Storage

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Molecular design for in-situ polymerization of hybrid ...

May 1, 2025 · The design of quasi-solid-state lithium metal batteries (QSSLMBs) with high-energy-density and safety through in-situ polymerization of ether-

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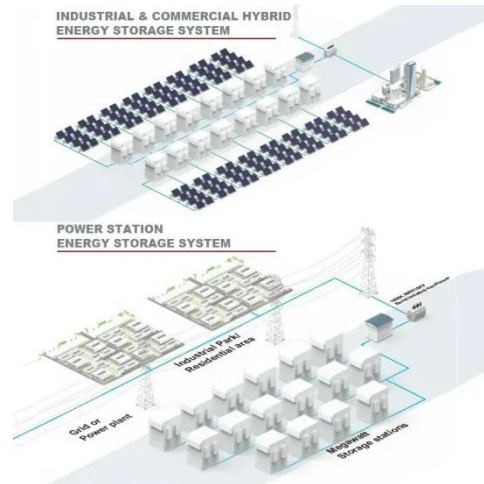
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Energy storage technology and its impact in electric vehicle: ...

Jan 1, 2025 · The objective of current research is to analyse and find out the optimal storage technology among different electro-chemical, chemical,

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Exploring the Frontier: Hybrid Solid-State Batteries ...

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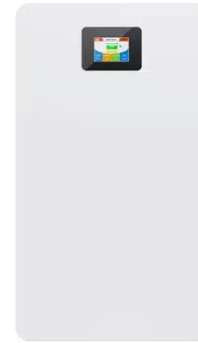
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A solid state energy storage device with supercapacitor-battery hybrid

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All-solid-state hybrid electrode configuration for high-performance

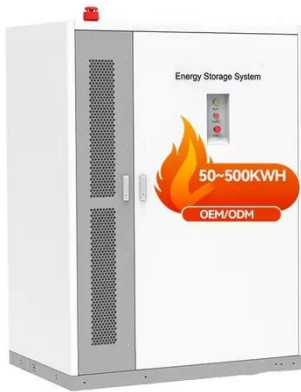
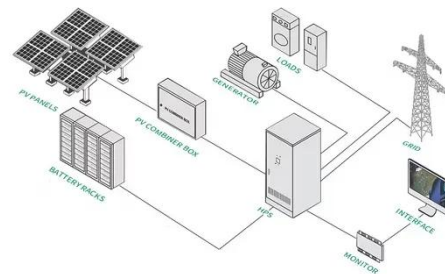
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Aug 1, 2023 · Abstract Solid-state lithium batteries (SSLBs) based on solid-state electrolytes (SSEs) are considered ideal candidates to overcome the energy

density limitations and safety ...



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