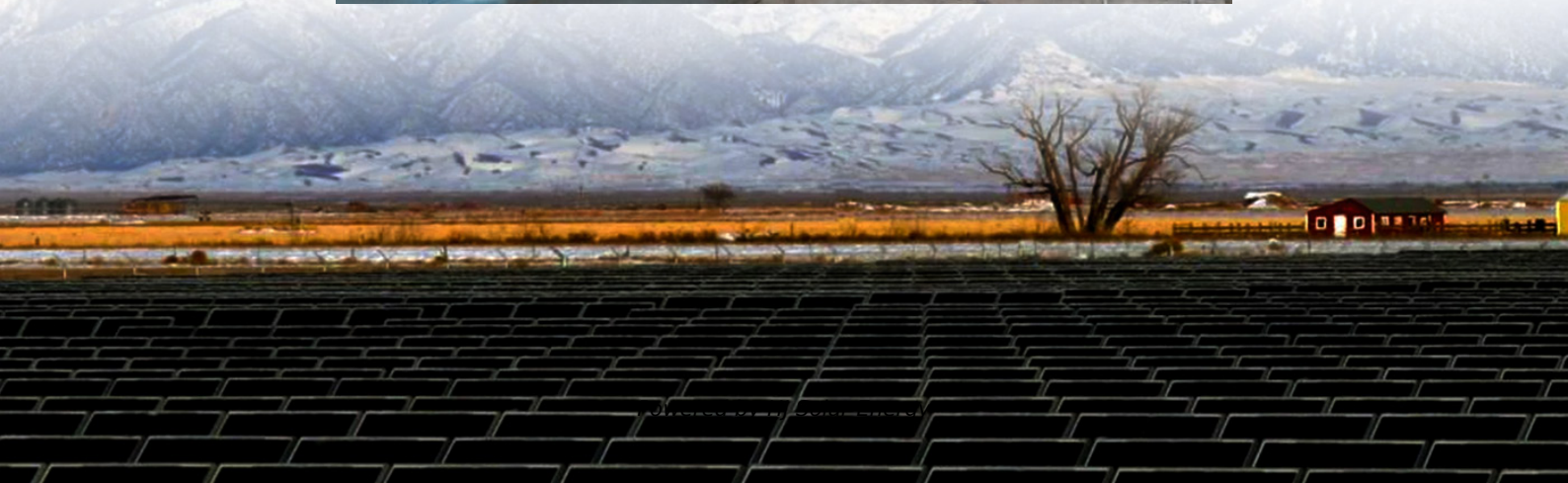


Designing solid-state electrolytes for safe energy-dense batteries





Overview

Are solid-state electrolytes a high-priority material?

Abstract | Solid-state electrolytes (SSEs) have emerged as high-priority materials for safe, energy-dense and reversible storage of electrochemical energy in batteries.

Are solid-state batteries safe?

Solid-state batteries based on electrolytes with low or zero vapour pressure provide a promising path towards safe, energy-dense storage of electrical energy. In this Review, we consider the requirements and design rules for solid-state electrolytes based on inorganics, organic polymers and organic-inorganic hybrids.

Are solid-state electrolytes safe?

Nature Reviews Materials 5, 229–252 (2020) Cite this article Solid-state electrolytes (SSEs) have emerged as high-priority materials for safe, energy-dense and reversible storage of electrochemical energy in batteries.

What are solid-state electrolytes?

Over the past 10 years, solid-state electrolytes (SSEs) have re-emerged as materials of notable scientific and commercial interest for electrical energy storage (EES) in batteries.

Which SSE should be used in a lithium ion battery?

The use of SSEs in these metal-gas batteries with open systems can solve the leakage problem, although the applied SSE should be stable in air (or CO₂). For Li-air batteries, the solid-oxide SIEs are promising because they are more stable than sulfide electrolytes in air, and NASICON-type (LATP, LAGP) SSEs are a suitable choice.

Do thin solid-state electrolytes reduce dendrite growth?



Designing and fabricating thin solid-state electrolytes (SSEs) are crucial to achieve high energy densities and boost the practical application of ASSLBs. However, the thickness reduction in SSEs introduces challenges such as a heightened risk of dendrite growth.



Designing solid-state electrolytes for safe energy-dense batteries



Designing solid-state electrolytes for safe, energy-dense batteries

Abstract Solid-state electrolytes (SSEs) have emerged as high-priority materials for safe, energy-dense and reversible storage of electrochemical energy in batteries.

Design of thin solid-state electrolyte films for safe and energy-dense

The review highlights the cost-effective and scalable methods to produce thin SSEs, and discusses future opportunities in this burgeoning area, ranging from fundamental ...

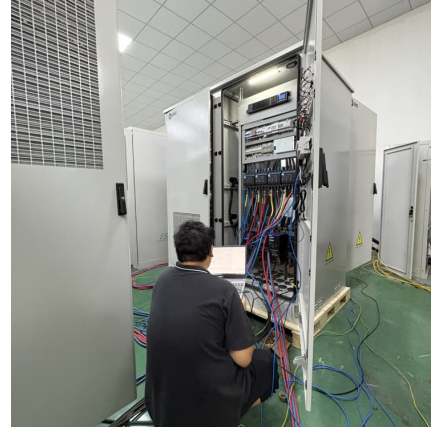


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Designing biomass-integrated solid polymer electrolytes for safe ...

This perspective provides enlightenment for the rational design of biomass-based SPEs, accelerating the sustainable development of advanced energy storage devices.



Designing solid-state electrolytes for safe, energy-dense ...

In this Review, we assess recent progress in the design, synthesis and analysis of SSEs, and identify key failure modes, performance limitations and design concepts for creating SSEs to



[Designing solid-state electrolytes for safe, energy ...](#)

In this Review, we assess recent progress in the design, synthesis and analysis of SSEs, and identify key failure modes, performance limitations and design concepts for creating SSEs to meet requirements for practical applications.





Dynamic control of lithium dendrite growth with sequential

The comprehensive analysis further reveals that the designed bilayer SSE effectively harnesses the interface-generated pressure during battery cycling, achieving ...



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Recent advances and remaining challenges of solid-state electrolytes

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