

Low temperature resistant sodium ion battery





Overview

Sodium-ion batteries (SIBs) present a sustainable and cost-effective alternative to lithium-ion batteries (LIBs) for low-temperature (LT) applications, leveraging sodium abundance and reduced geopolitical risks. Are sodium ion batteries suitable for low temperature applications?

Low temperature sodium-ion batteries outlook Compared with lithium-ion batteries, sodium-ion batteries have a better prospect of application at low temperatures due to the weaker viscosity effect of sodium ions in the electrolyte and the lower desolvation energy brought by larger cationic radius.

Do low-temperature sodium-ion batteries improve performance?

Although some studies on improving the performance of low-temperature sodium-ion batteries from different perspectives have been reported recently, there is a lack of reviews on the low-temperature performance of sodium-ion batteries [1, 2, 3, 4 – 42].

Are sodium ion batteries a viable alternative to lithium-ion batteries?

Abstract: Sodium-ion batteries (SIBs) have garnered significant interest due to their potential as viable alternatives to conventional lithium-ion batteries (LIBs), particularly in environments where low-temperature (LT) performance is crucial.

Are sodium ion batteries sluggish kinetics at low temperatures?

Sodium-ion batteries (SIBs) are recognized as promising large-scale energy storage systems but suffer from sluggish kinetics at low temperatures. Herein, we proposed a carbon nanotubes-modified P2-



Low temperature resistant sodium ion battery

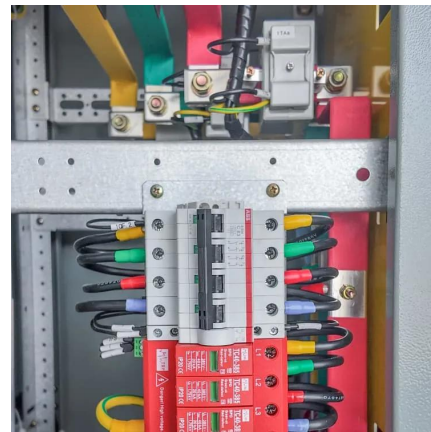


[The prospect and challenges of sodium-ion ...](#)

In recent years, considerable attention has been focused on the development of sodium-ion batteries (SIBs) because of the natural abundance of raw ...

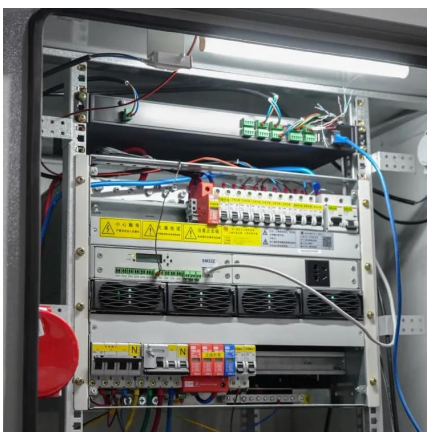
[Low-temperature performance of Na-ion batteries](#)

The aforementioned issues hinder the diffusion kinetics of sodium ions (Na^+) at the electrode/electrolyte interface and cause rapid degradation of battery performance. ...



[A perspective on low-temperature ...](#)

As an ideal candidate for the next generation of energy storage devices, sodium-ion batteries (SIBs) have received tremendous attention in recent ...



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The aforementioned issues hinder the diffusion kinetics of sodium ions (Na^+) at the electrode/electrolyte interface and cause rapid degradation of ...



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Unlocking low temperature-resistant lithium metal batteries: ...

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Extending the low-temperature operation of sodium metal batteries

Aug 22, 2022 · The low-temperature operation of non-aqueous sodium-based batteries is affected by the properties of the electrolyte. Here the authors propose specific electrolyte formulations ...

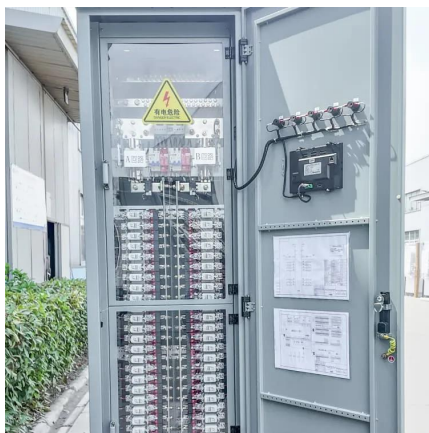
[Status and strategies of electrolyte ...](#)

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May 18, 2025 · The development of high-performance sodium-ion batteries (SIBs) that can operate effectively in low-temperature environments is ...



Interfacial-engineering-enabled practical low-temperature sodium ...

Dec 23, 2021 · Solid-state sodium (Na) batteries have received extensive attention as a promising alternative to room-temperature liquid electrolyte Na-ion batteries and high-temperature liquid ...



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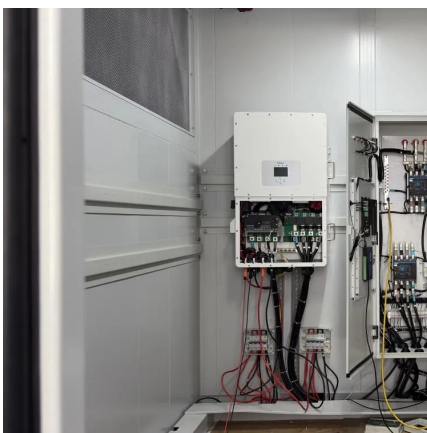
Dec 1, 2025 · With the development of lithium-ion batteries, people are no longer confined to portable electronic products. Large-scale energy storage systems and electric vehicles have ...





Sodium Ion Batteries: Outstanding ...

Sodium-ion batteries are proving to be a game-changer in the energy storage industry, offering superior performance as low temperature batteries.



Designing aggregates-dominated electrolyte via tuning ...

Jun 1, 2025 · Abstract Sodium-ion batteries (SIBs) have attracted widespread attention as a promising energy storage technology due to the abundant sodium resources and low cost. ...

Recent advances in research on cathodes for low-temperature sodium-ion

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