

# The role of energy storage batteries at low temperatures

Mar 23, 2022&ensp;&#0183;&ensp;Abstract Aqueous batteries represent promising candidates to address the grand challenge of energy storage. Ideally, a battery ought to deliver performance at low ...

Feb 6, 2023&ensp;&#0183;&ensp;In this review, we sorted out the critical factors leading to the poor low-temperature performance of electrolytes, and the ...

Jun 26, 2025&ensp;&#0183;&ensp;Rechargeable lithium-ion batteries and sodium-ion batteries significantly underperform at ultra-low temperatures, limiting their applicability in critical fields such as ...

Feb 19, 2025&ensp;&#0183;&ensp;Abstract High-energy low-temperature lithium-ion batteries (LIBs) play an important role in promoting the application of renewable ...

Lithium-ion batteries employing LiFePO<sub>4</sub> as the cathode have become a favored option for EVs and energy storage systems because of their inherent benefits, including cost-effectiveness, ...

Apr 25, 2022&ensp;&#0183;&ensp;Operating aqueous redox flow batteries (ARFBs) at low temperatures is prohibited by limited solubility of redox-active materials, freezing electrolytes and sluggish reaction kinetics.

Dec 9, 2024&ensp;&#0183;&ensp;Abstract Metal-ion batteries (such as lithium-ion batteries) are very popular energy-storage devices nowadays. However, low temperatures cause their poor electrochemical ...

Jul 7, 2025&ensp;&#0183;&ensp;The sluggish ion diffusion and charge transfer kinetics are the primary factors contributing to the suboptimal performance of ...

Feb 19, 2025&ensp;&#0183;&ensp;Abstract High-energy low-temperature lithium-ion batteries (LIBs) play an important role in promoting the application of renewable energy storage in national defense ...

Jul 7, 2025&ensp;&#0183;&ensp;The sluggish ion diffusion and charge transfer kinetics are the primary factors contributing to the suboptimal performance of rechargeable batteries at low temperatures, both ...

Apr 17, 2023&ensp;&#0183;&ensp;Lithium batteries are expected to be the main energy storage method due to their high energy density, power density, and low self-discharge rate. However, the performance ...

Rechargeable batteries have been indispensable for various portable devices, electric vehicles, and energy storage stations. The operation of rechargeable batteries at low temperatures has ...

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Apr 24, 2025&ensp;&#0183;&ensp;The commonly used carbonate-based electrolytes suffer from poor ionic conductivity at low temperatures, while electrode materials ...

Jun 1, 2024&ensp;&#0183;&ensp;As a promising candidate for future large-scale energy storage applications, rechargeable zinc-ion batteries (ZIBs) have experienced significant growth in the past decade ...

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