

Can Li stabilizing strategies be used in low-temperature batteries?

The Li stabilizing strategies including artificial SEI, alloying, and current collector/host modification are promising for application in the low-temperature batteries. However, expeditions on such aspects are presently limited, with numerous efforts being devoted to electrolyte designs. 3.3.1. Interfacial regulation and alloying

Do Li salts improve battery performance in low-temperature conditions?

Li salts as the solutes of electrolytes provide cation and anion in the batteries, which obviously are responsible for the ion transport and SEI formation, exhibiting evident impacts on battery performance. Therefore, the selection and design of Li salts plays a crucial role in optimizing the performance of LMBs in low-temperature conditions.

How does low temperature affect battery performance?

At low temperature, the high desolvation energy and low ionic conductivity of the bulk electrolyte limit the low-temperature performance of the LMBs. Such processes play important roles in deciding the low-temperature performances of batteries.

How solvation structure affect low-temperature battery cycling?

Adjusting the solvation structure is also an effective strategy for low-temperature LMBs. In addition to the type and proportion of solvents, the intricate interactions among solvents, Li salts, and additives are also of great significance to the low-temperature battery cycling.

How does low temperature affect lithium ion transport?

At low temperature, the increased viscosity of electrolyte leads to the poor wetting of batteries and sluggish transportation of Li-ion ( $\text{Li}^+$ ) in bulk electrolyte. Moreover, the  $\text{Li}^+$  insertion/extraction in/from the electrodes, and solvation/desolvation at the interface are greatly slowed.

Why do lithium batteries corrode at low temperature?

The resulted SEI typically is comprised of increased organic intermediate products, relating to uneven  $\text{Li}^+$  transport and deposition. In addition, dendritic Li deposits and localized short-circuits of batteries are more frequently at low temperature. Additionally, the corrosion behavior of Li at low temperature should also not be overlooked.

Understanding how temperature influences lithium battery performance is essential for optimizing their efficiency and longevity. Lithium batteries, particularly  $\text{LiFePO}_4$  ...

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