Illustration of the weakening process of new energy batteries

How does low-temperature battery performance relate to interphase chemistry?
The low-temperature performance of the batteries is inextricably linkedto the formation of the interfacial films and the resulting interphase chemistry between the electrolyte and the electrode.

What are phase transitions and resultant phase diagrams in Li-ion batteries?
The phenomenon of phase transitions and the resultant phase diagrams in Li-ion batteries (LIBs) are often observed in the synthesis of materials,electrochemical reaction processes,temperature changes of batteries,and so on. Understanding those phenomena is crucial to design more desirable materials and facilitate the overall development of LIBs.

How does entropy affect battery performance?
In addition,the high entropy induced by multiple salts can increase the disorder degree and lower the melting point of the electrolytes,thereby enhancing the low-temperature performanceof batteries without changing the solvents .

How will increased battery production affect the environment?
An increased volume of battery production will notably affect the environment due to raw material processing and generation of secondary streams. Currently in the European Union,only 50 wt% of lithium-ion batteries is required to be recycled based on the directive 2006/66/EC .

Could lithium-ion battery degradation revolutionize the design of electric vehicles?
Researchers have discovered the fundamental mechanism behind battery degradation,which could revolutionize the design of lithium-ion batteries,enhancing the driving range and lifespan of electric vehicles (EVs) and advancing clean energy storage solutions.

How battery chemistry can be used in a cryogenic environment?
Except the external/internal heating strategies,great endeavors are initiated from battery chemistry by optimizing the properties of the electrode,electrolyte,and interface to accelerate ion movement,which is conducive for battery systems under cryogenic scenarios to effectively cope with major challenges.

In this mini-review, we first outline the employment of advanced electrocatalysts such as carbon materials, noble and non-noble metals, and metal-organic frameworks to ...

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In this work, a high-performance rechargeable battery at ultralow temperature is developed by employing a nanosized Ni-based Prussian blue (NiHCF) cathode. The battery ...

New energy battery weakening process diagram Regulating the Solvation Structure of Li+ Enables Chemical Prelithiation of Silicon-Based Anodes Toward High-Energy Lithium-Ion Batteries ... The solvation structure of Li+ in chemical prelithiation reagent plays a key role in improving the low initial Coulombic efficiency (ICE) and poor cycle ...

Schematic illustrations of the multiple processes and critical challenges for lithium ion batteries operated under subzero temperatures. SEI = solid electrolyte interphase.

Aqueous metal ion batteries, due to their low cost, intrinsic safety, environmental benign, and high power density, have been widely investigated recently, among which zinc ion batteries (ZIBs) have attracted increasing attentions because of the low redox potential (-0.76 V vs standard hydrogen electrode) and high volumetric capacity (5860 mAh cm -3) of Zn [4-7].

Progress in the research on phase transitions during Li + extraction/insertion processes in typical battery materials is summarized as examples to illustrate the significance of understanding phase transition phenomena in Li-ion batteries.

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Lithium-oxygen (Li-O 2) batteries have great potential for applications in electric devices and vehicles due to their high theoretical energy density of 3500 Wh kg -1.Unfortunately, their practical use is seriously limited by the sluggish decomposition of insulating Li 2 O 2, leading to high OER overpotentials and the decomposition of cathodes and electrolytes.

In this mini-review, we first outline the employment of advanced electrocatalysts such as carbon materials, noble and non-noble metals, and metal-organic frameworks to improve battery performance. We then detail the ORR and OER mechanisms of photo-assisted electrocatalysts and single-atom catalysts for superior Li-O 2 battery performance.

In this work, a high-performance rechargeable battery at ultralow temperature is developed by employing a nanosized Ni-based Prussian blue (NiHCF) cathode. The battery delivers a high capacity retention of 89% (low temperature of -50 °C) and 82% (ultralow temperature of -70 °C) compared with that at +25 °C.

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Illustration of the weakening process of new energy batteries

The new energy vehicle market has grown rapidly due to the promotion of electric vehicles. Considering the average effective lives and calendar lives of power batteries, the world is gradually ushering in the retirement peak of spent lithium-ion batteries (SLIBs). Without proper disposal, such a large number of SLIBs can be grievous waste of resources and ...

Lithium-ion batteries are the state-of-the-art electrochemical energy storage technology for mobile electronic devices and electric vehicles. Accordingly, they have attracted a continuously increasing interest in academia and industry, which has led to a steady improvement in energy and power density, while the costs have decreased at even ...

Researchers have discovered the fundamental mechanism behind battery degradation, which could revolutionize the design of lithium-ion batteries, enhancing the ...

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