

# Ultra-long cycle life energy storage battery





## Overview

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The all-solid-state battery (ASSB) has been widely recognized as the critical next-generation energy storage technology due to its high energy density and safety. However, stable cycling at high cathode loadings is difficult to be realized due to the poor interfacial contacts and ion transportation.

Herein, a hydronium-ion battery with a soluble methylene blue (MB) anode and a  $\text{MnO}_2$  @graphite felt cathode is proposed, involving a  $-\text{C}=\text{N} / -\text{C}-\text{N}-\text{H}$  group transition at the anode and  $\text{MnO}_2 / \text{Mn}^{2+}$  at the cathode. The anode exhibits a maximum capacity of  $1324 \mu\text{Ah cm}^{-2}$  at  $2 \text{ mA cm}^{-2}$  and excellent cycle.

On December 12th, 2024, Hithium launched  $\infty\text{Cell N162Ah}$ , the first sodium-ion battery specifically designed for utility-scale energy storage, at the second Hithium Eco-Day in Beijing, China. Designed to excel in wide temperature ranges and high-rate discharge scenarios, the battery delivers.



## Ultra-long cycle life energy storage battery

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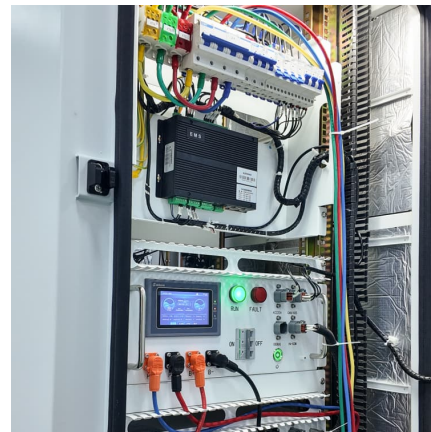


### [High-Energy Density Aqueous Zinc-Iodine Batteries ...](#)

Aqueous zinc-iodine batteries, featuring high energy density, safety, and cost-effectiveness, have been regarded as a promising energy ...

### **Fast-charging all-solid-state battery cathodes with long cycle life**

Many battery applications target fast charging to achieve an 80 % rise in state of charge (SOC) in < 15 min. However, in the case of all-solid-state batteries (SSBs), they ...



### **Super capacitors for energy storage: Progress, applications and**

These have sprung up as a result of the requirement to fabricate high-energy SCs while sustaining long cycle life and high power. Some researchers identified the presence of ...

### [Pre-intercalation d-MnO<sub>2</sub> Zinc-ion hybrid](#)

The design and exploration of new-type energy storage devices with exceptional energy and power density as well as ultra-long cycling lifespan are still on highly demand.



### 20,000-Cycle Ultra-Long Lifespan: Hithium Energy Storage First ...

Designed to excel in wide temperature ranges and high-rate discharge scenarios, the battery delivers outstanding cycle life, energy efficiency, high-rate ...



### Novel high-entropy oxides with ultra-long cycle life as cathode

Nevertheless, due to its limited resources and excessive use, it will cause serious harm to the environment [1], Therefore, the development of clean and sustainable energy ...



### High-Performance Zinc-Iodine Batteries with Ultra-Long Cycle Life

Explore the future of energy storage with insights on battery innovation, sustainable infrastructure, and policy trends in this free Industry Focus eBook.





Angewandte Chemie International Edition

Rechargeable aluminum batteries (RABs) are a promising candidate for large-scale energy storage, attributing to the abundant reserves, low cost, intrinsic safety, and high ...



**Ultra-long cycle life flexible quasi-solid-state alkaline zinc**

As a consequence, the as-designed quasi-solid-state flexible Ni-Zn battery demonstrates a high specific capacity of  $1.06 \text{ mAh cm}^{-2}$  ( $276.04 \text{ mAh g}^{-1}$ ) at  $8 \text{ mA cm}^{-2}$  ...

**High areal capacity, long cycle life 4 V ceramic all-solid**

Rechargeable batteries are key technologies for clean energy storage and electric vehicle applications. However, conventional lithium-ion batteries (LIBs) exploit flammable liquid ...



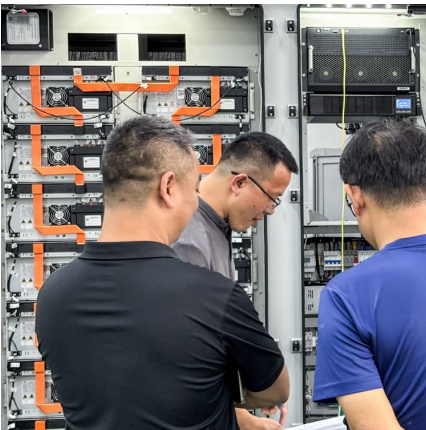
**Chinese Scientists Develop a High-Performance Ultralong-Life ...**

Operating under a weak magnetic field, the high-performance Zn-VS<sub>2</sub> battery demonstrated an ultralong cycle lifespan and delivered a high energy density and power ...



### Ultra-Stable, Ultra-Long-Lifespan and Ultra-High-Rate Na-ion ...

Molecule-aggregation organic electrodes in principle possess the "single-molecule-energy-storage" capability for metal-ion rechargeable batteries. Bes...



### Sustainable ultra-long cycle life aqueous Zn-I2 battery without ion

Effects of Se deposition time on the anti-corrosion performance, rate performance, capacity, and cycle life are investigated in detail. As a result, the button-type full cell using optimized Zn@Se ...

### Low-Cost, Safe, and Ultra-Long Cycle Life Zn-K ...

Combining the nonflammable nature of the electrolyte, the abundance of raw materials, and good electrochemical performance, the Zn-K ...



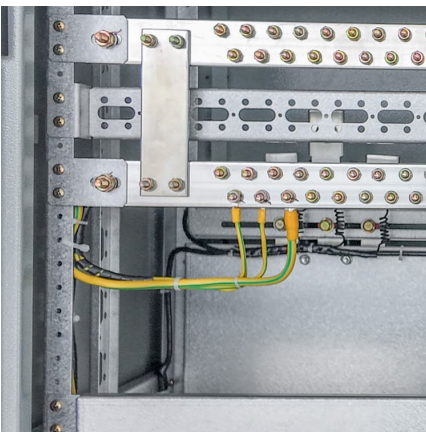
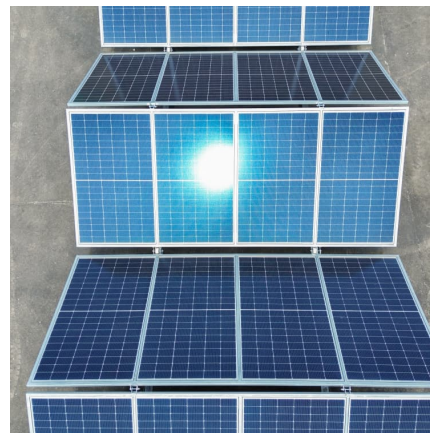


### **A high-energy-density long-cycle lithium-sulfur battery ...**

Lithium-sulfur (Li-S) battery is attracting increasing interest for its potential in low-cost high-density energy storage. However, it has been a ...

### **High areal capacity, long cycle life 4 V ceramic all-solid**

All-solid-state Li batteries (ASSBs) employing inorganic solid electrolytes offer improved safety and are exciting candidates for next-generation energy storage.



### **A solid-diffusion-free hydronium-ion battery with ultra-long cycle ...**

By coupling with MnO<sub>2</sub> @graphite felt cathode, the MB//MnO<sub>2</sub> batteries deliver an energy density of 198 mWh cm<sup>-2</sup> and outstanding long cycle stability over 8000 cycles.

### **Ultra-high rate and long cycle life sodium-based dual-ion batteries**

Lithium-ion batteries (LIBs) are considered state-of-the-art battery energy storage devices due to their high safety and long cycle life [ [1], [2], [3], [4], [5], [6



[A multifunctional polymer electrolyte enables ultra ...](#)

In this article, we demonstrated for the first time an ultra-strong bacterial cellulose supported poly (methyl vinyl ether-alt-maleic anhydride) as ...



**Flexible Zn-ion hybrid supercapacitor enabled by N-Doped MnO<sub>2</sub> ...**

An aqueous ZSC with ultra-long cycle life was constructed using N-MnO<sub>2</sub> as cathodes, they enable an excellent areal capacitance of 712.5 mF cm<sup>-2</sup>, a remarkable areal ...



**Lithophilic alloy and 3D grid structure synergistically reinforce**

The LFP/Li-Sn/Cu full battery exhibited an ultra-long stable cycle life of 1,000 cycles with 90.7% capacity retention and near 100% Coulombic efficiency. Notably, the ...





### A solid-diffusion-free hydronium-ion battery with ultra-long cycle life

Graphical abstract A hydronium-ion battery based on a soluble methylene blue (MB) anode and a MnO<sub>2</sub>@graphite felt cathode is proposed, involving a -C=N / -C-N H group ...



### High-areal-capacity and long-cycle-life all-solid-state battery ...

The all-solid-state battery (ASSB) has been widely recognized as the critical next-generation energy storage technology due to its high energy density and safety.



### [Chinese Scientists Develop a High-Performance ...](#)

Operating under a weak magnetic field, the high-performance Zn-VS<sub>2</sub> battery demonstrated an ultralong cycle lifespan and delivered a high ...

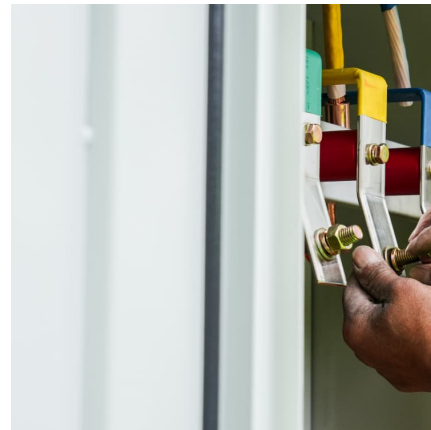
### [Ultrahigh-rate and ultralong-life aqueous batteries ...](#)

Batteries offer high energy density but lack high power density and long cycle life of supercapacitors (1). There is a growing demand for rapid ...



### [Flexible Low-Temperature Zinc Ion Hybrid Capacitor ...](#)

Zinc-ion hybrid capacitors (ZIHCs) are expected to become the next generation of energy storage devices, highly anticipated for their battery-like performance ...



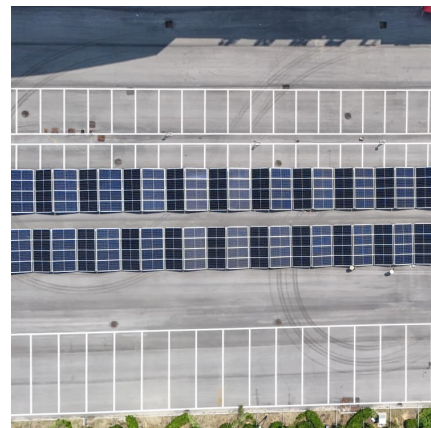
### [Low-Cost, Safe, and Ultra-Long Cycle Life Zn-K ...](#)

Zinc-ion batteries (ZIBs) are viewed as a promising energy storage system for large-scale applications thanks to the low cost and wide ...



### **A facile strategy toward sodium-ion batteries with ultra-long cycle**

Sodium-ion batteries (NIBs) has been considered as the most promising next generation low cost and environmentally friendly electrochemical energy storage system for ...





### [Layer-by-layer stacked amorphous V<sub>2</sub>O<sub>5</sub>/Graphene 2D](#)

Graphical abstract 2D amorphous V<sub>2</sub>O<sub>5</sub>/graphene heterostructures with highly stable layer-by-layer stacked structure are demonstrated for high-safe, rechargeable aqueous ...

### **Aqueous sodium ion hybrid batteries with ultra-long cycle life at -50**

Rapid charge-discharge ability and ultra-long cycling life are the important indicators and requirements of practical applications for ASIHBs. On this basis, the full battery ...



### **Long-life lithium-ion batteries realized by low-Ni, Co-free cathode**

There is an intensive effort to develop Li-ion batteries that rely on sustainable materials. Here the authors employ a complex doping approach to synthesize low-Ni, Co-free ...

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