BUHLE POWER

Alkaline Flow Battery Science

Overview

Are alkaline zinc-based flow batteries suitable for stationary energy storage applications?

Alkaline zinc-based flow batteries are well suitable for stationary energy storage applications, since they feature the advantages of high safety, high cell voltage and low cost. Currently, many alkaline zinc-based flow batteries have been proposed and developed, e.g., the alkaline zinc-iron flow battery and alkaline zinc—nickel flow battery.

Are alkaline Zn-Fe flow batteries suitable for large-scale energy storage?

The alkaline Zn-Fe flow battery stably operated for over 500 h, achieving an EE of 86.3 % at 80 mA cm−2. Alkaline zinc-based flow batteries (AZFBs) are considered one of the most promising candidates for large-scale energy storage owing to Zn abundance, cost effectiveness, intrinsic safety and eco-friendliness.

Can redox-active organic molecules be used in alkaline flow batteries?

The battery operates efficiently with high power density near room temperature. These results demonstrate the stability and performance of redox-active organic molecules in alkaline flow batteries, potentially enabling cost-effective stationary storage of renewable energy.

Are alkaline flow batteries safe?

We report an alkaline flow battery based on redox-active organic molecules that are composed entirely of Earth-abundant elements and are nontoxic, nonflammable, and safe for use in residential and commercial environments. The battery operates efficiently with high power density near room temperature.

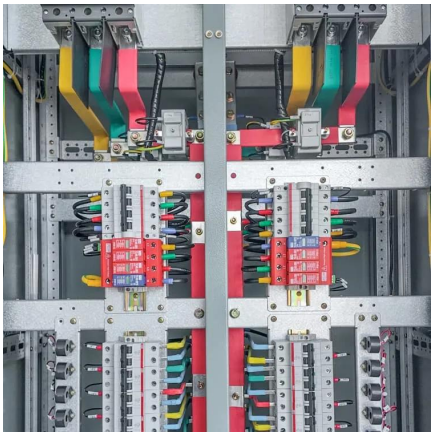
Alkaline Flow Battery Science

[Perspective of alkaline zinc-based flow batteries , Science]

Dec 1, 2022 · Alkaline zinc-based flow batteries are well suitable for stationary energy storage applications, since they feature the advantages of high safety, high cell voltage and low cost. ...

[A High-Capacity Alkaline Tin-Iron Aqueous Redox Flow Battery ...]

Mar 19, 2025 · High-capacity, low-cost alkaline metal aqueous redox flow batteries (ARFBs) are of great significance for large-scale energy storage. Among them, tin-based flow batteries have ...

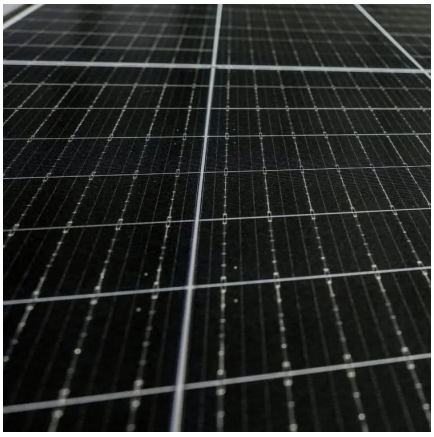


[Alkaline quinone flow battery , Science]

Sep 25, 2015 · Alkaline flow batteries can compensate for higher membrane resistance with higher voltage, leading to performance similar to that of their acidic counterparts. In addition, ...

[Alkaline zinc-based flow battery: chemical stability, ...]

May 23, 2024 · Alkaline zinc-based flow battery: chemical stability, morphological evolution, and performance of zinc electrode with ionic liquid Tianyong Mao*, Jing Dai*, Meiqing Xin, Deliang ...



[An aqueous alkaline zinc-sulfur flow battery]

Abstract We demonstrate a rechargeable aqueous alkaline zinc-sulfur flow battery that comprises environmental materials zinc and sulfur as ...

[Alkaline quinone flow battery]

Nov 5, 2025 · Storage of photovoltaic and wind electricity in batteries could solve the mismatch problem between the intermittent supply of these renewable resources and variable demand. ...

[Alkaline quinone flow battery]

Nov 1, 2021 · The battery operates efficiently with high power density near room temperature.These results demonstrate the stability and performance of redox-active organic ...

[High-performance alkaline zinc flow batteries enabled by ...]

Aug 10, 2025 · The alkaline Zn-Fe flow battery stably operated for over 500 h, achieving an EE of 86.3 % at 80 mA cm-2. Alkaline zinc-based flow batteries (AZFBs) are considered one of the ...

[A High-Capacity Alkaline Tin-Iron Aqueous ...]

Mar 19, 2025 · High-capacity, low-cost alkaline metal aqueous redox flow batteries (ARFBs) are of great significance for large-scale energy storage. ...

[Alkaline Zn-Mn aqueous flow batteries with ultrahigh ...]

Aug 1, 2023 · Low energy densities restrict the widespread applications of redox flow batteries. Herein, we report an alkaline Zn-Mn aqueous redox flow battery (ARF...

[An aqueous alkaline zinc-sulfur flow battery]

Abstract We demonstrate a rechargeable aqueous alkaline zinc-sulfur flow battery that comprises environmental materials zinc and sulfur as negative and positive active species. Meanwhile, a ...

Alkaline quinone flow battery

The battery operates efficiently with high power density near room temperature. These results demonstrate the stability and performance of redox-active organic molecules in alkaline flow ...

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