
Zinc-based flow batteries are mainstream

What is a zinc-based flow battery?

The history of zinc-based flow batteries is longer than that of the vanadium flow battery but has only a handful of demonstration systems. The currently available demo and application for zinc-based flow batteries are zinc-bromine flow batteries, alkaline zinc-iron flow batteries, and alkaline zinc-nickel flow batteries.

Are zinc-based flow batteries good for distributed energy storage?

Among the above-mentioned flow batteries, the zinc-based flow batteries that leverage the plating-stripping process of the zinc redox couples in the anode are very promising for distributed energy storage because of their attractive features of high safety, high energy density, and low cost.

How much does a zinc flow battery cost?

In addition to the energy density, the low cost of zinc-based flow batteries and electrolyte cost in particular provides them a very competitive capital cost. Taking the zinc-iron flow battery as an example, a capital cost of \$95 per kWh can be achieved based on a 0.1 MW/0.8 MWh system that works at the current density of 100 mA cm⁻².

Can a zinc-based flow battery withstand corrosion?

Although the corrosion of zinc metal can be alleviated by using additives to form protective layers on the surface of zinc [14,15], it cannot resolve this issue essentially, which has challenged the practical application of zinc-based flow batteries.

Zinc-based flow battery technologies are regarded as a promising solution for distributed energy storage. Nevertheless, their upscaling for practical applications is still ...

Zinc-based redox flow batteries (ZRFBs) have been considered as ones of the most promising large-scale energy storage technologies owing to their low cost, high safety, ...

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 ...

In addition to the aforementioned challenges, different kinds of zinc-based flow batteries also encounter many issues individually, such as the corrosion of bromine in zinc ...

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Abstract: In alkaline zinc-iron flow batteries (AZIFBs), the non-ideal deposition behavior of zincate ions ($[\text{Zn}(\text{OH})_4]^{2-}$) readily induces the formation of zinc dendrites and ...

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Aqueous zinc-iodine flow batteries show potential in large-scale storage but face water imbalance-induced instability. Here, authors develop a tailored ionic-molecular sieve ...

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