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Zinc flow battery

Overview

Aqueous zinc-based flow batteries (ZFBs) represent one of the most promising energy storage technologies benefiting from their high safety and competitive energy density.Are aqueous zinc-based flow batteries a promising energy storage technology?

Aqueous zinc-based flow batteries (ZFBs) represent one of the most promising energy storage technologies benefiting from their high safety and competitive energy density. However, the morphological evolution of Zn still remains vague but is significant in the electrolyte, whose Zn 2+ concentration constantly decreases during Zn plating.

Do all zinc-based flow batteries have high energy density?

Indeed, not all zinc-based flow batteries have high energy density because of the limited solubility of redox couples in catholyte. 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.

Are zinc-bromine flow batteries suitable for large-scale energy storage?

Zinc-bromine flow batteries (ZBFBs) offer great potential for large-scale energy storage owing to the inherent high energy density and low cost. However, practical applications of this technology are hindered by low power density and short cycle life, mainly due to large polarization and non-uniform zinc deposition.

What are the advantages of zinc-based flow batteries?

Benefiting from the uniform zinc plating and materials optimization, the areal capacity of zinc-based flow batteries has been remarkably improved, e.g., 435 mAh cm -2 for a single alkaline zinc-iron flow battery, 240 mAh cm -2 for an alkaline zinc-iron flow battery cell stack , 240 mAh cm -2 for a single zinc-iodine flow battery .

What are zinc-bromine flow batteries?

Among the above-mentioned zinc-based flow batteries, the zinc-bromine flow batteries are one of the few batteries in which the anolyte and catholyte are completely consistent. This avoids the cross-contamination of the electrolyte and makes the regeneration of electrolytes simple.

What are the different types of zinc-based flow batteries?

Since the 1970s, various types of zinc-based flow batteries based on different positive redox couples, e.g., Br - /Br 2, Fe (CN) 64- /Fe (CN) 63- and Ni (OH) 2 /NiOOH , have been proposed and developed, with different characteristics, challenges, maturity and prospects.

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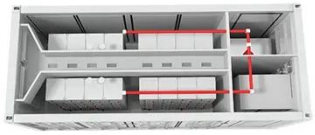

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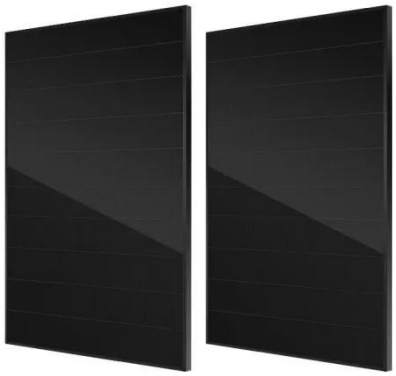

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