

# Charge and discharge control of zinc-iron flow battery





## Overview

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Are neutral zinc-iron flow batteries a good choice?

Neutral zinc-iron flow batteries (ZIFBs) remain attractive due to features of low cost, abundant reserves, and mild operating medium. However, the ZIFBs based on  $\text{Fe}(\text{CN})_6^{3-}/\text{Fe}(\text{CN})_6^{4-}$  catholyte suffer from  $\text{Zn}_2\text{Fe}(\text{CN})_6$  precipitation due to the  $\text{Zn}^{2+}$  crossover from the anolyte.

Can zinc-iron chloride flow batteries be used in grid-scale energy storage?

This enables the use of mixed Zn-Fe electrolytes and microporous separators in place of expensive ion-exchange membranes. Considering the low-cost materials and simple design, zinc-iron chloride flow batteries represent a promising new approach in grid-scale energy storage.

Can zinc-iron flow batteries be used in mildly acidic chloride electrolytes?

Soc. 164 A1069 DOI 10.1149/2.0591706jes The feasibility of zinc-iron flow batteries using mixed metal ions in mildly acidic chloride electrolytes was investigated. Iron electrodeposition is strongly inhibited in the presence of  $\text{Zn}^{2+}$  and so the deposition and stripping processes at the negative electrode approximate those of normal zinc electrodes.

Are zinc-iron redox flow batteries safe?

Authors to whom correspondence should be addressed. Zinc-iron redox flow batteries (ZIRFBs) possess intrinsic safety and stability and have been the research focus of electrochemical energy storage technology due to their low electrolyte cost.



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Review of the Research Status of Cost ...

Oct 31, 2022 · Zinc-iron redox flow batteries (ZIRFBs) possess intrinsic safety and stability and have been the research focus of electrochemical ...

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Battery management system for zinc-based flow batteries: A ...

Jun 1, 2025 · Zinc-based flow batteries are considered to be ones of the most promising technologies for medium-scale and large-scale energy storage. In order to en...

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Optimal Design of Zinc-iron Liquid Flow Battery Based on Flow Control

Sep 28, 2023 · Zinc-iron liquid flow batteries have high open-circuit voltage under alkaline conditions and can be cyclically charged and discharged for a long time under high current ...

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Zinc-Iron Flow Batteries with Common Electrolyte

Mar 22, 2017 · Considering the low-cost materials and simple design, zinc-iron chloride flow batteries represent a promising new approach in grid-scale energy storage. The preferential ...

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An Exploration of Battery Management Solutions for Zinc-Based Flow

Mar 23, 2025 · Navigating the complexities of zinc-based flow batteries reveals innovative solutions to enhance performance and efficiency, but what groundbreaking strategies await ...

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A Neutral Zinc-Iron Flow Battery with Long Lifespan and ...

Jun 24, 2024 · Neutral zinc-iron flow batteries (ZIFBs) remain attractive due to features of low cost, abundant reserves, and mild operating medium. However, the ZIFBs based on Fe (CN) ...

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Review of the Research Status of Cost-Effective Zinc-Iron Redox Flow

Oct 31, 2022 · Zinc-iron redox flow batteries (ZIRFBs) possess intrinsic safety and stability and have been the research focus of electrochemical energy storage technology due to their low ...

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A Neutral Zinc-Iron Flow Battery with Long ...

Jun 24, 2024 · Neutral zinc-iron flow batteries (ZIFBs) remain attractive due to features of low cost, abundant reserves, and mild operating medium. ...

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Discharge profile of a zinc-air flow battery at various ...

In this regard, zinc-air flow batteries (ZAFBs) are seen as having the capability to fulfill this function. In flow batteries, the electrolyte is stored in external tanks and circulated through the ...

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Zinc-Iron Flow Batteries with Common ...

Mar 22, 2017 · Considering the low-cost materials and simple design, zinc-iron chloride flow batteries represent a promising new approach in grid ...

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#### Mathematical modeling and numerical analysis of alkaline zinc-iron flow

Feb 1, 2021 · The alkaline zinc-iron flow battery is an emerging electrochemical energy storage technology with huge potential, while the theoretical investigations are still absent, limiting ...

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#### Discharge profile of a zinc-air flow battery at various electrolyte

Jun 22, 2020 · Thus, each file contains the discharge profile of the battery, at different constant discharge currents, in the range of 100-200 mA and various electrolyte flow rates in the range ...

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#### An Exploration of Battery Management ...

Mar 23, 2025 · Navigating the complexities of zinc-based flow batteries reveals innovative solutions to enhance performance and efficiency, but ...

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#### Optimal Design of Zinc-iron Liquid Flow Battery Based on Flow Control

Sep 26, 2023 · Zinc/bromine flow batteries are a promising solution for utility-scale electrical energy storage. The behavior of complex Zn-halogen species in the electrolyte during charge ...

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