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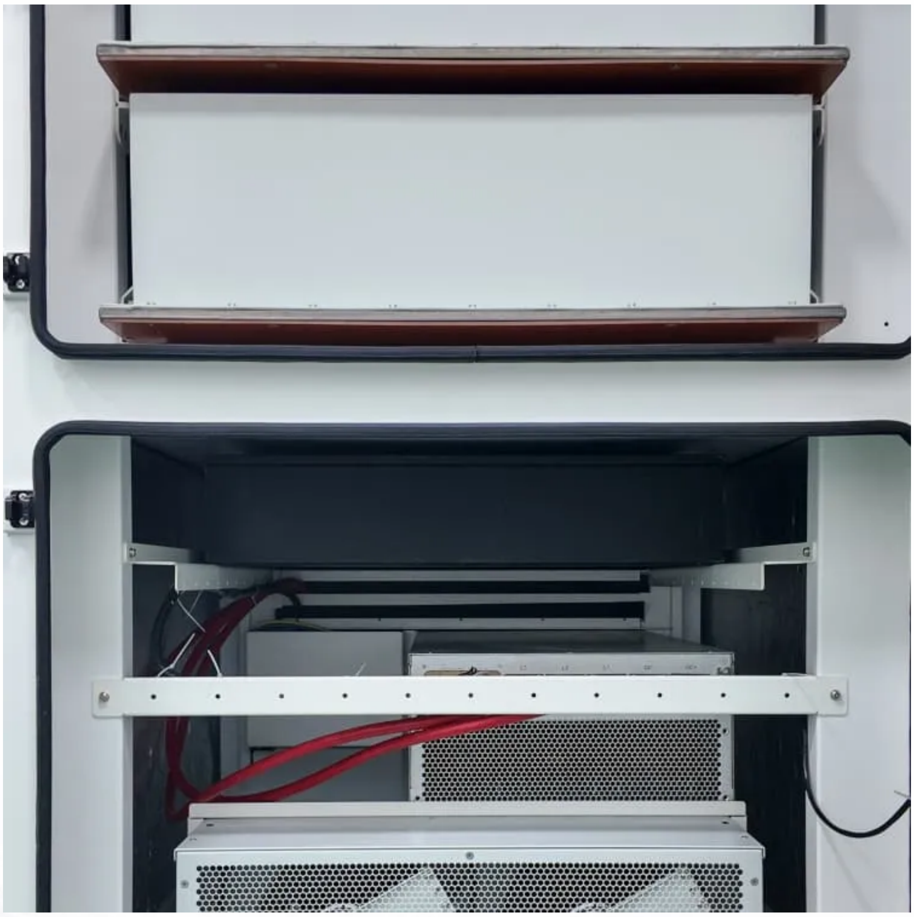
Ionic conduction of zinc-based flow batteries



Overview

Are aqueous zinc-iodine flow batteries promising?

Among the array of prospective systems, aqueous zinc-iodine flow batteries (Zn-I FBs) manifest promising potential due to low cost, intrinsic safety, and high theoretical volumetric capacity (268 Ah L −1) (Fig. 1a) 11, 12, 13, 14, 15, 16.

Are aqueous rechargeable zinc-iodine batteries a viable energy storage solution?

Fei Huang and Weihua Xu contributed equally to this study. Aqueous rechargeable zinc-iodine (Zn-I 2) batteries have emerged as a promising energy storage solution, offering benefits such as affordability, high energy density, and enhanced safety.

What are zinc based batteries?

Currently, zinc serves as a key component in multiple battery systems, such as zinc-ion, zinc-air, Zn-CO_2, zinc-based flow, and flexible zinc batteries . Compared with lithium-based batteries, zinc-based batteries exhibit superior cost-efficiency along with enhanced safety characteristics (Figure 1B).

How does surface conduction affect the conductivity of Zn 2+ ions?

The robust interactions between Zn 2+ ions and the ZrOF drove surface conduction to become the predominant mode of ion transport, leading to a 6.54-fold enhancement in the single-Zn-ion conductivity. Notably, the contribution of surface conduction to the overall single-Zn 2+ -ion conduction was 53.2%.

Ionic conduction of zinc-based flow batteries

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