

ContainerPower Energy Solutions

Zinc-bromine flow battery in chemistry



Overview

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In this work, a systematic study is presented to decode the sources of voltage loss and the performance of ZBFBs is demonstrated to be significantly boosted by tailoring the key components (electrolyte, electrodes, and membranes) and operating conditions (flow rate and temperature).

ZBBs have been primarily studied in flow battery configurations with liquid electrolyte reservoirs and pumps, making their operation complex. Their energy density is only $\approx 70 \text{ Wh kg}^{-1}$, less than 20% of the theoretical energy density. Solidified electrolytes have also been explored.

Zinc-bromine batteries (ZBBs) are promising candidates for grid-scale energy storage owing to their high energy density and inherent safety, but their practical deployment is impeded by zinc dendrite formation and bromine shuttle effects. This review introduces a unified electrolyte design framework to reconcile the contrasting requirements of zinc anodes and bromine cathodes. By integrating .

In this study, we initially screen various aqueous electrolytes for KBr cathode and determine that ZnSO_4 is an optimal choice due to its stronger repulsion with polybromides and low cost, laying a strong foundation for further Zn-Br battery design.

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