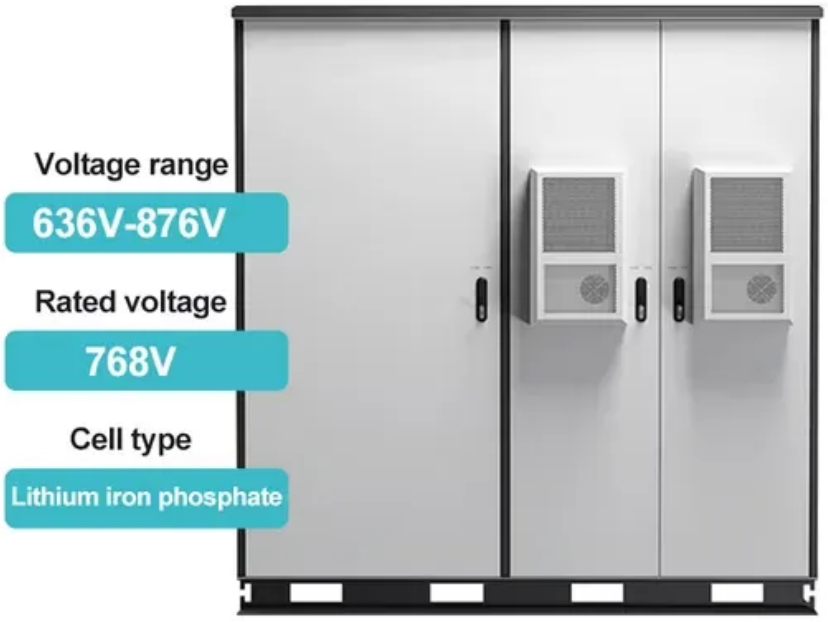
ContainerPower Energy Solutions

Iodine liquid flow energy storage battery



Overview

Are aqueous zinc iodine batteries suitable for energy storage?

Aqueous zinc–iodine batteries are promising energy storage candidates due to their high safety and moderate cost. A high areal-capacity iodine cathode is the key to achieving practical batteries towards commercialization. However, high iodine loading exacerbates polyiodide shuttling and reduces the electrical conductivity of the electrodes.

Can iodine batteries be used for energy storage?

Their high-energy density and iodide anion-rich electrolytes meet the demands of modern industries, enabling the initial large-scale application of zinc–iodine batteries for energy storage. However, storing electroactive substances in the electrolyte limits the utilization rate of iodine and reduces the battery's energy density.

Can iodine batteries be loaded with a substrate?

In practical applications, the conventional method for loading active materials in batteries is mixing and coating. However, due to the low sublimation temperature of iodine, the active material in zinc–iodine batteries can benefit from a substrate designed during the loading process, enabling mass production of zinc–iodine batteries.

Are zinc-iodine batteries a viable alternative to lithium-ion batteries?

Zinc-iodine batteries are emerging as a promising candidate for large-scale energy storage due to their intrinsic safety, low cost, and environmental friendliness. Compared with lithium-ion batteries, aqueous zinc-based systems offer considerable advantages in terms of resource abundance and thermal stability.

Are aqueous zinc iodine batteries reversible?

However, low capacity and short cyclic life are significant obstacles to their

practical applications. Here, we demonstrate a highly reversible aqueous zinc–iodine battery using encapsulated iodine in microporous carbon as the cathode material by controlling solid–liquid conversion reactions.

Why do zinc iodine batteries have a low energy density?

This leads to slower iodine redox kinetics, exacerbates the generation of intermediates, and makes the self-discharge of zinc–iodine batteries more severe. Therefore, the insufficiently high iodine loading has consistently led to unsatisfactory energy densities in zinc–iodine batteries.

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