Hydrogen iodine battery

Can iodine conversion chemistry be used in high-energy aqueous batteries?
To enable practical applicationof the bromide-iodate based iodine conversion chemistry in high-energy aqueous batteries,we further propose to use the acid-alkali decoupling electrolyte to satisfy both the anode and cathode. The proof of concept of Zn/I 2 battery in the acid-alkali decoupling electrolyte is shown in Supplementary Fig. 29.

Why do aqueous iodine-cathode batteries self-discharge?
Originated from the dissolubility of iodine and iodine speciesin the aqueous environment of the batteries,self-discharge behavior is common for the aqueous iodine-cathode battery systems 3,4,5,6. How to reduce the self-discharge rate effectively has been an intriguing but challenging issue.

Can iodine electrodes improve energy density of aqueous batteries?
The proposed iodine electrode is substantially promisingfor the design of future high energy density aqueous batteries,as validated by the zinc-iodine full battery and the acid-alkaline decoupling battery. Enhancing energy density of batteries is a crucial focus within the field of energy storage.

Is iodine a good battery chemistry?
Iodide/iodine and hydrogen/water,owing to their fast reaction kinetics,benign nature,and high solubility,provide promising battery chemistry. However,H 2 -I 2 RFBs suffer from low open circuit potentials,iodine crossover,and their multiphase nature.

How iodine anionic species affect aqueous metal||I 2 battery system?
In the cases of the conventional aqueous metal||I 2 battery systems, iodine anionic species can diffuse into the vicinity of the metal anode and induce the formation of electrochemically inactive complexes, resulting in the irreversible loss of iodine elements and self-discharge behavior 3, 4, 5, 6.

Can advanced cathode chemistries be combined with hydrogen gas anode?
Coupling advanced cathode chemistries with hydrogen gas anode is an emerging and exciting area of research. Here,a novel high-performance aqueous iodine-hydrogen gas (I 2 -H 2) battery using iodine as cathode and hydrogen gas as the electrocatalytic anode in environmentally benign aqueous electrolytes is reported.

In this study, we present the electrochemical performance of hydrogen and iodine half-reactions representing a H 2 -I 2 redox flow battery. We also validate our findings ...

Among them, aqueous zinc-iodine batteries (AZIBs) stand out owing to the abundant iodine reserves, considerable theoretical capacity (211 mAh g-1) and volumetric energy density (322 ...

Aqueous zinc-iodine (Zn-I 2) batteries are becoming increasingly attractive due to their considerable capacity, inherent safety and economic viability.However, the key issues ...

Electrocatalytic iodine reduction reaction enabled by aqueous zinc-iodine battery with improved power and energy densities. Angew Chem Int Ed, 60 (2020), pp. 3791 ...

One of the few commercially successful water-free batteries is the lithium-iodine battery. The anode is lithium metal, and the cathode is a solid complex of (I_2). ... A Hydrogen Fuel Cell ...

Rechargeable hydrogen gas batteries are highly desirable for large-scale energy storage because of their long life cycle, high round trip efficiency, fast reaction kinetics, and ...

In the pursuit of high-performance energy storage systems, four-electron zinc-iodine aqueous batteries (4eZIBs) with successive I - /I 2 /I + redox couples are appealing for their potential to deliver high energy density and ...

Researchers reported a 1.6 V dendrite-free zinc-iodine flow battery using a chelated Zn(PPi)26- negolyte. The battery demonstrated stable operation at 200 mA cm-2 ...

Four-electron conversion of iodine in aqueous solution. Simply charge/discharge the iodine electrode (15-20 wt% iodine loaded in PAC carbon) in 1 m ZnSO 4 solution ...

Rechargeable hydrogen gas batteries are highly desirable for large-scale energy storage because of their long life cycle, high round trip efficiency, fast reaction kinetics, and hydrogen gas ...

The battery''s capacity, corresponding to the amount of encapsulated iodine molecules, indicates that SWCNTs can effectively adsorb the byproduct iodine molecules within the photocatalyst test cell. It is also ...

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