

Are aqueous organic redox flow batteries sustainable?

Aqueous organic redox flow batteries hold great promise as a technology for creating economical grid energy storage using sustainable materials. Nonetheless, the solubility limit presents a universal barrier for all redox-active organic molecules.

Are aqueous iron-based flow batteries suitable for large-scale energy storage applications?

Thus, the cost-effective aqueous iron-based flow batteries hold the greatest potential for large-scale energy storage application.

What is the difference between Fe-organic and Fe-Ce flow batteries?

Meanwhile, Fe-organic flow batteries ($\text{Fe}^{2+}/\text{Fe}^{3+}||\text{organic redox species}$) leverage redox-active organic molecules to enhance tunability and cycle life, while Fe-Ce flow batteries ($\text{Fe}^{2+}/\text{Fe}^{3+}||\text{Ce}^{3+}/\text{Ce}^{4+}$) provide higher voltages (~1.34 V) but require careful electrolyte management.

Are iron-based aqueous redox flow batteries the future of energy storage?

The rapid advancement of flow batteries offers a promising pathway to addressing global energy and environmental challenges. Among them, iron-based aqueous redox flow batteries (ARFBs) are a compelling choice for future energy storage systems due to their excellent safety, cost-effectiveness and scalability.

Additionally, all-soluble iron-based ARFBs face limitations in redox species solubility and electrolyte stability. To address these issues, various strategies have been developed, such as ...

Incorporating phosphorus into sodium-sulfur catholytes enhances their stability and solubility, increasing the volumetric capacity and making Na-P-S catholytes a promising, cost ...

In conventional flow batteries, the volumetric capacity is limited by the solubility of redox-active species. [27 - 31] In contrast, by employing redox-targeting reactions, RT-FBs utilize solid ...

To overcome this issue, here we report size-selective ion-exchange membranes prepared by sulfonation of a spirobifluorene-based microporous polymer and demonstrate their efficient ion ...

In this paper, a new approach is proposed to surpass the solubility limit by manipulating the solvation structure with polycomplex ion additives (PIA).

Various innovative strategies have enhanced the solubility of as-prepared ROMs through chemical functionalization and noncovalent interactions. ROMs should also maintain high solubility ...

Organic compounds, based on abundant elements, are appealing alternatives as redox couples for redox flow batteries. The straightforward scalability, the independence of material ...

We demonstrate the potential utility and applicability of this high-throughput process by measuring the

Flow Battery Solubility

aqueous and non-aqueous solubilities of redox-active materials and studying the ...

This study systematically examined thermodynamic strategies to enhance the solubility of redox-active organic molecules (ROMs) in electrolyte solutions, with the aim of improving the ...

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