

Aqds flow battery





Overview

The example we demonstrate is a metal-free flow battery based on the redox chemistry of 9,10-anthraquinone-2,7-disulphonic acid (AQDS).

How does aqueous flow battery (AQDS) perform reversible two-electron two-proton reduction?

AQDS undergoes extremely rapid and reversible two-electron two-proton reduction on a glassy carbon electrode in sulphuric acid. An aqueous flow battery with inexpensive carbon electrodes, combining the quinone/hydroquinone couple with the Br_2/Br^- redox couple, yields a peak galvanic power density exceeding 0.6 W cm^{-2} at 1.3 A cm^{-2} .

What is a aqueous flow battery?

An aqueous flow battery with inexpensive carbon electrodes, combining the quinone/hydroquinone couple with the Br_2/Br^- redox couple, yields a peak galvanic power density exceeding 0.6 W cm^{-2} at 1.3 A cm^{-2} . Cycling of this quinone-bromide flow battery showed >99 per cent storage capacity retention per cycle.

What is AQDS NH_4^+ flow battery chemistry?

The present AQDS (NH_4^+) flow battery chemistry opens a new avenue to apply anthraquinone molecules in developing low-cost and benign pH-neutral flow batteries for scalable energy storage.

What are aqueous redox flow batteries?

Among various ESS candidates, aqueous redox flow batteries (ARFBs) have emerged as a powerful solution due to their ability to store the large amount of energy and their rapid response time [1, 2, 3]. However, despite such benefits, ARFBs have several issues that need to be addressed.



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[Organic Redox Species in Aqueous Flow Batteries: Redox](#)

Dec 14, 2016 · Organic molecules are currently investigated as redox species for aqueous low-cost redox flow batteries (RFBs). The envisioned features of using organic redox species are ...

Aggregation and Capacity Limiting Effects in Anthraquinone-Based Flow

Feb 1, 2024 · Anthraquinone-based molecules are promising electroactive materials for use in aqueous organic flow batteries. At high concentrations in aqueous solutions, the well-known ...



[Understanding Aqueous Organic Redox Flow Batteries: A ...](#)

Oct 19, 2022 · Using a well-studied chemistry of anthraquinone (AQDS)-based anolyte and $\text{Na}_4[\text{Fe}(\text{CN})_6]$ catholyte, different techniques for the characterization of RFBs were described. The ...



[A Durable, Inexpensive and Scalable Redox Flow Battery ...](#)

Apr 9, 2020 · A new redox flow battery system based on iron sulfate and anthraquinone disulfonic acid (AQDS) is shown here to have excellent electrical performance, capacity retention, and ...



[A pH-Neutral, Metal-Free Aqueous Organic Redox Flow Battery ...](#)

Aug 5, 2019 · The present AQDS (NH₄)₂ flow battery chemistry opens a new avenue to apply anthraquinone molecules in developing low-cost and benign pH-neutral flow batteries for ...



[Influence of NH₄Cl additive in a VO₂⁺/VO₂⁺](#)

Sep 1, 2023 · Here we present a solar redox flow battery that uses a MoS₂ @TiO₂ thin film with a Nafion protection layer supported on FTO glass substrate as photoanode, employing VO₂⁺ ...



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