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Cobalt-sulfur flow battery





Overview

Can aqueous sulfur-based redox flow batteries be commercialized?

Aqueous sulfur-based redox flow batteries (SRFBs) are promising candidates for large-scale energy storage, yet the gap between the required and currently achievable performance has plagued their practical applications. Here, we propose several engineering strategies towards SRFB commercialization.

What are aqueous redox flow batteries?

Aqueous redox flow batteries (RFBs) are regarded as one of the most competitive battery technologies, owing to their design flexibility, superior safety, quick response time, high energy efficiency (EE) and easy scalability 1, 2.

Are polysulfide-iodide redox flow batteries good?

Polysulfide-iodide redox flow batteries attract great attention, while restricting by the limited energy efficiency and power density. Here, authors introduce single Co atoms into the defective MoS₂, endowing a fast transformation of S₂[–]/S_x^{2–} and I[–]/I₃[–], thus leading to good battery performance.

Are all-solid-state lithium-sulfur batteries safe?

The development of high-performance all-solid-state lithium-sulfur batteries (ASSLSBs) has garnered considerable attention due to their potential for high energy density and enhanced safety. However, significant challenges such as poor cycling stability, interface incompatibility, and reaction kinetics hinder severely their practical application.



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[Understanding the role of cobalt sulfide catalysts for high sulfur](#)

Our work provides new insights for understanding about the catalytic activity of cobalt sulfides and designing advanced catalysts for the high utilization of sulfur in Li-S batteries.

[Cobalt Catalytic Regulation Engineering in ...](#)

Dec 12, 2024 · The sluggish conversion kinetics and uneven deposition of sodium sulfide (Na_2S) pose significant obstacles to the practical implementation of room temperature sodium-sulfur ...



[Crafting of Photothermal Cobalt/Sulfur Doped Manganese ...](#)

Mar 5, 2025 · In this research work, cost-effective manganese selenide (MnSe) is integrated as an intermetallic catalyst and its overall catalytic performance is subsequently enhanced by ...

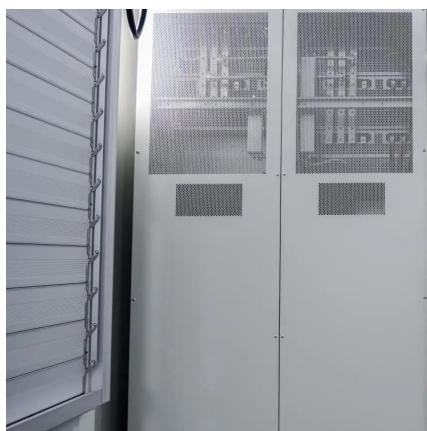
[Aqueous sulfur-based redox flow battery, Nature Reviews](#)

Mar 3, 2025 · Aqueous sulfur-based redox flow batteries (SRFBs) are promising candidates for large-scale energy storage, yet the gap between the required and currently achievable ...



Pathway to commercialization of aqueous sulfur-based redox flow batteries

Mar 27, 2025 · Researchers in China have identified a series of engineering strategies to bring aqueous sulfur-based redox flow batteries closer to commercial production. Improving catalyst ...



Aqueous sulfur-based redox flow battery

Mar 3, 2025 · Aqueous sulfur-based redox flow batteries (SRFBs) are promising candidates for large-scale energy storage, yet the gap between the required and currently achievable ...



Rational design of a cobalt sulfide nanoparticle-embedded ...

Aug 17, 2021 · Both the sluggish redox kinetics and severe polysulfide shuttling behavior hinders the commercialization of lithium-sulfur (Li-S) battery. To solve these obstacles, we design a ...



[Hollow-structured cobalt sulfoselenide as cathode host to ...](#)

Sep 1, 2024 · Additionally, the high molecular weight of the inactive sulfide leads to the low actual energy density of the battery. Thus, this study constructed the hollow structural cobalt ...



[All-in-One Homogenized Sulfur/Cobalt Disulfide Composite ...](#)

Feb 15, 2025 · The development of high-performance all-solid-state lithium-sulfur batteries (ASSLSBs) has garnered considerable attention due to their potential for high energy density ...

[Synergy of single atoms and sulfur vacancies for advanced ...](#)

Mar 25, 2025 · Polysulfide-iodide redox flow batteries attract great attention, while restricting by the limited energy efficiency and power density. Here, authors introduce single Co atoms into ...



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