

Aluminum-sulfur battery cabinet

What is an aluminum-sulfur battery?

The aluminum-sulfur battery offers cost-effective, fire-resistant energy storage, challenging lithium-ion dominance in safety and affordability. The three primary constituents of the battery are aluminum (left), sulfur (center), and rock salt crystals (right).

Are aluminum-sulfur batteries a good idea?

An aluminum-sulfur battery that is lightweight, doesn't burn, and can be made much more cheaply than the lithium-ion batteries currently in use. When MIT's Donald Sadoway sits down with colleagues to invent something, as he often does, the bar is set high. It's not enough, he believes, for a new technology to be novel and interesting.

What is the difference between aluminum & lithium sulfur batteries?

Aluminum-sulfur batteries have a theoretical energy density comparable to lithium-sulfur batteries, whereas aluminum is the most abundant metal in the Earth's crust and the least expensive metallic anode material to date.

Is carbonized-MOF a sulfur host for aluminum-sulfur batteries?

Guo, Y. et al. Carbonized-MOF as a Sulfur Host for Aluminum-Sulfur Batteries with Enhanced Capacity and Cycling Life. *Adv. Funct. Mater.* 29, 1807676 (2019). Cao, W., Zhang, J. & Li, H. Batteries with High Theoretical Energy Densities. *Energy Storage Mater.* 26, 46-55 (2020).

What is a rechargeable aqueous aluminum-sulfur battery?

A rechargeable aqueous aluminum-sulfur battery through acid activation in water-in-salt electrolyte. *Chem. Commun.* 56, 2023-2026 (2020). Li, H. et al. Reversible electrochemical oxidation of sulfur in ionic liquid for high-voltage Al-S batteries. *Nat. Commun.* 12, 5714 (2021).

Do Al-S batteries have a sulfur cathode?

So far, the publications on Al-S batteries mostly reported ex-situ studies of the Al-ion electrolyte and the sulfur cathode during cycling. After discharge, it has been determined the presence of all possible sulfur species, i.e. elemental sulfur, S^{2-} , S_2^{2-} , S_4^{2-} , S_6^{2-} and S_8^{2-} .

Aluminum-sulfur batteries have become the most prominent battery technology due to their high theoretical capacity, eco-friendliness, economics, and abundance of ...

Aluminum-sulfur batteries (AlSBs) hold immense promise for sustainable energy storage due to their high theoretical energy density and low-cost materials. However, rapid capacity fading ...

Created from low-cost and plentiful aluminum, elemental sulfur, and common salt, their new battery is cheap

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and fire-resistant, can store enough energy to electrify a house or a car, and ...

In conclusion, this study, utilizing first-principles calculations, has significantly advanced our understanding of the interactions and mechanisms at play in Al-S clusters ...

Unlike its finicky cousin, the lithium-ion battery, Al-S batteries promise cheaper materials, safer operation, and a recipe that could finally make renewable energy storage as common as ...

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