



EXIT-LYON Energy

Sodium metal as energy storage battery



Overview

Researchers within the University of Maryland's A. James Clark School of Engineering, have now developed a NASICON-based solid-state sodium battery (SSSB) architecture that outperforms current sodium-ion batteries in its ability to use sodium metal as the anode for higher energy density, cycle it at record high rates, and all with a more stable ceramic electrolyte that is not flammable like current liquid electrolytes.



Article Content

Salt-in-presalt electrolyte solutions for high-potential non ...

Jan 23, 2025 · Room-temperature non-aqueous sodium metal batteries are viable candidates for cost-effective and safe electrochemical energy storage. However, they show low specific ...

Developments and Perspectives on Emerging High-Energy-Density Sodium ...

Oct 10, 2019 · Emerging rechargeable sodium-metal batteries (SMBs) are gaining extensive attention because of the high energy density, low cost, and promising potentials for large-scale ...

Highly stable anode-free sodium batteries enabled by ...

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Sodiophilic design for sodium-metal batteries: ...

Jan 22, 2025 · Sodium-metal batteries are considered as attractive energy storage systems because of the high theoretical capacity, low redox potential, ...

An overview of sodium-ion batteries as next ...

Abstract The rise in the popularity of electric vehicles and portable devices has boosted the demand for rechargeable batteries, with lithium-ion (Li-ion) ...

Tuning the solvation structure with salts for stable sodium-metal batteries

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Fast-Charging Long-Life Solid-State Sodium ...

Apr 29, 2025 · Abstract Solid-state sodium metal batteries (SSMBs) are considered as one highly competitive, high-energy-density yet safe energy ...

Sodium is the new lithium

Jul 21, 2022 · Now, a strategy based on solid-state sodium-sulfur batteries emerges, making it potentially possible to eliminate scarce materials such as lithium and transition metals.

Alkaline-based aqueous sodium-ion batteries for large-scale energy storage

Jan 17, 2024 · Aqueous sodium-ion batteries show promise for large-scale energy storage, yet face challenges due to water decomposition, limiting their energy density and lifespan.

Sodium-ion Batteries: The Future of Affordable Energy Storage

Jan 20, 2025 · These batteries facilitate a diversified supply chain, reducing dependency on specific countries for critical minerals important for green energy transition. The potential of ...

Developments and Perspectives on Emerging High-Energy-Density Sodium ...

Oct 10, 2019 · The Bigger Picture Sodium-metal batteries (SMBs) are emerging as a high-energy-density system toward stationary energy storage and even electric vehicles.

Ultra-stable all-solid-state sodium metal batteries enabled ...

Jul 4, 2022 · Rechargeable batteries with sodium metal anodes are promising as energy-storage systems despite safety concerns related to reactivity and dendrite formation. Solvent-free ...

Anode-free sodium metal batteries: optimisation ...

Anode-free sodium metal batteries (AFSMBs) represent a significant advancement in energy storage technology, offering high energy density and ...

Current Progress of Anode-Free Rechargeable ...

Jan 23, 2024 · Anode-free sodium metal batteries (AFSMBs) as one new battery configuration, have attracted more attention in recent years and considered as ...

Wide-temperature-range sodium-metal ...

Aug 25, 2023 · Sodium metal with a high theoretical specific capacity ($\sim 1166 \text{ mA h g}^{-1}$) and low redox potential (-2.71 V) shows tremendous application ...

New solid-state sodium batteries enable lower ...

Dec 19, 2023 · Researchers within the University of Maryland's A. James Clark School of Engineering, have now developed a NASICON-based solid-state ...

Sodium-iron battery startup to challenge Li-ion ...

Mar 31, 2025 · Inlyte's sodium-iron battery tech offers a safer, cheaper, and longer-lasting alternative to lithium-ion for long-duration energy storage. ...

Bromide-based nonflammable electrolyte for ...

Dec 7, 2023 · Abstract Sodium metal batteries (SMBs) are one of the most promising energy storage technologies owing to the rich abundance of sodium ...

DOE ESHB Chapter 4: Sodium-Based Battery Technologies

Feb 2, 2022 · Abstract The growing demand for low-cost electrical energy storage is raising significant interest in battery technologies that use inexpensive sodium in large format storage ...

Sodium-based battery development

Apr 15, 2024 · This cross-journal Collection brings together the latest developments in electrodes, electrolytes, and battery components used in ...

Sodium metal anodes for room-temperature sodium-ion batteries ...

Jan 1, 2019 · Room-temperature (RT) sodium-ion batteries (SIBs) have gained much attention due to rich sodium resource and low cost for potential application in large-scale energy ...

Wide-temperature solid-state sodium metal batteries using Na

Jan 1, 2025 · Abstract Solid-state sodium metal batteries (SSMBs) are considered as one of the critical technologies for safe and high-energy-density batteries. However, most SSMBs ...

Are Na-ion batteries nearing the energy storage tipping ...

Dec 1, 2022 · Sodium metal-based batteries have drawn much attraction as the perfect low-cost stationary energy storage choice because of their high theoretical specific capacity and low ...

11 New Battery Technologies To Watch In 2025

Dec 12, 2024 · We explore cutting-edge new battery technologies that hold the potential to reshape energy systems, drive sustainability, and support the ...

Research progress of sodium energy storage ...

Sodium batteries based on oxide solid electrolytes (OSSBs), especially those with liquid metal sodium as the anode, are considered as one of the most ...

Toward Emerging Sodium-Based Energy Storage ...

As one of the potential alternatives to current lithium-ion batteries, sodium-based energy storage technologies including sodium batteries and capacitors are ...

Studying the Chemistry of Sodium Metal Systems for Batteries

Apr 9, 2025 · Understanding the behavior of Na - which is cheaper, more abundant, and safer than other battery materials - is key to developing next-generation energy storage. As ...

Sodium-ion Batteries: Inexpensive and Sustainable ...

Jun 10, 2021 · Sodium-ion batteries (NIBs) are attractive prospects for stationary storage applications where lifetime operational cost, not weight or volume, is the overriding factor. ...

New solid-state sodium batteries enable lower ...

Dec 19, 2023 · Dr. Eric Wachsman, Distinguished University Professor and Director of the Maryland Energy Innovation Institute notes, "Sodium opens the ...

Engineering of Sodium-Ion Batteries: Opportunities and ...

May 1, 2023 · The recent proliferation of sustainable and eco-friendly renewable energy engineering is a hot topic of worldwide significance with regard to combatting the global ...

Redesigning the sodium-metal chloride battery for low-cost grid storage ...

Jun 25, 2025 · Solar and wind energy require low-cost grid storage to be economic at high penetrations. Sodium-metal chloride batteries have been produced commercially for more ...

Quasi-Solid-State Dual-Ion Sodium Metal Batteries for Low-Cost Energy ...

Apr 9, 2020 · The Bigger Picture Rechargeable dual-ion sodium metal batteries (DISBs) with graphitic cathode materials are viable for large-scale stationary energy storage because of the ...

Solid-State Electrolytes for Sodium Metal ...

Mar 24, 2021 · As a low-cost alternative, solid-state sodium metal batteries (SSMBs) have shown great competitive advantages and extensive application ...

Comprehensive review of Sodium-Ion Batteries

Feb 1, 2025 · Sodium-ion batteries have a significant advantage in terms of energy storage unit price compared to lithium-ion batteries. This cost-effectiveness stems from the abundance and ...

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