Sodium vanadium tetrasulfide battery

Is vanadium sulfide a good electrode material for Na/K-ion batteries?
In recent years, vanadium sulfide has received widespread attention as electrode material for Na/K-ion batteries. Vanadium sulfide electrodes have high theoretical capacities and multi-electron transfer capabilities thanks to their numerous valence states (V 2+ /V 3+ /V 4+ /V 5+).

What is a vanadium sulfide electrode?
Vanadium sulfide electrodes have high theoretical capacities and multi-electron transfer capabilities thanks to their numerous valence states (V 2+ /V 3+ /V 4+ /V 5+). The electrochemical characteristics of typical vanadium sulfides are displayed in Table 1.

Can vanadium sulfide be used for aqueous rechargeable zinc-ion batteries (azibs)?
Vanadium sulfide has become one of the promising cathodes of aqueous rechargeable zinc-ion batteries (AZIBs); however,the further application of vanadium sulfides for AZIBs is severely restrictedby the limited specific capacity and poor cycling stability.

Are vanadium sulfide-based materials the next generation of anode materials?
Vanadium sulfide-based materials have emerged as intriguing contendersfor the next generation of anode materials due to their high theoretical capacity,abundant reserves,and cost-effectiveness.

Can vanadium-based compounds fill the gap in battery technology?
This is where vanadium-based compounds (V-compounds) with intriguing properties can fit in to fill the gap of the current battery technologies.

What is the oxidation state of vanadium sulfide?
It's important to note that the oxidation state of vanadium remains constantin both VS 2 and VS 4,while the oxidation state of the sulfide differs,with VS 2 containing S 2 ? monomers and VS 4 featuring S 22 ? dimers.

The development of high-capacity and high-voltage electrode materials can boost the performance of sodium-based batteries. Here, the authors report the synthesis of a polyanion positive electrode ...

Rechargeable aluminum batteries (RABs) are gaining widespread attention for large-scale energy storage applications as a result of their high energy densities, high security, and abundance. The key to sustain the progress of RABs lies in the quest for the proper cathode materials with prominent capacity and reversible cycle life ...

This is where vanadium-based compounds (V-compounds) with intriguing properties can fit in to fill the gap of the current battery technologies. The history of experimenting with V-compounds (i.e., vanadium oxides, vanadates, vanadium-based NASICON) in various battery systems, ranging from monovalent-ion to

multivalent-ion batteries, stretches ...

Vanadium tetrasulfide (VS4) is known as a prospective electrode material due to its unique one-dimensional atomic chain structure with a large chain spacing, weak ...

As another form of vanadium sulfide, vanadium tetrasulfide (VS 4) exhibits a one-dimensional chain structure that is unique with weak interchain van der Waals forces and an interchain distance of 0.583 nm. This gives it a loosely stacked framework. The sulfur atoms in VS 4 exist as S 2 2 - and are attached to the adjacent V atomic [21]. Therefore, VS 4 can be ...

Structure engineering of electrode materials can significantly improve the life cycle and rate capability of the sodium-ion battery (SIB), yet remains a challenging task due to the lack of an effective synthetic strategy. ...

Vanadium tetrasulfide (VS 4) is known as a prospective electrode material due to its unique one-dimensional atomic chain structure with a large chain spacing, weak interactions between adjacent chains, and high sulfur content. This review summarizes the synthetic strategies and recent advances of VS 4 as

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The vanadium element has multiple continuous chemical valence states (V 2+ /V 3+ /V 4+ /V 5+), which makes its compounds exhibit a high capacity of electric energy storage [13, 14].Vanadium compounds have shown good performances as electrode materials of new ion batteries including sodium-ion batteries, zinc ion batteries, and RMBs [15], [16], [17], [18].

Sodium-ion batteries (SIBs) have emerged as a promising alternative to lithium-ion batteries (LIBs) in sectors requiring extensive energy storage. The abundant availability of sodium at a low cost addresses concerns ...

Structure engineering of electrode materials can significantly improve the life cycle and rate capability of the sodium-ion battery (SIB), yet remains a challenging task due to the lack of an effective synthetic strategy. Herein, the microstructure of VS 4 hollow spheres is successfully engineered through a facile hydrothermal method.

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Alkali metal-ion batteries (SIBs and PIBs) and multivalent metal-ion batteries (ZIBs, MIBs, and AIBs), among the next-generation rechargeable batteries, are deemed appealing alternatives to lithium-ion batteries (LIBs) because of their cost competitiveness. Improving the electrochemical properties of electrode materials can greatly accelerate the pace of development in battery ...

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