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Tungsten disulfide lithium battery

Can tungsten sulfide be used as an anode material in Li-ion battery?

Thin films of tungsten sulfide (WS2) are prepared by atomic layer deposition (ALD) and its intercalation properties as an anode material in Li-ion battery are studied. The self-saturation growth of the material and the temperature window for ALD growth is confirmed by in situ quartz crystal microbalance (QCM). In s

What are tungsten-based materials in lithium-ion batteries?

This review describes the advances of exploratory research on tungsten-based materials (tungsten oxide,tungsten sulfide,tungsten diselenide,and their composites) in lithium-ion batteries,including synthesis methods,microstructures,and electrochemical performance.

What is tungsten disulfide?

Tungsten disulfide (WS2) is a gray black fine crystal powder with metallic lusterthat has a greasy feeling. Its relative density is 7.4~7.5and Mohs hardness is 1.0~1.5. The compressive strength is up to 21000kg/cm2,the friction coefficient is 0.01~0.15,and it has semiconductor conductivity.

Is WS 2 a suitable intercalation based material for Li-ion battery anode?

The as-grown films are tested as a suitable intercalation based material for Li-ion battery anode. CV measurements are carried out extensively to explore the dominant intercalation property of the WS 2 anode. Stable cycling performance with high coulombic efficiency (>99%) up to 100 charge-discharge cycles is observed.

Are lithium ion batteries reliable electrochemical energy storage devices?

Abstract Lithium-ion batteries are widely used as reliable electrochemical energy storage devicesdue to their high energy density and excellent cycling performance. The search for anode materials ... Tungsten-Based Materials for Lithium-Ion Batteries - Zheng - 2018 - Advanced Functional Materials - Wiley Online Library Skip to Article Content

This review describes the advances of exploratory research on tungsten-based materials (tungsten oxide, tungsten sulfide, tungsten diselenide, and their composites) in lithium-ion batteries, including synthesis methods, ...

Here we demonstrate the feasibility of tungsten disulfide nanotubes (WS 2 -NTs)/graphene (GS) sandwich-type architecture as anode for lithium-ion batteries for the first time. The graphene-based hierarchical architecture plays vital roles in achieving fast electron/ion transfer, thus leading to good electrochemical performance.

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WS2-MWCNT (1:1) hybrid, when used as anode material in lithium ion battery, exhibited a high initial charge capacity (483 mA h g (-1)) and an improved cycling stability with over 80%...

Tungsten-based materials are receiving considerable attention as promising anode materials for lithium-ion batteries owing to their high intrinsic density and rich framework diversity. This review describes the advances of exploratory research on tungsten-based materials (tungsten oxide, tungsten sulfide, tungsten diselenide, and their composites) in lithium-ion batteries, including ...

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Tungsten disulfide (WS2) is a transition metal disulfide and a promising anode material due to its layered structure, making it favorable for attaining lithium-ion batteries with rate capability and thermal/mechanical ...

Tungsten disulfide (WS 2) is considered as a promising anode material for high-performance lithium-ion batteries (LIBs) result from its inherent characteristics such as high theoretical capacity, large interlayer spacing and weak interlayer Van der Waals force.

Thin films of tungsten sulfide (WS2) are prepared by atomic layer deposition (ALD) and its intercalation properties as an anode material in Li-ion battery are studied. The self-saturation growth of the material and the temperature window for ALD growth is confirmed by in situ quartz crystal microbalance (QCM). In s

Tungsten disulfide (WS2) is a transition metal disulfide and a promising anode material due to its layered structure, making it favorable for attaining lithium-ion batteries with rate capability and thermal/mechanical stability. Although WS2 has a rich redox chemistry and a large density, which can increase the specific capacity and volumetric ...

Feng CQ, Huang LF, Guo ZP, Liu HK. Synthesis of tungsten disulfide (WS 2) nanoflakes for lithium ion battery application. Electrochem Commun. 2007;9(1):119. Article CAS Google Scholar Wang GX, Bewlay S, Yao J, Liu HK, Dou SX. Tungsten disulfide nanotubes for lithium storage. Electrochem Solid St. 2004;7(10):A321.

Owing to high aspect ratio of edge sites and superior catalytic activity, atomically thin transition metal dichalcogenides (TMDCs) show great promise to tailor the ...

Current anode storage materials used in lithium ion battery technologies take a fair amount of time to charge to capacity, while the charge depletes very quickly when a load is placed on the...

During the intercalation of lithium ions, a complete charge transfer occurs, which involves not only the reduction of M 4+ to M 3+ but also the diffusion of Li + into the Van der Waals gaps [8]. Thus, these sulfides could be developed as an intercalation host to form a promising electrode material in high energy density batteries [5], [6], [9].

The feasibility of tungsten disulfide nanotubes/graphene sandwich-type architecture as anode for lithium-ion batteries for the first time is demonstrated and the relatively high density of this hybrid is beneficial for high capacity per unit volume. Transition metal dichalcogenides (TMD), analogue of graphene, could form various dimensionalities. Similar to ...

Tungsten disulfide (WS2) and Al-doped WS2 (WS2@Alx, x = 0, 2, and 4 wt.%) are prepared by a one-step hydrothermal technique and used as a cathode material for magnesium batteries. We explore the Mg2+ insertion/extraction process on the WS2@Alx in the presence of a halogen-free electrolyte (HFE) based on 0.69 M Mg(NO3)2·6H2O dissolved in ...

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