Self-supporting lithium battery

Can a 3D self-supporting host be used for lithium metal batteries?
These issues will inevitably incur short cycling life and severe safety hazards of lithium metal batteries. Herein,a 3D self-supporting host composed of hollow carbon nanofibers incorporated with silicon (Si) nanoparticles inside (Si-HCF) is constructed as Li metal hostby a scalable coaxial electrospinning technique.

Are lithium-sulfur batteries a good energy storage system?
Lithium-sulfur batteries (LSBs),as a new generation of energy storage system,hold much higher theoretical energy density than traditional batteries,and they have attracted extensive attention from both the academic and industrial communities. Selection of a proper substrate material is important for the flexible self-supporting electrode.

What is a lithium-sulfur battery?
In the new energy storage system,lithium-sulfur batteries (LSBs) use sulfur or substances containing sulfur as cathodes and lithium metal as anodes. Compared to other secondary batteries,LSBs have a high theoretical specific capacity (1675 mAh g -1) and high energy density (2600 Wh kg -1).

Can self-supporting materials adsorb lithium sulfide?
Self-supporting materials can load heterojunction structure catalysts,and the effective interface between the media with strong polarity and less conductivity and the media with strong conductivity and less polarity can realize the effective adsorptionand rapid transformation of LiPSs,as well as the rapid nucleation of lithium sulfide.

Why do lithium ion batteries have a short cycling life?
However, uneven local electric field and lack of lithiophilic sites on the reactive interface cause nonuniform lithium ion (Li +) deposition, leading to Li dendrite growth and parasitic reactions. These issues will inevitably incur short cycling life and severe safety hazards of lithium metal batteries.

Which biomass materials can be used to fabricate Li-S batteries?
Various biomass materials have been used for fabricating Li-S batteries such as pomelo peel,peanut shells,and luffa,and so forth,123 - 127 which provides a new idea for the application of self-supporting flexible electrode in Li-S batteries.

As a lithium-ion battery anode, the balanced graphitization degree ensures high electrical conductivity, enabling efficient charge-discharge processes and prolonged stability. 4. ... A facile electrospinning strategy to prepare cost-effective carbon fibers as a self-supporting anode for lithium-ion batteries. Fuel, 373 (2024) Google Scholar [14]

A MoO 3 /MoO 2-CP self-supporting heterostructure for modification of lithium-sulfur batteries ... (Li 2 S 8)

for lithium-sulfur batteries. Different from other heterostructures with a sharp interface, the transition state of MoO x is ...

Comparison of flexible self-supporting cathode materials based on carbon substrates for lithium-sulfur batteries. (A) SEM image and (B) ...

Self-supporting S@GO-FWCNTs composite films as positive electrodes for high-performance lithium-sulfur batteries+. Lifeng Cui * a, Yanan Xue a, Suguru Noda c and Zhongming Chen * b a School of Materials Science and Engineering, ...

A flexible self-supporting graphene-sulfur paper with 67 wt% sulfur was fabricated for lithium sulfur batteries. This binder and current collector-free electrode demonstrated a reversible capacity of 600 mA h g-1 with 83% ...

Enhanced lithium storage performance of Si/C composite nanofiber membrane with carbon coating as binder-free and self-supporting anode for lithium-ion battery. Mater. Res. Bull., 167 (2023) Google Scholar [44] Y. Yuan, H. Li.

Here a binder-free, self-supporting multifunctional interlayer composed of lithium lanthanum titanate (LLTO) with amorphous carbon nanofiber matrices for Li-S batteries has been constructed.

Lithium metal rechargeable batteries (LMBs) degrade rapidly due to morphological instabilities as well as electrolyte consumption. As an alternative to Li BCC ...

Flexible self-supporting inorganic nanofiber membrane-reinforced solid-state electrolyte for dendrite-free lithium metal batteries ... The prepared flexible self-supporting 3D nanofiber network structure construction can provide a simple and efficient new strategy for the exploitation of high-performance solid-state electrolytes.

Semantic Scholar extracted view of "Ultrahigh volumetric capacity enabled by dynamic evolutions of host-guest pairs in self-supporting lithium-sulfur batteries" by Zhubing Xiao et al. Skip to search form Skip to main content Skip to account menu. Semantic Scholar"s Logo. Search 224,122,005 papers from all fields of science ...

Based on the CNF framework used to maintain a self-supporting structure, CNTs were added as crosslinking agents, which improved the mechanical properties and electrical conductivity of the self-supporting electrode. Silicon nanoparticles (Si NPs) have been adopted as high-capacity agents, providing sufficient lithium-ion storage capacity.

Elastic commercial melamine foam is utilized as a precursor material which was subjected to pyrolysis with PVDF to synthesize N, F co-doped self-supporting carbon cathode (NF-NSC). Remarkably, thanks to the

synergistic effects of N, F heteroatomic in conjunction with the inherent three-dimensional interconnected porous structure, NF-NSC exhibited enhanced ...

Lithium-sulfur (Li-S) batteries are potential candidates as next-generation batteries for their high theoretical specific energy density, environmental friendliness, and low cost. However, the low utilization of active ...

In summary, a self-supporting 3D hollow carbon nanofibers shell with Si nanoparticles core was fabricated as a robust host for Li metal deposition. The design of ...

At present, the main limitations for the practical application of silicon (Si) as an anode material of a lithium-ion battery are huge volume variation and low electrical conductivity. Core-shell silicon/carbon (Si/C) composites can greatly ...

Lithium-sulfur (Li-S) batteries, with high theoretical energy density, cost-effective preparation and environmental benignancy, have been deemed as new encouraging energy storage solutions. ... Herein, self-supporting Ti 3 C 2 T x foam, as a novel sulfur host, was synthesized via direct stacking of Ti 3 C 2 T x flakes into film followed by ...

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