# Phosphorus energy storage lithium battery performance

Is phosphorus a good anode material for lithium ion batteries?

Phosphorus is an ideal anode materialfor high-rate lithium-ion batteries due to its high theoretical specific capacity and moderate operating potential. However,phosphorus undergoes tremendous volume expansion and low electrical conductivity during lithium storage,affecting its actual lithium storage performance.

Why is phosphorus a promising anode material for fast-charging lithium-ion batteries?

Phosphorus is a promising anode material for fast-charging in lithium-ion batteries because of the combined advantages of high theoretical mass and volume specific capacityas well as a relatively low,yet safe lithiation potential to avoid Li metal dendrite formation.

How does phosphorus affect lithium storage performance?

However,phosphorus undergoes tremendous volume expansion and low electrical conductivityduring lithium storage,affecting its actual lithium storage performance. The formation of P-C bonds is an effective strategy to inhibit the volume expansion and maintain stable electrical contact between phosphorus and the current collector.

Can phosphorus oxidation improve battery performance?

Moderately controlling the oxidation of phosphorus anodes to form a uniform surface coating could improve battery performancewhile maintaining stability and safety. Phosphorus oxidation is an irreversible process that profoundly affects the performance of phosphorus-based anode in batteries.

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The electrification of transportation and the proliferation of portable electronics demand high-performance lithium-ion batteries that deliver both high energy density and long cycle life under fast ...

Abstract Phosphorus-based anode materials have attracted considerable attention due to their high theoretical capacity, safe operational potential, and favorable redox chemistry for diverse ...

Here, by using a scalable high-energy ball milling approach, we report a practical hierarchical micro/nanostructured P-based anode material for high-energy lithium-ion batteries, ...

The development of high-performance lithium-ion batteries (LIBs) hinges on searching for advanced anode materials with large specific capacities as well as high cycling stability. However, ...

Phosphorus, particularly the red phosphorus (RP) allotrope, has been extensively studied as an anode material in both lithium-ion batteries (LIBs) and emerging sodium-ion batteries (SIBs). ...

This review specifically highlights the very recent progress in the synthesis and applications of black

phosphorus in the energy process, including secondary battery system, supercapacitor device, and ...

Lithium-ion batteries (LIBs) are currently dominating the portable electronics market because of their high safety and long lifespan [1, 2]. However, the electrode materials need to be ...

The research progress in various ion batteries, including lithium-sulfur batteries, lithium-air batteries, and supercapacitors, is summarized according to the introduction of black phosphorus materials in ...

Developing new anode materials with high rate performance with low lithium-plating risk is the key to improve the power density and at the same time achieving extremely fast charging capability. Herein, ...

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