Nitrogen defect energy storage

Why are nitrogen bonded carbon materials used in energy storage devices?
The various form of nitrogen bonded carbon materials has become an apparent choice as electrodes to enhance the electrochemical performanceof energy storage devices. In particular,C-N-H bonds,or direct N-H bonds participates in pseudo-capacitance,hence,enhance the overall capacitance of the storage system.

Is nitrogenated carbon a promising electrode material for electrochemical energy storage devices?
Therefore,nitrogenated carbon materials (C-N) seems promisingas electrode material for electrochemical energy storage devices [,,,,,,,,,,,,].

What are nitrogenated carbon materials?
Synthesis techniques As discussed in section 2 that nitrogenated carbon materials could be nitrogen or carbon dominated which refer as carbon nitridesand nitrogen doped carbon materials,respectively.

Can nitrogen-doping and defect-engineering unlock ultrahigh-rate capability and long-term cyclability in hard carbon?
Hard carbon (HC) anodes for sodium-ion batteries (SIBs) face challenges such as sluggish Na+ diffusion kinetics and structural instability. Herein, we propose a synergistic nitrogen-doping and defect-engineering strategy to unlock ultrahigh-rate capability and long-term cyclability in biomass-derived hard carbon.

Can defect engineering improve Anode Carbon Materials for Na-ion storage?
Hence,advanced anode carbon materials with excellent Na storage capacities still require further research and development. Defect engineering could be used to improvethe anode carbon materials for Na-ion storage. In this view,defect-enriched carbons with different degrees of intrinsic defects were obtained by template-assisted strategy.

How do nitrogen species affect sodium storage capacity?
Collectively,these nitrogen species induce lattice distortions and defects,synergistically optimizing the material's sodium storage capabilities through multi-scale structural tuning.

Here, we first synthesize one-dimensional necklace-like nitrogen-doped carbon nanochains (N-CNCs) with abundant defects on carbon fiber paper (CFP) by chemical vapor deposition (CVD) method.

Construction of hierarchical porous (meso-microporous) carbonaceous anodes with reasonable-sized defects and rich active sites is important for enhancing K+ storage ...

The g-C 3 N 4 was subjected to defect engineering with carbon vacancy defects, nitrogen-vacancy defects, and oxygen elemental doping achieved by heat treatment in an ...

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A nitrogen-doped, carbon-coated Na 3 V 2 (PO 4) 3 cathode material is synthesized and the formation of doping type of nitrogen-doped in carbon coating layer is systemically investigated.

In this review, recent advances in defects of carbons used for energy conversion and storage were examined in terms of types, regulation strategies, and fine characterization means of defects.

Graphitic carbon nitride (g-C3N4), a smart material with fascinating properties, finds extensive use in applications such as visible-light-driven photocatalysis and lithium-ion ...

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Therefore, many nitrogen-doped carbon materials have low ICE due to their high graphitic N content [29], [30]. Hence, it is advisable to investigate a unique synthetic method to ...

Metal-free heteroatom-doped carbon materials, especially those codoped with nitrogen (N) and sulfur (S), have gained prominence due to their exceptional conductivity, large specific surface area, remarkable ...

Precise control over defects and porous structures in carbon materials is crucial for enhancing their performance in energy storage and conversion. In this study, an innovative salt template method is introduced ...

These findings demonstrate that nitrogen-doped samples exhibit faster energy storage kinetics compared to the undoped sample. Furthermore, the hierarchical porous ...

Hard carbon (HC) is a prospective energy storage anode material in sodium-ion batteries (SIBs). However, their unimpressive rate capability and poor initial Coulombic ...

Rather than phase conversion/alloying type mechanism, the excellent Li-ion storage performance of defect engineered hBN is attributed to the diffusion independent ...

Significant improvements in the configuration, electron distribution, and chemical environment of the carbon matrix by unavoidable defect sites have hastened parturition in the study of carbon ...

Graphynes have great application potential in energy storage and conversion. However, due to the limitation of specific surface area and active site, their energy storage ...

Herein, a heteroatom-refilling strategy has been proposed with the example of refilling oxygen in nitrogen-deficient g-C 3 N 4. With the support of theoretic prediction, we ...

In this study, nitrogen/sulfur codoped carbon nanotubes (NS-CNTs) were first obtained via the pyrolysis of

presynthesized polyaniline nanotubes with micelles composed of methyl orange and ferric chloride ...

Defect engineering is an effective method to improve electron migration and expand the light response capability of photocatalysts. As a nitrogen-rich material, g-C3 N 4 ...

Based on physicochemical analysis and density functional theory calculations, the energy storage capacity of FWHB700 was found to be related to its high specific surface ...

The formation of various nitrogen defects in nitrogen-doped graphene and CNTs, which are identified by several observations, is reviewed. The electronic properties and transport characteristics for ...

Compared with other common methods, the laser one-step synthesis of nitrogen-doped hierarchically porous graphene is simpler and more efficient, and the as-prepared LING ...

Hydrogen storage has been investigated by using aluminum-silver nanoalloy supported nitrogen-doped carbon nanotubes (AlAg@NSWC) with various mechanical defect ...

This observation suggests the presence of unpaired electrons within the ?-conjugated graphite hexagonal rings, providing strong evidence for the introduction of nitrogen ...

Herein, the nitrogen doping strategy is used to produce micro-defect, increasing the likelihood of exposing large edge active sites, which can realize the improved potassium ...

Crystal-defect engineering in electrode materials is an emerging research area for tailoring properties, which opens up unprecedented possibilities not only in battery and ...

Herein, we propose a synergistic nitrogen-doping and defect-engineering strategy to unlock ultrahigh-rate capability and long-term cyclability in biomass-derived hard carbon.

The formation of various nitrogen defects in nitrogen-doped graphene and CNTs, which are identified by several observations, is reviewed. The electronic properties and ...

This study provides valuable insights into the interplay between defects, activity, and performance in carbon materials for energy storage applications, offering a promising path ...

New trends in the study of radiation effects in nitrogen solids with a focus on the defect-induced processes are presented. An electron beam of subthreshold energy was used to generate ...

Defects and morphology engineering is a serviceable strategy to boost the electrochemical energy conversion and storage performance of carbon-based materials. In this ...

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Defect engineering is regarded as one of the efficient approaches to modulating the physical and chemical properties of materials for energy-related a...

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