

# **Energy storage performance mechanism of phenol**





## Overview

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Energy storage performance mechanism of phenol How does phenol removal affect adsorbent activity?

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In a mechanistic investigation, statistical physics modeling was applied to explore the responsible mechanism for phenol adsorption onto the MSAC composite and pristine AC.

Batch experiments, multiple characterization analysis and density functional theory (DFT) calculations were used to elucidate the phenol adsorption behavior and phenol adsorption mechanism of biochar in wastewater.

Nitrogen-doped hierarchical porous biochar has aroused great interest in energy storage and adsorption applications. In this study, nitrogen-doped hierarchical porous biochar was prepared from corn stalks by in situ pyrolysis with urea as the nitrogen source and  $\text{NaHCO}_3$  as the green activation agent.

Biochars are considered as promising materials in energy storage and environmental remediation because of their unique physicochemical properties and low cost. How to determine phenol removal mechanism?

It is essential to calculate the adsorption energy during the adsorption process to identify the phenol removal mechanism. The  $C_{1/2}$  (i.e., half-saturation concentration) is associated with the binding energy of adsorbed layer, considering the expression of the monolayer adsorption process.



Does temperature affect phenol adsorption energy?

Furthermore, as the temperature of the process increased, the adsorption energy increased, indicating that the nature of phenol adsorption was exothermic, which was agreement with the experimental data. Influence of temperature on adsorption energy (E) for MSAC and pristine activated carbon.

What is the mechanism for phenol adsorption on MSAC composite?

Proposed mechanism for phenol adsorption onto MSAC composite. Reusability of an adsorbent is an important parameter in the adsorption process. There are different methods, such as heating or chemical regeneration and solvent washing for reusing the adsorbent.

Why are phenol adsorption capacities higher than pristine AC?

It is noted that all the adsorption capacities of phenol onto MSAC are higher than those of pristine AC due to the stronger interactions between phenol molecule and MSAC composite, especially the additional interaction provided by metal hydroxides.

What is adsorption kinetics of phenol?

The study of adsorption of kinetics gives the better understanding of adsorption mechanism of phenol onto the SBAC. The study performed by varying the contact time between phenol and adsorbent from 0 to 180 min at 313 K temperature, 2 g/L adsorbent dosage, 150 rpm, pH 5.5, and initial phenol concentration of 150 mg/L as shown in Fig. 8 A.

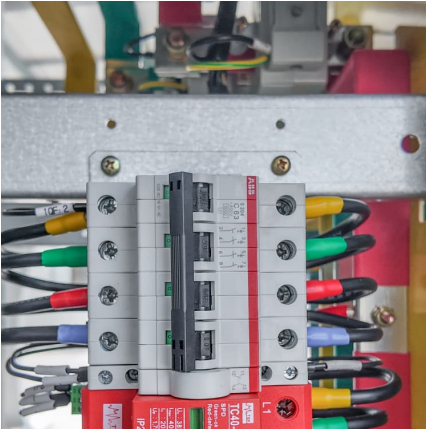
How does temperature affect phenol removal?

It can be found that the number of anchorages increased upon raising the temperature. This behavior expresses an antagonistic effect. As the amount of phenol molecules per site enhances, the accessible active site of the adsorbent for phenol removal decreases.



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### [Energy storage performance mechanism of phenol](#)

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### **Synthesis and capability evaluation of quinone-enriched polymer ...**

To verify actual energy storage performance of PDQ/rGO-0.3, an aqueous asymmetric supercapacitor (ASC) is assembled by employing 2,5-dihydroxy-1,4-benzoquinone ...



### [Research progress on modification of phenolic resin](#)

The hydroxymethyl-phenol modification process involves first synthesizing the intermediates of phenolic resin (including hydroxymethyl-phenol, monohydric phenol alcohol, ...

### **Enhanced nitrate, manganese, and phenol removal by polyvinyl ...**

Enhanced nitrate, manganese, and phenol removal by polyvinyl alcohol/sodium alginate with biochar gel beads immobilized bioreactor:



Performance, mechanism, and ...



### **KOH activation of carbon-based materials for energy storage**

Following the introduction to KOH activation mechanisms and processing technologies, the characteristics and performance of KOH-activated carbons as well as their relationships are ...



### **Mechanistic insights into phenol-ammonia synergy for optimizing**

However, the use of single-phenol precursor limits the diversity in tuning the structure of porous carbon. The introduction of mixed phenols may significantly affect the ...



### **Hard carbons derived from green phenolic resins for Na-ion batteries**

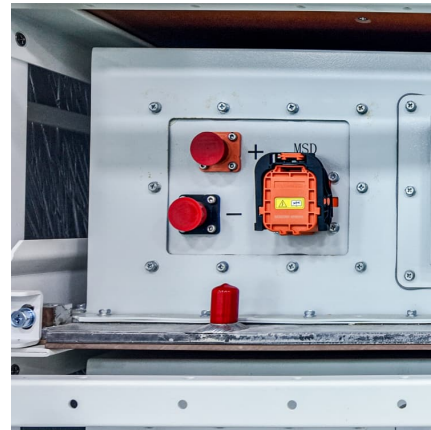
Carbon-based materials have been studied theoretically and experimentally for a long time as electrode materials for energy storage in applications such as supercapacitors, ...





### A characterization of the two-step reaction mechanism of phenol

Reaction mechanism describing the different phenol intermediates based on the interaction of phenol with two hydroxyl radicals. A) Generation of HQ by the interaction of the ...



### Regulation mechanism of phenol on intermediates during ...

The regulation mechanism of phenol in the polycondensation stage during coal gasification involves the decomposition of SCW forming hydroxyl radicals, which replaces the substituents ...

### Selectivity adsorption mechanism of different phenolic organic

To further evaluate the effect of pH value on adsorption, the number of H-bond of phenol with UiO-66 and water were estimated in Fig. 7, and the interaction energy between ...



### Molecular Dynamics Investigation of the Gasification ...

Supercritical water gasification is an efficient and clean method for converting biomass into hydrogen-rich gas. Phenol plays a crucial role as ...



### Green conversion of bamboo chips into high-performance phenol ...

By using phenol as probe, the adsorption behaviour of phenol on N-doped biochar was investigated. The adsorption mechanism of N-doped biochar at molecular level was ...



### Energy storage performance mechanism of phenol

This review presents an overview of the electrochemical performance and energy storage mechanisms of currently widely studied anodes for KIBs, including carbon-based, alloy-based, ...

### (PDF) Energy storage in electrochemical capacitors: ...

Electrochemical capacitors, also known as supercapacitors, are becoming increasingly important components in energy storage, although their ...





### Transformation of Hindered Phenolic Antioxidants

In the normal course of performance hindered phenolic antioxidant will undergo in-situ transformation as part of its known mechanism but the degree of discoloration does not have to ...

### **Toward a mechanistic understanding of adsorption behavior of ...**

In a mechanistic investigation, statistical physics modeling was applied to explore the responsible mechanism for phenol adsorption onto the MSAC composite and pristine AC.

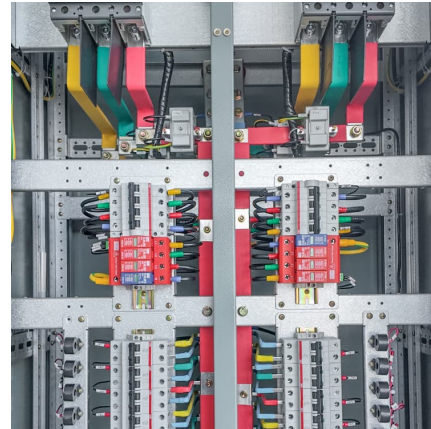


### **Complete mineralization of phenolic compounds in visible-light ...**

Since single-crystal  $WO_3$  had excellent performance in energy storage, it is naturally expected that single-crystal  $WO_3$  will also show much more enhanced PCO ...

### **Electrochemical regeneration and porosity recovery of phenol ...**

Basing on the obtained results, an overall phenomenological mechanism for the electrochemical regeneration has been proposed. The general worse performance of anodic ...



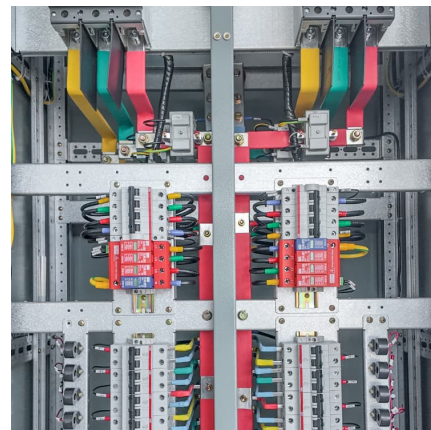
### Degradation of phenol by peroxymonosulfate catalyzed by cerium ...

The mechanism of degradation of phenol for the above system was analyzed through free radical burst test, and the metal ion dissolution of catalytic materials in simulated ...



### Engineered synthesis of Fe-Mn bimetallic anchored hierarchical ...

Batch experiments, multiple characterization analysis and density functional theory (DFT) calculations were used to elucidate the phenol adsorption behavior and phenol ...



### Discoloration performance and mechanism research of a novel

The discoloration performance is enhanced consequently. In the prepared thermochromic energy storage materials, a small amount of OD is used as the solvent to ...





### Engineered synthesis of Fe-Mn bimetallic anchored hierarchical ...

The Fe-Mn oxide modified functionalized biochar was synthesized using bamboo biochar with KOH pretreatment coupled with Fe-Mn co-doping method, and adsorption mechanism of ...



### Mechanistic insights into phenol-ammonia synergy for optimizing

The introduction of mixed phenols may significantly affect the structure and performance of porous carbon, yet the underlying mechanisms are not well understood.

### [An Updated Comprehensive Literature Review of Phenol](#)

2 Reaction Pathways and Mechanisms The production of C=O and C-OH are thermodynamically favorable since the standard free energy of the phenol hydro-genation is negative (Fig. 1B). ...



### Effectiveness and mechanisms of the adsorption of phenol from

Request PDF , On Jul 1, 2023, Yan Cui and others published Effectiveness and mechanisms of the adsorption of phenol from wastewater onto N-doped graphene oxide aerogel , Find, read ...



### **Redox-active polymers: The magic key towards energy storage - a polymer**

Renewable organic batteries represent a valuable option to store sustainably generated energy and can play a major role in phasing out current carbon...



### **Insights into the structure-property relationships of activated ...**

SDG7 sets key targets for the 2030 global agenda by focusing on (i) universal access to energy, (ii) increasing the share of renewable energy, and (iii) optimizing energy ...

### **Mechanisms of electrochemical hydrogenation of aromatic ...**

Here, the authors provide insight into the reaction mechanisms of electrochemical hydrogenation of mixtures of benzoic acid, phenol and guaiacol, which ...



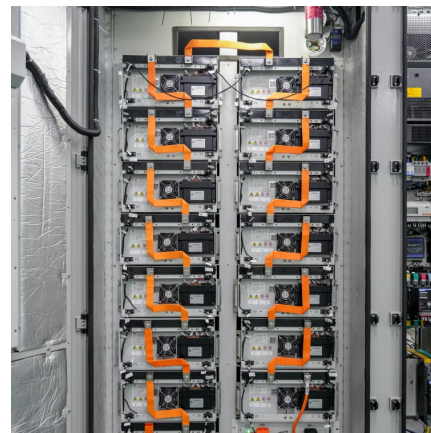


### [Adsorption of phenol using adsorbent derived from](#)

The feasible mechanism is based on a thorough understanding of all conceivable physical and chemical interactions between the substrate (phenol) and adsorbent ...

### **Synthesis and characterization of microencapsulated phase ...**

In this study, a novel type of microcapsule for thermal energy storage based on an n-icosane core and a phenol-formaldehyde resin shell was fabricated via in-situ ...



### [Phenol-driven ammonium recovery from coal chemical ...](#)

Request PDF , On Feb 1, 2025, Ran Zeng and others published Phenol-driven ammonium recovery from coal chemical wastewater in a bioelectrochemical system (BES) , Find, read and ...

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