

# Organic acid energy storage





## Overview

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Depleted carbonate reservoirs are increasingly utilized for underground gas storage due to their proven ability to retain hydrocarbons over geological time scales. In this context, understanding the wettability characteristics of these reservoirs is crucial, as wettability influences fluid distribution, capillary forces, and gas trapping efficiency. Researchers have attempted to replicate oil .

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Four strategic metals (Li, Ni, Co, and Mn) were leached from spent NMC batteries using several organic acids as model green leachants. Among the various candidates of green leaching agents, 2 M citric acid and 5 wt% glucose were selected as the leachant and reductant, respectively.

Here, authors develop pressurized organic electrodes with high capacity and durability under practical and extreme conditions, advancing organic batteries toward real-world applications.

This review is conducted to address the limitations and challenges of conventional energy storage and conversion technologies by exploring the potential of functional organic materials.

Herein, a biodegradable battery made from magnesium–molybdenum electrodes and gelatin-organic acid electrolytes such as lactic acid (LA)-gelatin (gel) and the citric acid (CA)-gelatin (gel) is proposed. Can organic materials be used for energy storage?

By incorporating organic materials that passivate defects, the longevity and reliability of these devices can be greatly enhanced, making them more viable for commercial applications (Padam et al. 2014; Wang et al. 2024). Additionally, the exploration of organic materials extends to the development of flexible and wearable energy storage devices.



Can functional organic materials be used for energy storage and conversion?

The review of functional organic materials for energy storage and conversion has revealed several key findings and insights that underscore their significant potential in advancing energy technologies. These materials have demonstrated remarkable promise in meeting the increasing demand for efficient and sustainable energy solutions.

Are organic batteries the future of energy storage?

In summary, it can be said that great hopes lie in the development of market-ready organic (full-cell) battery systems. Progress in this field over the last decade has already unlocked some of the great potential of organic materials for energy storage.

Are organic materials the future of energy storage & conversion?

As research and development continue to advance in this field, organic materials are expected to play an increasingly pivotal role in shaping the future of technology and innovation. To fully harness the potential of functional organic materials in energy storage and conversion, future research efforts should prioritize several key areas.

How will organic-based energy storage materials impact non-conventional applications?

The application of organic-based energy storage materials will most likely impact non-conventional applications first, where their unique properties, such as ultra-fast charging, stretchability, processability in solution, etc., can give them the edge over inorganic materials.

Can redox-active organic molecules improve energy storage performance?

Researchers are actively developing novel redox-active organic molecules with customized structures and functionalities to enhance the performance of energy storage systems (Mauger et al. 2019).



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### **Gelatin-Organic Acid-Based Biodegradable Batteries for ...**

Herein, a biodegradable battery made from magnesium-molybdenum electrodes and gelatin-organic acid electrolytes such as lactic acid (LA)-gelatin (gel) and the citric acid ...

### **Emerging organic electrode materials for sustainable batteries**

Organic electrode materials present the potential for biodegradable energy storage solutions in batteries and supercapacitors, fostering innovation in sustainable technology.



### **A review of organic phase change materials and their ...**

Abstract Organic phase change materials (O-PCMs) such as alkanes, fatty acids, and polyols have recently attracted enormous attention for ...

### **Metal-Organic Framework-based Phase Change Materials for Thermal Energy**

Chen et al. review the recent advances in thermal energy storage by MOF-based composite phase change materials (PCMs), including pristine MOFs and MOF ...



### Investigation on thermal reliability and corrosion characteristics of

The successful implementation of the latent heat solar thermal energy storage system depends on the long term thermal stability and corrosion characteristics of phase ...



### Carbon-Filled Organic Phase-Change Materials for Thermal Energy Storage

Abstract Phase-change materials (PCMs) are essential modern materials for storing thermal energy in the form of sensible and latent heat, which play important roles in the efficient use of ...



### [Covalent organic frameworks: From materials design ...](#)

Covalent organic frameworks (COFs) with tunable porosity, composition, and structure and their recent progresses in the energy storage applications are ...





### Renewable organic phase change materials for latent heat thermal energy

Highlights o Thermal properties of diesters of sebacic acid (decandioic acid). o PCMs with enthalpy above 185 kJ/kg, melting onsets between 30 °C and 58 °C. o Single sharp ...



### Effect of Methyl Orange on the Wettability of Organic ...

Carbon capture and sequestration are feasible techniques for achieving net-zero carbon emissions. In this respect, the storage capacity and ...

### Hydrogen-wettability alteration of Indiana limestone in the ...

This study focuses on the wettability alteration (changing from a hydrophobic state to a hydrophilic state) of Indiana limestone for hydrogen (H<sub>2</sub>) geological storage. We ...



### [Effect of Near-Freezing Temperature Storage on the ...](#)

Organic acids play multiple physiological roles in energy substance generation, the storage of carbon, and amino acid biosynthesis [16]. ...



### Trouble in Storage?: Understanding the dynamics of airborne organic

Trouble in Storage?: Understanding the dynamics of airborne organic acids in storage buildings and its consequences for the air quality, energy use, and preservation of heritage collections



### Challenges and advances of organic electrode ...

Organic electrode materials with merits of bountiful resources, structural designability, and sustainability offer an attractive solution to develop the ...

### What are the examples of energy storage molecules?

Proteins, lipids, carbohydrates, and nucleic acids are the most common long-term energy storage molecules in cells. All four are organic compounds and are much larger in ...



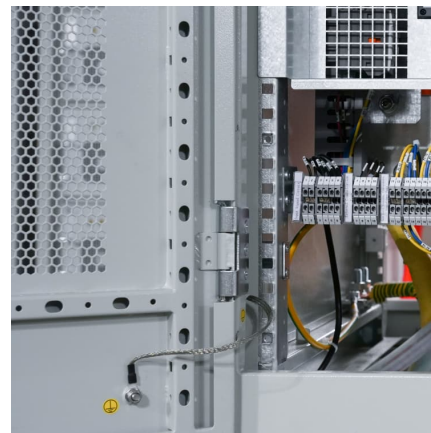


## Organic Acids: Roles, Metabolism, Analysis, and Applications

Explore the diverse world of organic acids - their roles in metabolism, mechanisms of action, analytical techniques, and applications in various fields.

### Role of organic acids in the integration of cellular redox ...

Abstract Organic acids play a crucial role in numerous metabolic processes accompanied by transfer of electrons and protons and linked to the reduction/oxidation of major redox couples ...



### Study on thermal properties of organic phase change materials for

B. Eanest [27] prepared organic based ternary eutectic fatty acid mixture based on capric-myristic-palmitic acid and thermal characteristics of composite PCMs were obtained ...

### Gelatin-Organic Acid-Based Biodegradable Batteries for ...

1 Introduction Biodegradable batteries are energy storage devices made from materials that can be decomposed naturally in the environment. These eco-friendly ...



### Effect of organic acids on CO

The adsorption of organic acid molecules on rock surfaces and the high cohesive energy density of CO<sub>2</sub> at high pressure could decrease the CO<sub>2</sub> trapping potential and ...



### Simple, green organic acid-based hydrometallurgy for waste-to-energy

Simple, green organic acid-based hydrometallurgy for waste-to-energy storage devices: Recovery of NiMnCoC<sub>2</sub>O<sub>4</sub> as an electrode material for pseudocapacitor from spent ...



### Carbon-Filled Organic Phase-Change Materials for

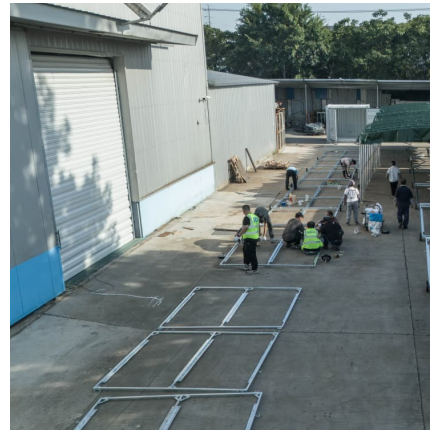
Abstract Phase-change materials (PCMs) are essential modern materials for storing thermal energy in the form of sensible and latent heat, which play ...





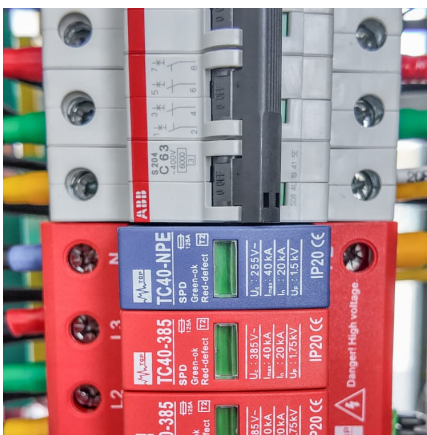
### Preparation of organic based ternary eutectic fatty acid mixture as

Rapid economic and social development has led to increase the demand on energy gradually. In thermal system, the energy can be stored for reusing or recycling purpose. ...



### Distribution of temperature, moisture and organic acids in storage

However, organic acids accumulated in concentrations up to 134 mg m<sup>-3</sup> in parts of one storage room with semi-passive climate control. Whether to install a HVAC system ...



### Chapter 3 Flashcards , Quizlet

Study with Quizlet and memorize flashcards containing terms like What type of lipid do plants use for long-term energy storage?, True or false: The chemistry of carbon, with its four electrons in ...



### [Organic Phase Change Materials for Thermal Storage](#)

Discover the role of Organic Phase Change Materials in sustainable thermal energy storage, from smart buildings to renewable energy and electric vehicles.



### [Organic Electrode Materials for Energy Storage and ...](#)

In this Account, we initially provide an overview of the sustainability and environmental friendliness of OEMs for energy storage and ...



### **Formic Acid's Role in Energy Storage and Sustainable Chemical ...**

Explore the cutting-edge applications of Formic Acid in energy storage, particularly in formic acid fuel cells and hydrogen storage, and its potential in green chemistry initiatives.

### **A comprehensive review on development of eutectic organic ...**

The energy storage in the form of latent heat energy is better than the sensible energy storage in terms of operating temperature and storage density. Organic PCMs (O ...



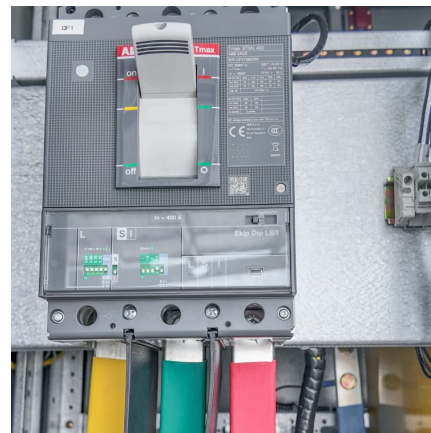


### **An aqueous organic flow battery integrating a high-capacity**

Aqueous organic redox flow batteries (AORFBs) are promising in large-scale energy storage applications due to their environmental friendliness, decoupled energy and ...

### [How Do Organic Batteries Work? Theoretical and ...](#)

The application of organic-based energy storage materials will most likely impact non-conventional applications first, where their unique ...



### **Engineering of thermal energy storage: An experimental study of organic**

Engineering of thermal energy storage: An experimental study of organic/silver and organic/silver-coconut shell biochar composite phase change materials

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