

Can a dual-carbon energy storage device be used as an anode or cathode?

Herein, we extend the concept of dual-carbon devices to the energy storage devices using carbon materials as active materials in both anode and cathode, and offer a real-time and overall review of the representative research progress concerning such generalized dual-carbon devices.

Are dual-carbon batteries and supercapacitors a promising electrochemical energy storage device?

Propose new insights for the future research directions and challenges of the dual-carbon devices. Dual-carbon based rechargeable batteries and supercapacitors are promising electrochemical energy storage devices because their characteristics of good safety, low cost and environmental friendliness.

What is a dual-carbon electrochemical energy storage device?

Dual-carbon electrochemical energy storage device Apparently, although the types of anion and cation that can be used for energy storage on carbon-based electrodes are abundant, the energy storage mechanisms can be classified just into adsorption/desorption and intercalation/de-intercalation.

What are generalized dual-carbon devices?

In this review, we defined the concept of generalized dual-carbon devices for the first time, namely the EES devices using carbon materials as active materials in both anode and cathode.

Are generalized dual-carbon EES devices a green and efficient energy storage system?

In short, we believe that generalized dual-carbon EES devices with excellent charge storage performance and environmental/cost advantages are ideal green and efficient energy storage systems in the future.

What is ion storage in a dual-carbon device?

In all generalized dual-carbon devices, the essence of energy storage is the charge storage into the carbonaceous electrodes in form of ionic states. On carbonaceous electrodes, the ways of ion-storage mainly includes ion-adsorption and ion-intercalation.

1 Introduction. The dwindling supply of non-renewable fossil fuels presents a significant challenge in meeting the ever-increasing energy demands. [] Consequently, there is a growing pursuit of renewable energy sources to achieve a green, low-carbon, and circular economy. [] Solar energy emerges as a promising alternative owing to its environmentally friendly nature, abundant ...

When incorporated with pine needle-activated carbon as cathode, the assembled dual-carbon PICs can function at a high voltage of 5 V, exhibiting a high energy density of 156.7 Wh kg<sup>-1</sup> at a power density of 500 W kg<sup>-1</sup> along with a satisfied cycle life, which highlights their potential application in economic and advanced PICs.

Accordingly, a dual-carbon confinement strategy is regarded as an effective method for handling this issue. Herein, Sb is firstly captured by mesoporous carbon sphere (MCS) to form a composite of Sb/MCS, and then reduced graphene oxide (rGO) is adopted as an outer layer to wrap the Sb/MCS to obtain the dual-carbon confinement material (Sb/MCS@rGO).

Advanced Energy Materials is your prime applied energy journal for research providing solutions to today's global energy challenges. Abstract Constructing dual-ion energy storage devices using anion-intercalation graphite cathodes offers the unique opportunity to simultaneously achieve high energy density and output power densit...

Modern research has made the search for high-performance, sustainable, and efficient energy storage technologies a main focus, especially in light of the growing environmental and energy-demanding issues. This review paper focuses on the pivotal role of biomass-derived carbon (BDC) materials in the development of high-performance metal-ion ...

Dual-carbon batteries (DCBs) with both electrodes composed of carbon materials are currently at the forefront of industrial consideration. This is due to their low cost, safety, sustainability, fast charging, and simpler electrochemistry than lithium and other post-lithium metal-ion batteries. This article provides an overview of the past lessons on rechargeable DCBs and their future promises.

Advanced Energy Materials. Volume 12, Issue 3 2103341. Research Article. Zero-Strain Structure for Efficient Potassium Storage: Nitrogen-Enriched Carbon Dual-Confinement CoP Composite. Yuanxing Yun, Yuanxing Yun. School of Chemistry and Chemical Engineering, State Key Laboratory of Crystal Materials, Shandong University, Jinan, 250100 ...

Advanced Energy Materials published by Wiley-VCH GmbH important properties for electric vehicles and stationary energy storage.[14] There are several associated reasons for these advantages. First, DCBs have both their anodes and cathodes made of carbon-based materials. Since their electrodes are metal-free,

All-solid-state sodium ion batteries (AS 3 iBs) are highly sought after for stationary energy storage systems due to their suitable safety and stability over a wide temperature range. Hard carbon (HC), which is low cost, exhibits a low redox potential, and a high capacity, is integral to achieve a practical large-scale sodium-ion battery.

The aim of this Special Issue entitled "Advanced Energy Storage Materials: Preparation, Characterization, and Applications" is to present recent advancements in various aspects related to materials and processes contributing to the creation of sustainable energy storage systems and environmental solutions, particularly applicable to clean ...

With the swift advancement of renewable energy and escalating demands for energy storage, potassium-ion batteries (PIBs) are increasingly recognized as a potent energy storage technology. Various carbon anode materials have been utilized for PIBs anodes owing to their superior  $K^+$  storage capacity, outstanding cycling performance, elevated capacity, and ...

Among various energy storage technologies, electrochemical energy storage is of great interest for its potential applications in renewable energy-related fields. There are various types of electrochemical energy storage devices, such as secondary batteries, flow batteries, super capacitors, fuel cells, etc. Lithium-ion batteries are currently ...

In this context, carbon fibers emerge as a compelling choice of material and serve dual purpose by storing energy and providing stiffness and strength to the battery. Previous investigation has demonstrated proof-of-concept of functional positive electrodes against metallic lithium in structural battery electrolyte.

1 Introduction. Recently, devices relying on potassium ions as charge carriers have attracted wide attention as alternative energy storage systems due to the high abundance of potassium resources (1.5 wt % in the earth's crust) and fast ion transport kinetics of  $K^+$  in electrolyte. 1 Currently, owing to the lower standard hydrogen potential of potassium ( $-2.93\text{ V}$  ...

High volumetric performance is a challenging issue for carbon-based electrical double-layer capacitors (EDLCs). Herein, collapsed N,S dual-doped carbon nanocages (cNS-CNC) are constructed by simple capillary compression, which eliminates the surplus meso- and macropores, leading to a much increased density only at the slight expense of specific surface ...

The developed dual carbon-based LIC using recovered RG from spent LIBs offers several promising features, such as low cost and good applicability in a wide range of temperature ...

Web: <https://www.arcingenieroslaspalmas.es>