Sensing energy storage electrocatalysis

In view of these hotspots, we propose this Special Issue titled "Advanced Materials for Electrocatalysis and Energy Storage", designed to bring together researchers to address these issues. The main objective of this Special Issue is to publish relevant scientific papers. Original research articles, reviews, and communications are welcome.

Next, the role of SiNW in LIB anodes for the storage of energy is discussed in section 5. As part of sensing applications, biosensing, gas and pH sensing, light sensing (photodetection) and piezoresistive applications are discussed in sections 6-9 respectively. The effect of surface modified SiNW in enhancing the sensitivity is explained in ...

Developing advanced electrochemical energy storage technologies (e.g., batteries and supercapacitors) is of particular importance to solve inherent drawbacks of clean energy systems. However, confined by limited power density for batteries and inferior energy density for supercapacitors, exploiting high-performance electrode materials holds the ...

Among various energy storage and conversion systems, batteries, supercapacitors, and fuel cells (electrocatalysis) play a vital role that can store energy on a large scale and can increase the use of variable renewable resources.

By systematically exploring SECM"s practical application in energy conversion and storage, this review will elevate understanding of electrocatalytic reaction, offering new ...

Energy storage and conversion technologies are vital to the efficient utilization of sustainable renewable energy sources. Rechargeable lithium-ion batteries (LIBs) and the emerging sodium-ion batteries (SIBs) are considered as two of the most promising energy storage devices, and electrocatalysis processes play critical roles in energy conversion techniques that achieve ...

5 COFS IN ELECTROCHEMICAL ENERGY STORAGE. Organic materials are promising for electrochemical energy storage because of their environmental friendliness and excellent performance. As one of the popular organic porous materials, COFs are reckoned as one of the promising candidate materials in a wide range of energy-related applications.

Keywords: Metal-free nanomaterials; Carbon-based nanostructures; Conducting polymers; Electrocatalysis; Sensing; Energy storage; Heteroatom doping; Fuel cells. This Collection supports and amplifies research related to SDG 7 and SDG 9. Participating journal. Submit your manuscript to this collection through the participating journal.

Nanoporous metals with bicontinous and three-dimensional (3D) pore/ligament structure have received considerable attention due to their big specific surface area, large amount of active sites and excellent

conductivity, etc. [1, 2].They have been widely used in electrocatalysis [], electrochemical (bio)sensors [], energy conversion/storage and fuel cells [].

The major applications including supercapacitors, lithium ion batteries, energy storage, sensing, electrocatalysis and photocatalysis are summarized in this review. It would ...

In this regard, manganese oxides (Mn x O y) are known to be an excellent electrode material for energy storage, electrocatalysis, and sensing applications due to their superb environmental stability, nontoxic nature, low cost, high ... including energy storage and sensing. Furthermore, hydrogen peroxide (H 2 O 2) is a widely known oxidant in ...

Electronic gas sensors and supercapacitors have been fabricated with the CA-rGO and show good performance, which demonstrates the potential of CA-rGO for sensing and energy storage applications.

Increasing demands for energy conversion and storage, coupled with environmental concerns of global warming and fossil fuel depletion, have spawned intense exploration of renewables, alternative energy storage and conversion technologies based on supercapacitors, lithium/sodium ion batteries, metal-air batteries, fuel cells and electrocatalytic ...

Because of accelerating global energy consumption and growing environmental concerns, the need to develop clean and sustainable energy conversion and storage systems, such as fuel cells, dye-sensitized solar cells, metal-air batteries, and Li-CO 2 batteries, is of great importance [1,2,3].These renewable energy technologies rely on several important reactions, ...

The performance of these energy storage system strongly depends on the advanced materials used in electrochemical system. It is generally acknowledged that porous structure with high specific surface area (SSA) is beneficial for electron and ion transport, which is favorable for electrocatalysis and energy conversion and storage.

Nanoporous metals produced by dealloying have shown great promise in many areas such as catalysis/electrocatalysis, energy conversion/storage, sensing/biosensing, actuation, and surface-enhanced Raman scattering. Particularly, nanoscale metal ligaments with high electronic conductivity, tunable size and rich

These targeted chemical modifications hold significant promise for optimising MXenes in various energy storage technologies, including supercapacitors, sensors, and batteries [108]. MXenes" exceptional performance in energy storage stems from the significant influence of their surface chemistry on electrochemical behaviour [109].

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title={Nanocarbon-based electrochemical systems for sensing, electrocatalysis, and energy storage}, author={Xianwen Mao and Gregory C. ...

Covalent organic polymers (COPs), quasi-ordered porous network materials synthesized through irreversible chemical bonding, have garnered significant attention in electrocatalytic energy conversion, including fuel cells, electrolytic water systems, and CO 2 electrolysis cells. In this article, we have described the key factors that influence the ...

Additionally, adding redox-active groups to SURMOFs can provide materials with remarkable electrochemical qualities that are appropriate for use in energy storage, electrocatalysis, and sensing. For instance, Shao et al. demonstrate the ferrocene based SURMOFs structure exhibiting the Fc + /Fc redox hopping mechanism and excellent diffusion ...

MXenes, as an emerging 2D material, are expected to exert a great influence on future energy storage and conversion technologies. In this review, we systematically summarize recent advances in MXene-based materials in electrocatalysis, particularly in the hydrogen evolution, oxygen evolution, oxygen reduction, nitrogen reduction, and CO2 reduction ...

1. Introduction. The improvement in human living standards and the rapid growth of the global economy have led to the continued rise of resource consumption [1].The sustainable development of energy storage and conversion facilities is being propelled by the need to attain carbon neutrality, unique nanomaterials, and environmentally friendly nanotechnologies that ...

Advancing high-performance materials for energy conversion and storage systems relies on validating electrochemical mechanisms [172], [173]. Electrocatalysis encounters challenges arising from complex reaction pathways involving various intermediates and by-products, making it difficult to identify the precise reaction routes.

The electrodes surfaces (nanostructured electrochemical interfaces) are key components in a broad range of applications including electrocatalysis, sensing, and energy storage. The development of electrodes provides new opportunities for exploring reaction mechanisms, electrode kinetics, and designing new electrochemical devices (in situ ...

This review describes the significant accomplishments achieved by MXenes (primarily in 2019-2024) for enhancing the hydrogen storage performance of various metal hydride materials such as MgH 2, AlH 3, Mg(BH 4) 2, LiBH 4, alanates, and composite hydrides also discusses the bottlenecks of metal hydrides, the influential properties of MXenes, and the ...

1 Introduction. With the rapid increase in greenhouse gas emissions and the resulting serious climatic issues induced by the excessive use of traditional fossil fuels, clean energy conversion and storage technologies with net-zero emissions, such as H 2-O 2 fuel cells and metal-air batteries, have become the focus of widespread

research efforts in recent years.

Nanomaterials derived from metal-organic frameworks (MOFs) show good performance in sensing, gas storage, catalysis and energy-related applications. In this Review, the influence of the ...

Therefore, the electrodeposited, oxygen vacancy-enriched Na-MnO 2-x film electrode has great potential to be used for both flexible energy storage and electrocatalysis. Three-dimensional tree-like NiCo<inf>2</inf>Se<inf>4</inf>@ZnNi layered double hydroxide core-shell heterojunctions for supercapacitors