BLINK SOLAR

Three-dimensional electrodes for electrochemical energy storage

Overview

Why are electrode materials important for electrochemical energy storage devices?

For any electrochemical energy storage device, electrode materials as the major constituent are key factors in achieving high energy and power densities.

Can three-dimensional ordered porous materials improve electrochemical storage of energy?

Three-dimensional ordered porous materials can improve the electrochemical storage of energy. Jing Wang and Yuping Wu from Nanjing Tech University, China and co-workers review the development of these materials for use as electrodes in devices such as batteries and supercapacitors.

What are 3D ordered porous electrode materials?

This review summarizes recent advancements in 3D ordered porous (3DOP) electrode materials and their unusual electrochemical properties endowed by their intrinsic and geometric structures. The 3DOP electrode materials discussed here mainly include carbon materials, transition metal oxides (such as TiO 2, SnO 2,Co 3O 4, NiO, Fe 2O 3,V 2O 5,Cu.

What is interdigital electrochemical energy storage (EES)?

Interdigital electrochemical energy storage (EES) device features small size, high integration, and efficient ion transport, which is an ideal candidate for powering integrated microelectronic systems. However, traditional manufacturing techniques have limited capability in fabricating the microdevices with complex microstructure.

Three-dimensional electrodes for electrochemical energy storage

Three-dimensional carbon architectures for electrochemical capacitors

Three-dimensional (3D) carbon-based materials are emerging as promising electrode candidates for energy storage devices. In comparison to the 1D and 2D structures, ...

Three-dimensional porous carbon materials and their ...

Electrode materials play a vital role in electrochemical energy storage devices and many efforts have been devoted to exploring optimized high-performance electrode materials. 3D porous ...

Macroscopic-Scale Three-Dimensional ...

Recent progress has demonstrated that three-dimensional (3D) carbon nanomaterials are extremely promising candidates for the ...

Three-Dimensional, Submicron Porous ...

Herein, we demonstrate a density-graded composite electrode that arises from a three-dimensional current collector in which the porosity gradually ...

3D-printed interdigital electrodes for electrochemical energy storage

Interdigital electrochemical energy storage (EES) device features small size, high integration, and efficient ion transport, which is an ideal candidate for powering integrated ...

Ideal Three-Dimensional Electrode Structures ...

Ideal Three-Dimensional Electrode Structures for Electrochemical Energy Storage April 2014 Advanced Materials 26 (15) ...

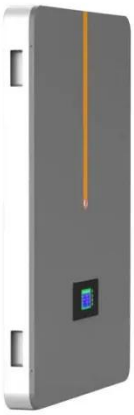
Coaxial nickel cobalt selenide/nitrogen-doped carbon ...

Coaxial nickel cobalt selenide/nitrogen-doped carbon nanotube array as a three-

dimensional self-supported electrode for electrochemical energy storage+

Three-dimensional porous carbon decorated with FeS

Herein, three-dimensional porous carbon (3DPC) decorated with FeS 2 nanospheres nanocomposites (FeS2/3DPC) are developed as electrode material for ...



Three-Dimensional, Submicron Porous Electrode with a ...

Herein, we demonstrate a density-graded composite electrode that arises from a three-dimensional current collector in which the porosity gradually decreases to 53.8% along the ...

Three-dimensional iron oxyhydroxide/reduced graphene oxide composites

Abstract Three-dimensional (3D)

electrodes hold great potential for supercapacitors (SCs) due to their unique architectures and prominent electrochemical properties. Herein, a ...

3D-printed interdigital electrodes for electrochemical ...

Three-dimensional (3D) printing, as an emerging advanced manufacturing technology in rapid prototyping of 3D microstructures, can fabricate interdigital EES devices ...

Three dimensional NiO nanonetwork electrode for efficient

The porous NiO nanonetwork-based electrode manifests a great potential to be an ultra-fast efficient next-generation electrode candidate for electrochemical energy storage ...

Research and development progress of porous foam-based electrodes ...

Foam structure is a three-dimensional (3D) porous skeleton, which has been

widely studied in the field of electrochemical energy storage due to its excellent structural properties, ...

Ideal Three-Dimensional Electrode Structures ...

Ideal 3D electrodes offer kinetics and mass transport advantages in electrochemical energy storage. The common features of ...

Ideal Three-Dimensional Electrode Structures for Electrochemical Energy

Ideal 3D electrodes offer kinetics and mass transport advantages in electrochemical energy storage. The common features of ideal 3D electrodes are summarized ...

Three-dimensional ordered porous electrode materials for

The past decade has witnessed substantial advances in the synthesis of

various electrode materials with three-dimensional (3D) ordered macroporous or mesoporous ...

Ideal Three-Dimensional Electrode Structures ...

Three-dimensional electrodes offer great advantages, such as enhanced ion and electron transport, increased material loading per unit ...

Versatile zero- to three-dimensional carbon ...

Secondary batteries have been widely developed and used in various fields, such as large-scale energy storage, portable electronics, ...

Ideal Three-Dimensional Electrode Structures for Electrochemical Energy

Ideal Three-Dimensional Electrode

Structures for Electrochemical Energy Storage April 2014 Advanced Materials 26 (15) DOI: 10.1002/adma.201305095 Source PubMed

High-precision 3D printed octet-truss microlattices for electrochemical

ABSTRACT High-precision three-dimensional (3D) printing has enabled the fabrication of architected microlattices with complex geometries and tunable functionalities, ...

Three-dimensional porous carbon materials ...

Electrode materials play a vital role in electrochemical energy storage devices and many efforts have been devoted to exploring optimized high ...

Three-dimensional porous metal electrodes: Fabrication

Diverse three-dimensional (3D) porous metal electrodes, including meshes,

foams and felts, are used in electrochemical flow reactors for a wide range of industrial applications, ...

Three-dimensional ordered porous electrode materials ...

Three-dimensional ordered porous electrode materials for electrochemical energy storage Zaichun Liu1,2, Xinhai Yuan2, Shuaishuai Zhang2, Jing Wang2, Qinghong Huang2, ...

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