

Carbon-based fibrous supercapacitors (CFS) have emerged as an encouraging energy storage option for wearable electronics owing to their good flexibility, excellent practicality, and lightness of carbon fiber as both electrode material and substrate [18,19,20,21,22,23,24]. Additionally, the textiles formed by the collective twisting of multiple ...

Also, it has high energy density and excellent flexibility, which can be a candidate material for flexible energy storage devices for wearables [127], [128], [129]. The hard ceramic material B₄C has promising applications in wearable microelectrochemical energy storage devices as electrodes for flexible all-solid micro-supercapacitors [130].

A self-powered system based on energy harvesting technology can be a potential candidate for solving the problem of supplying power to electronic devices. In this review, we focus on portable and ...

The rapid development of portable/wearable electronics proposes new demands for energy storage devices, which are flexibility, smart functions and long-time outdoor operation. Supercapacitors (SCs) show great potential in portable/wearable applications, and the recently developed flexible, smart and self-sustainable supercapacitors greatly meet ...

The concept of charging energy storage systems with photons is an attractive pathway to achieve a sustainable low-carbon society. Herein, we demonstrated a wearable energy textile that can be used to power various wearable electronics for full-day operation by solely charging with photons. The wearable energy textile was powered by zinc-ion fiber ...

When utilized as electrode materials for energy storage devices, ... Towards flexible solid-state supercapacitors for smart and wearable electronics. Chem. Soc. Rev., 47 (2018), pp. 2065-2129. Crossref View in Scopus Google Scholar [31] Y. ...

At the same time, they realized the storage and conversion of energy reversibly with a high efficiency. The elastic fabrics could also be used as a stretchable conductor in a range of deformation. The integrative functions of the smart fabrics promise them great potential in wearable systems and intelligent protective garments.

The rapid conversion from the blueprint to the entity opened up the exploration of 3D printing technology in energy storage material. Compared with planar printing, it allows integrated molding of the electrode and other components. ... but also ...

Carbon-based material, conductive polymer (PPy, PANI, PEDOT, etc.) and other one-dimensional

(1D)-structured metallic wires, cotton thread, and yarn produced by spinning ...

Wearable smart materials can utilize interconversion of heat and electricity [235][236] ... The smart energy storage fiber with integrative properties could be woven into fabrics, providing a new ...

Wearable electronics are expected to be light, durable, flexible, and comfortable. Many fibrous, planar, and tridimensional structures have been designed to realize flexible devices that can sustain geometrical deformations, such as bending, twisting, folding, and stretching normally under the premise of relatively good electrochemical performance and mechanical ...

1 INTRODUCTION. Rechargeable batteries have popularized in smart electrical energy storage in view of energy density, power density, cyclability, and technical maturity. 1-5 A great success has been witnessed in the application of lithium-ion (Li-ion) batteries in electrified transportation and portable electronics, and non-lithium battery chemistries emerge as alternatives in special ...

The advanced fiber-based products such as wearable electronics and smart clothing can be employed as the second skin to enhance information exchange between humans and the external environment. ... as a wearable energy storage device, the fiber-shaped batteries should be washable and stable under complex stress. ... Chen S, Wang F, Tao XM ...

Fiber supercapacitors (FSs) based on transition metal oxides (TMOs) have garnered considerable attention as energy storage solutions for wearable electronics owing to their exceptional characteristics, including superior comfortability and low weights. These materials are known to exhibit high energy densities, high specific capacitances, and fast ...

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Energy Storage Materials. Volume 41, October 2021, Pages 748-757. 3D-printed twisted yarn-type Li-ion battery towards smart fabrics. ... which are essential to obtain batteries for smart wearable electronics. Upon optimizing the above ratios, final candidates for both the anode and cathode inks were selected and used for the successful ...

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