Laser energy storage device

Energy harvesting and storage devices play an increasingly important role in the field of flexible electronics. Laser-induced graphene (LIG) with hierarchical porosity, large specific surface area, high electrical conductivity, and mechanical flexibility is an ideal candidate for fabricating flexible energy devices which supply power for other electronic components.

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 (3D) printing, as ...

So far, several 3D printing technologies have been used to construct electrode structures and improve the electrochemical performance of energy storage devices, such as direct ink writing, stereolithography, inkjet printing, and selective laser sintering. 3D printing technology has the following significant advantages: (1) the ability to ...

The research for three-dimension (3D) printing carbon and carbide energy storage devices has attracted widespread exploration interests. Being designable in structure and materials, graphene oxide (GO) and MXene accompanied with a direct ink writing exhibit a promising prospect for constructing high areal and volume energy density devices. This review ...

Supercapacitors, with the merits of both capacitors for safe and fast charge and batteries for high energy storage have drawn tremendous attention. Recently, laser scribed graphene has been increasingly studied for supercapacitor applications due to its unique properties, such as flexible fabrication, large surface area and high electrical conductivity. With ...

Emerging miniaturized energy storage devices for microsystem applications: from design to integration, Huaizhi Liu, Guanhua Zhang, Xin Zheng, Fengjun Chen, Huigao Duan. ..., and laser scribing [64, 65], have been extensively applied to prepare desirable microelectrodes for MESDs (figure 5). Fabricating a high-resolution structure for the ...

Miniaturized energy storage devices with flexibility and portability have become increasingly important in the development of next-generation electronics 1,2,3,4,5.Generally, it still needs to ...

In real devices for energy storage and conversion, the electrode materials function in aggregated forms where the materials, polymer binder, and conductive additives are glued together to produce an electrode with a thickness of several tens, and even hundreds of micrometers. 108 The active species in the electrolytes are transferred to the ...

energy storage devices Meng ... eling, stereolithography, selective laser sintering, inkjet printing, and binder jetting have been tested to fabricate EES devices. Among these, the most common techniques adopted for the fab-rication of 3D architectures are direct ink writing, fused deposi-

Recently, the three-dimensional (3D) printing of solid-state electrochemical energy storage (EES) devices has attracted extensive interests. By enabling the fabrication of well-designed EES device architectures, enhanced electrochemical performances with fewer safety risks can be achieved. In this review article, we summarize the 3D-printed solid-state ...

The advent of wearable technology has brought with it a pressing need for energy storage solutions that can keep pace with the flexibility and stretchability of soft electronic devices. Micro supercapacitors (MSCs) have emerged as a promising candidate for deformable energy storage, due to high-power density, rapid charging, and long cycle life.

This review delves into recent advancements in laser processing techniques for energy storage device electrodes, focusing on their application in battery technology. We discuss the key challenges and potential benefits of laser-based methods in graphene processing and the fabrication of energy storage devices.

Microfabrication for cost-effective miniaturized energy storage devices remains a challenge. Here, the authors propose a spatially shaped femtosecond laser method, which is ultrafast, one-step ...

This article aims to explore the most optimal pulsed laser energy density when using the pulsed laser deposition (PLD) process to prepare the MoS2 films. We gradually increased the pulsed laser energy density from 70 mJ·cm-2 to 110 mJ·cm-2 and finally determined that 100 mJ·cm-2 was the best-pulsed laser energy density for MoS2 films by ...

Polyimide and other polymeric materials [15] are routinely used to prepare laser-induced graphene electrodes for use in chemical sensing and energy storage devices [16, 18]. The surface modification of conductive polymers, metal oxide nanoparticles, and carbonaceous materials enhances their chemical properties, especially in energy storage ...

The demand for wearable and portable electronic devices and flexible electronic systems has significantly accelerated the development of flexible, all-solid-state planar micro energy storage devices [1], [2], [3] recent years, the attractive merits of planar micro-supercapacitors (MSCs) [4], [5], such as high power density [6], excellent rate capabilities and ...

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