Programmable energy storage materials

Can programmable electrochemical energy storage devices power future wearable and biointegrated electronics?
Leveraging these customizable electrochemical energy storage devices will shed light on smarter programmable electrochemical energy storage devices to power future wearable and biointegrated electronics.

What is a customizable electrochemical energy storage device?
A customizable electrochemical energy storage device is a key component for the realization of next-generation wearable and biointegrated electronics. This Perspective begins with a brief introduction of the drive for customizable electrochemical energy storage devices.

What is energy storage materials?
Energy Storage Materials is an international multidisciplinary journal for communicating scientific and technological advances in the field of (such as in metal-O2 battery). It publishes comprehensive research articles including full papers and short communications, as well as topical feature articles/reviews by leading experts in the field.

What is a programmable material?
Henceforth,the term "programmable" will denote materials engineered to be highly dynamic,either in shape and/or in physical/functional properties such as color,stiffness,density,and damping capacity,which can be altered on-demand -either autonomously or through user inputs- and in a precise,pre-established sequence post-fabrication.

Which materials can be used for energy storage?
Materials possessing these features offer considerable promise for energy storage applications: (i) 2D materials that contain transition metals(such as layered transition metal oxides 12,carbides 15 and dichalcogenides 16) and (ii) materials with 3D interconnected channels (such as T-Nb 2 O 5 (ref. 17 or MnO 2 spinel 12).

What materials have programmable electrical properties?
Fig. 13. Examples of materials with programmable electrical properties. (A) Sensor for monitoring body signals, based on a silk fibroin-based hydrogel that detect a wide range of strains and respond by changing their electrical resistance as well as output voltage signal. The sensor was attached to the skin for 24 h to test its biocompatibility.

DOI: 10.1002/adfm.202070002 Corpus ID: 213380062; Soft Machines: Elastic Energy Storage Enables Rapid and Programmable Actuation in Soft Machines (Adv. Funct. Mater. 1/2020)

This review addresses the cutting edge of electrical energy storage technology, outlining approaches to overcome current limitations and providing future research directions towards the next ...

1 ??· Azo-compounds molecules and phase change materials offer potential applications for sustainable energy systems through the storage and controllable release photochemical and ...

Photoresponsive fluorochromic materials are regarded as an effective means for information storage. Their reversible changes of color and fluorescence facilitate the storage process and increase the possible storage capacity. Here, we ...

His research mainly focuses on the technology development and application of functional thin films and new energy storage materials/devices (multivalent-ion battery, dual-ion battery, etc.). ...

Advanced Functional Materials, part of the prestigious Advanced portfolio and a top-tier materials science journal, publishes outstanding research across the field. Abstract Storage of elastic ...

?? > ???? > Advanced functional materials > 2020?1? > Elastic Energy Storage Enables Rapid and Programmable Actuation in Soft Machines DOI: 10.1002/adfm.201906603 Elastic ...

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A considerable global leap in the usage of fossil fuels, attributed to the rapid expansion of the economy worldwide, poses two important connected challenges [1], [2].The primary problem is ...

Their reversible changes of color and fluorescence facilitate the storage process and increase the possible storage capacity. Here, we propose an optically reconfigurable Förster resonance energy transfer (FRET) process to realize ...

Advanced Functional Materials, part of the prestigious Advanced portfolio and a top-tier materials science journal, publishes outstanding research across the field. Abstract Storage of elastic energy is key to increasing the efficiency, speed, ...

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Imagine a material so versatile that it could redefine industries and transform our daily lives. The unassuming corrugated plastic holds secrets that are sparking a revolution in programmable ...

They can achieve variable stiffness [1,2], passive energy storage and large strain characteristics by changing the structure and composition of the flexible materials [3][4] [5] [6]. ...

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The lead acid battery has been a dominant device in large-scale energy storage systems since its invention in 1859. It has been the most successful commercialized aqueous electrochemical ...

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