Polymers are ubiquitous in the things we use in everyday life, and are even responsible for life itself, e.g., due to the polymers of DNA and proteins. 1 For ages, polymers have been used to improve the quality of life, although the true polymeric nature of the substances (e.g., natural rubber) was not known. 2 Likely driven by the economic impetus of the rubber industry in the ???

ConspectusAchieving a stable latent heat storage over a wide temperature range and a long period of time as well as accomplishing a controlled heat release from conventional phase change materials have remained prominent challenges in thermal energy control. Because the conventional phase change materials have the fixed phase transition temperatures under the ???

Flexible energy storage devices have received much attention owing to their promising applications in rising wearable electronics. By virtue of their high designability, light weight, low cost, high stability, and mechanical flexibility, polymer materials have been widely used for realizing high electrochemical performance and excellent flexibility of energy storage ???

TIMULI-RESPONSIVE POLYMERS FOR ELECTROCHEMICAL ENERGY STORAGE

sources for the requirement of large speci???c energy density.[4,5] Meanwhile, supercapacitors which feature high output power, exhibit complementary energy storage characteristics to rechargeable batteries.[6???8] Beyond energy storage, future smart electronics would require their power sources to be more reliable under extreme or risky

Stimuli-responsive polymers can be engineered, in both film and colloid forms, to respond to a variety of inputs, from temperature to pH. (W911NF-05-1-0339), AFOSR-FA9550-08-1-0446 and the US

Semantic Scholar extracted view of "Thermo???responsive polymers for thermal regulation in electrochemical energy devices" by Mingqian Li et al. Thermal-responsive hydrogels are developed as ion-conductive switchs for energy storage devices, however, the molecule mechanism of switch on/off remains unclear. Built-In Stimuli-Responsive

TIMULI-RESPONSIVE POLYMERS FOR ELECTROCHEMICAL ENERGY STORAGE

Stimuli-responsive polymers can also be attached to surfaces to control interfacial properties. These macromolecules find applications in various areas, including in nanomedicine and in energy storage. The research of his ???

For example, hydrogel of grafting polymer is a method commonly used to stimuli-responsive materials. Hydrogel is a three-dimensional (3D) polymer with a large molecular weight. The smart polymer structure that is formed depends on several factors such as the composition of raw material, chemical structure, hydrophobicity, and density of linking

These energy storages can be achieved by various mechanisms such as thermal [16], batterybased [17], an electrochemical energy storage device [18], and supercapacitor energy storage devices [19

TIMULI-RESPONSIVE POLYMERS FOR ELECTROCHEMICAL ENERGY STORAGE

The current challenge is to focus on the fundamental understanding of ion-containing polymers. Poly(ionic liquid)s (PILs) belong to an important subclass of ionic polyelectrolyte with broad range of structural and functional properties. This review outlines the different kinds of stimuli-responsive PILs those are recently developed, specifically highlighting ???

The physicochemical properties of stimuli-responsive polymers can be easily adjusted using changes in their external environment. This attribute made them to capture the attention of many

For most stimuli-responsive polymer materials (SRPMs), such as polymer gels, micelles, and brushes, the responsive mechanism is based on the solubility or compatibility with liquid media. That basis always results in distorting or collapsing the material's appearance and relies on external liquids. ???

TIMULI-RESPONSIVE POLYMERS FOR ELECTROCHEMICAL ENERGY STORAGE

Advanced electrochemical energy storage devices (EESDs) are essential for the seamless integration of renewable energy sources, ensuring energy security, driving the electrification of transportation, enhancing energy efficiency, promoting sustainability through longer lifespans and recycling efforts, facilitating rural electrification, and enabling the ???

Due to the energy requirements for various human activities, and the need for a substantial change in the energy matrix, it is important to research and design new materials that allow the availability of appropriate technologies. In this sense, together with proposals that advocate a reduction in the conversion, storage, and feeding of clean energies, such as fuel ???

Synthesis and Characterization of Redox-Responsive Disulfide Cross-Linked Polymer Particles for Energy Storage Applications. Garrett L. Grocke. Garrett L. Grocke. Pritzker School of Molecular Engineering, University of Chicago, Chicago, Illinois 60637, United States (RAPs) capable of electrochemical energy storage via a reversible 2

TIMULI-RESPONSIVE POLYMERS FOR ELECTROCHEMICAL ENERGY STORAGE

The supercapacitor is a key member of electrochemical energy storage systems; it basically consists of two electrodes and an electrolytic medium [37, 40, 110]. According to the charge storage mechanism at the electrode/electrolytic phase boundaries, supercapacitors can be categorized into two distinct types: electrical double layer capacitors

Recent research progress on the use of thermal-responsive polymers to enhance the thermal safety of electrochemical storage devices and the prevention of thermal runaway in next-generation smart electrochemicalstorage devices is reviewed. Thermal runway constitutes the most pressing safety issue in lithium???ion batteries and supercapacitors of large???scale and ???

Electrochemical detection is based on changes in the access of an electrochemical tag to an electrode surface. As illustrated in Fig. 1, an analyte can cause a stimulus change in a macromolecule to "fold" or "bend" the structure, increasing the access to the electrochemical tag (lowering to the surface).The design of these structures has the macromolecule attached to an ???

TIMULI-RESPONSIVE POLYMERS FOR ELECTROCHEMICAL ENERGY STORAGE

As shown in the timeline of research progress on stimulusresponsive polymers in energy storage (Fig. 1), the potential of stimulus-responsive materials in the energy storage field has been

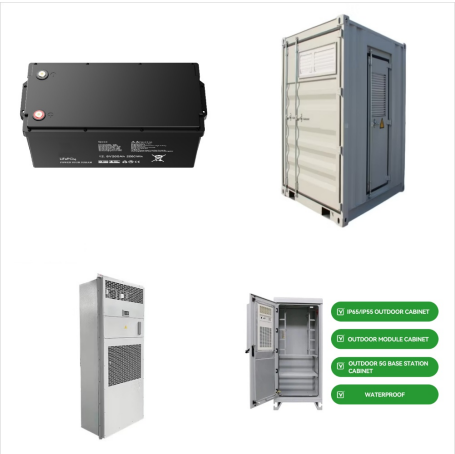
Functional dyes offer fascinating properties in response to external stimuli and enable unique stimuli-responsive functions in materials by chemical incorporation into polymers. In this review, we

This review focuses on smart nano-materials built of stimuli-responsive (SR) polymers and will discuss their numerous applications in the biomedical field. The authors will first provide an overview of different stimuli and their corresponding, responsive polymers. By introducing myriad functionalities, SR polymers present a wide range of possibilities in the ???

TIMULI-RESPONSIVE POLYMERS FOR ELECTROCHEMICAL ENERGY STORAGE

The remarkable degree of chemical and physico???chemical versatility of catechols (ortho-dihydroxybenzene) has long motivated scientists to create numerous advanced multifunctional materials with outstanding and fascinating properties by the synergistic combination of catechols with polymers.Most of the past and current developments exploit the ???

More specifically, stimuli-responsive polymers that exhibit the ability to undergo conformational/size changes in response to stimuli such as: temperature, pH, light, magnetic field, electrical field, sonication, ions, ???



Stimuli???responsive electrochemical energy storage (EES) devices including stimuli???responsive batteries, supercapacitors, and hybrid EES devices have been widely developed in recent years.