

Manipulating Na occupation and constructing protective film of  $\text{P2-Na}_{0.67}\text{Ni}_{0.33}\text{Mn}_{0.67}\text{O}_2$  as long-term cycle stability cathode for sodium-ion batteries. ... The increased demand for renewable energy sources has accelerated the development of large-scale energy storage and intelligent power networks. Lithium-ion batteries (LIBs) have become ...

The supercapacitor structure for energy storage requires a large specific surface area to achieve high performance. Engineering of the preparation and material properties of structures on the nanoscale is essential for achieving a better performance of energy storage devices [1,2]. With the high specific surface area and good wettability, ions ...

This review covers electrochromic (EC) cells that use different ion electrolytes. In addition to EC phenomena in inorganic materials, these devices can be used as energy storage systems. Lithium-ion ( $\text{Li}^+$ ) electrolytes are widely recognized as the predominant type utilized in EC and energy storage devices. These electrolytes can exist in a variety of forms, including ...

Capacitors exhibit exceptional power density, a vast operational temperature range, remarkable reliability, lightweight construction, and high efficiency, making them extensively utilized in the realm of energy storage. There exist two primary categories of energy storage capacitors: dielectric capacitors and supercapacitors. Dielectric capacitors encompass ...

The practical application of high-voltage lithium cobalt oxide (LCO) has been hampered by the severe degradation of its structural integrity. In this work, a protective bilayer was fabricated on LCO surfaces by means of large-scale and facile electrolyte engineering. The protective bilayer consisting of a LiF-rich cathode-electrolyte interphase (CEI) as the outermost layer and a layer ...

Abstract. Lithium (Li) metal anode is a promising candidate for next-generation high capacity energy storage systems. Unfortunately, the uneven deposition/dissolution of Li metal hinders ...

Herein, in this work, renewable biomass-based lignin (L) with rich functional groups and a three-dimensional networked structure was constructed on metallic Zn anodes ...

Careful investigation of the role of each component in the hybrid protective film reveals the key attributes required to achieve an efficient protective layer for Li metal batteries with improved electrochemical performance. ... have been considered "unsafe" energy storage devices. 7, 8 There are two main challenges that hinder ...

The uncontrolled growth of dendrites and serious side reactions, such as hydrogen evolution and corrosion,

significantly hinder the industrial application and development of aqueous zinc-ion batteries (ZIBs). This article presents ovalbumin (OVA) as a multifunctional electrolyte additive for aqueous ZIBs. Experimental characterizations and theoretical ...

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Read the latest articles of Energy Storage Materials at ScienceDirect , Elsevier's leading platform of peer-reviewed scholarly literature. Skip to ... Molecularly engineered three-dimensional covalent organic framework protection films for highly stable zinc anodes in aqueous electrolyte. Kuan Wu, Xiansong Shi, Fangfang Yu, Haoxuan Liu

1. Introduction. Next-generation batteries with high energy density are urgently needed for the development of electric vehicles and smart grid storage [1]. The lithium-oxygen (Li-O<sub>2</sub>) battery is a promising candidate because of its extremely high specific energy density (3500 Wh kg<sup>-1</sup>), which is approximately tenfold higher than that of lithium-ion batteries [2], [3], [4], [5].

High power and extended cycle life at high energy density are key benefits for energy storage, which can be achieved through adopting advanced high-energy electrode materials and novel architectures and manufacturing protocols to transform the current form of Li-ion battery and energy storage technology. Thin film processing is the promising ...

Besides, safety and cost should also be considered in the practical application. 1-4 A flexible and lightweight energy storage system is robust under geometry deformation without compromising its performance. As usual, the mechanical reliability of flexible energy storage devices includes electrical performance retention and deformation endurance.

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The protective hydrothermal treatment maintains the conductivity of MXene layers. ... To further explore the feasibility of the N-doped MXene/TiO<sub>2</sub> heterogeneous film electrode in flexible energy storage devices, a flexible symmetric supercapacitor was fabricated with the 180-8-cys as electrodes and PVA/LiCl gel as separator and electrolyte ...

lasting protection strategy to protect lithium metal anodes in Li-O<sub>2</sub> batteries. Silane pretreatment of Li metal anodes has been reported to produce a protection film for a stable stripping/plating process in Li-ion battery on account of reacting with hydroxyl groups on lithium metal to generate a protection film [24,25]. However, the

low con-

Enhancing the energy storage properties of dielectric polymer capacitor films through composite materials has gained widespread recognition. Among the various strategies ...

Herein, a zincophilic covalent organic framework (COF; TpPa-SO<sub>3</sub>H) film is fabricated via interfacial reaction to stabilize the Zn anode (TpPa-SO<sub>3</sub>H@Zn-foil). The ...

Ferroelectric-based dielectric thin films with large polarizability, high breakdown strength, and miniaturization potential hold promises for competitive integrated and discrete energy storage ...

When the composite films are annealed at 620 °C for 3 min, the PZT films show the perovskite phase and the PZ films exhibit the pyrochlore phase with tiny perovskite phase, making the films obtain a linear hysteresis loop and possess the high energy storage density of 10.0 J cm<sup>-3</sup> and the energy storage efficiency of 84.8%. The ...

Metallic Zn has been regarded as ideal anodes in aqueous electrolyte owing to its high theoretical capacity, intrinsic safety, low cost, and nontoxicity. However, the Zn dendrite growth and the side-reactions hindered the practical application of Zn anode. Herein, a thin and uniform three-dimensional (3D) COOH-functionalized covalent organic frameworks (COF) film (denoted as ...

Based on the above problems, it is particularly imperative to develop materials with excellent performance for energy storage and environmental protection [11,12,13]. In this connection, various technologies have been developed to realize the devices with high performance for energy storage and environmental protection [14,15,16,17].

Additionally, this review studies the high-temperature energy storage of polymer films from three perspectives: molecular modification, doping engineering and multilayer design. ... composed of high voltage power that can supply voltage of V<sub>s</sub> to charge the film capacitor, a protection load resistor R<sub>L1</sub> and discharge load resistor R<sub>L2</sub> ...

The development of high energy density Li-O<sub>2</sub> batteries is hindered by many scientific and technological challenges, especially the intrinsic corrosion of the lithium metal anode induced by O<sub>2</sub>, H<sub>2</sub>O and discharge intermediates in electrolytes. In response, as a proof-of-concept experiment, we first propose and demonstrate a facile and highly efficient strategy for the in ...

We show that high-energy ion bombardment improves the energy storage performance of relaxor ferroelec. thin films. Intrinsic point defects created by ion bombardment reduce leakage, delay ...

Lithium batteries are widely used in energy storage, transportation and communication fields. According to the recyclability, lithium batteries can be divided into rechargeable lithium secondary batteries and

non-rechargeable lithium primary batteries. ... These results indicate that PLNL composite film may effectively protect Li anode and ...

The demand for high-temperature dielectric materials arises from numerous emerging applications such as electric vehicles, wind generators, solar converters, aerospace power conditioning, and downhole oil and gas explorations, in which the power systems and electronic devices have to operate at elevated temperatures. This article presents an overview of recent ...

Enhancing the energy storage properties of dielectric polymer capacitor films through composite materials has gained widespread recognition. Among the various strategies for improving dielectric materials, nanoscale coatings that create structurally controlled multiphase polymeric films have shown great promise. This approach has garnered considerable attention in recent ...

Next-generation batteries with high energy density are urgently needed for the development of electric vehicles and smart grid storage [1]. The lithium-oxygen (Li-O<sub>2</sub>) battery is a promising candidate because of its extremely high specific energy density (3500 Wh kg<sup>-1</sup>), which is approximately tenfold higher than that of lithium-ion batteries [2], [3], [4], [5].

To date, diverse functional materials have been utilized in the protection of ZMAs, such as fluorinated covalent organic frameworks (COFs) [12], trivalent chromium conversion film [13], ZnSiO<sub>4</sub> [14], and so on. Among them, the atomically designable COFs have drawn considerable attention owing to their unique porosity and adjustable functionalities [4], ...

This work uncovers a new method of achieving exceptional high-temperature polymeric dielectric films for high capacitive energy storage by engineering highly aligned 2D MMT/PVA nanosheets at the polymer-electrode interfaces. By probing the energetic modes of transport and aging at pre-breakdown field, it is shown for the first time that the ...

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protective films, and alloy protective films. The mechanisms of various protective films toward the suppression of dendrite growth are summarized. Existing challenges and future research directions are also proposed, which together provide a reference for promoting the use of lithium metal in high-energy batteries.

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