

Graphene is potentially attractive for electrochemical energy storage devices but whether it will lead to real technological progress is still unclear. Recent applications of graphene in battery ...

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Recently, a class of 2D porous heterostructures in which an ultrathin 2D material is sandwiched between two mesoporous monolayers (Fig. 1) has emerged as a research horizon for supercapacitors and ...

In this review, we summarize the recent research progress of MXene-based materials applied in ESS, mainly focusing on the preparation strategies, theoretical calculation, as well as electrochemical performance analysis. Moreover, the key challenges and opportunities for MXene-based materials in energy storage devices are also highlighted. 1.

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The ever-growing pressure from the energy crisis and environmental pollution has promoted the development of efficient multifunctional electric devices. The energy storage and multicolor electrochromic (EC) characteristics have gained tremendous attention for novel devices in the past several decades. The precise design of EC electroactive materials can facilitate the ...

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MOF-related materials have been demonstrated as potential candidates for essential components in electrochemical energy storage and conversion devices, such as electrode materials, electrocatalysts, and electrolytes.

Electrochemical energy storage technologies have a profound influence on daily life, and their development heavily relies on innovations in materials science. Recently, high-entropy materials have attracted increasing research interest worldwide. In this perspective, we start with the early development of high-entropy materials and the calculation of the ...

Supercapacitors and batteries are among the most promising electrochemical energy storage technologies available today. Indeed, high demands in energy storage devices require cost-effective fabrication and robust electroactive materials. In this review, we summarized recent progress and challenges made in the development of mostly nanostructured materials as well ...

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In 2011, 2D transition metal carbides, nitrides and carbonitrides (all uniformly denoted as MXenes) have been discovered and quickly became popular research materials due to their unique physical and chemical properties [[1], [2], [3], [4]]. Up to now, about a hundred kinds of MAX (a general term used for metal carbides or/and nitrides) have been discovered [5]. 2D ...

In this context, functional organic materials have gained attention as promising alternatives for energy storage and conversion (Kalak 2023). These materials are characterized by their ...

With the increasing demand for energy and to decrease the consumption of fossil fuel and its derivatives, renewable energy sources are necessary in the current context of environmentally friendly energy landscape (solar, wind, and hydroelectric power) [1], [2], [3], [4]. Electrochemical energy storage devices (EESDs) such as batteries and supercapacitors ...

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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 ...

PCMs are functional materials that store and release latent heat through reversible melting and cooling processes. In the past few years, PCMs have been widely used in electronic thermal management, solar thermal storage, industrial waste heat recovery, and off-peak power storage systems [16, 17]. According to the phase transition forms, PCMs can be divided into ...

Materials Today: Proceedings. Volume 58, Part 4, 2022, Pages 1360-1367. ... This short review article provides information on how PCMs as latent thermal energy storage materials can help with the growing energy and environmental crisis. In the study, the general classification, properties and application fields of PCMs are briefly discussed. ...

As research and development continue to advance in this field, organic materials are expected to play an increasingly pivotal role in shaping the future of technology and innovation. To fully harness the potential of functional organic materials in energy storage and conversion, future research efforts should prioritize several key areas.

Hydrogen storage alloy with high dissociation pressure has been reported in 2006 [9]. Ti<sub>1.1</sub>CrMn (Ti-Cr-Mn) of AB<sub>2</sub> type alloy with high dissociation pressure, where a part of Cr is replaced by Mn, exhibits excellent hydrogen absorption and desorption capacities at low temperature. Pressure-composition (P-C) isotherms of Ti-Cr-Mn-H system at 233 K and 296 ...

Thermal Energy Storage Materials (TESMs) may be the missing link to the "carbon neutral future" of our dreams. TESMs already cater to many renewable heating, cooling and thermal management applications. However, many challenges remain in finding optimal TESMs for specific requirements. Here, we combine literature, a bibliometric analysis and our ...

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