Functional Materials Lithium-ion Batteries

Lithium-ion batteries (LIBs) have helped revolutionize the modern world and are now advancing the alternative energy field. Several technical challenges are associated with LIBs, such as increasing their energy ...

Functional Materials Letters is an international peer-reviewed scientific journal for original contributions to research on the synthesis, behavior and characterization of functional materials. ... SiO x /CNTs/Sn composite as high-performance anode material for lithium-ion batteries.

Advanced Functional Materials, part of the prestigious Advanced portfolio and a top-tier materials science journal, publishes outstanding research across the field. ... alleviate the severe volume expansion of Bi alloy-based anodes with a high theoretical capacity of 3800 mAh cm -3 for lithium ion batteries (LIBs). However, the complicated ...

A lithium-ion or Li-ion battery is a type of rechargeable battery that uses the reversible intercalation of Li + ions into electronically conducting solids to store energy. In comparison with other commercial rechargeable batteries, Li-ion ...

This chapter will discuss about the use of nanostructured functional materials as anode and cathode materials in lithium ion rechargeable battery, emphasizing the benefits ...

Advanced Functional Materials. Volume 33, Issue 42 2303121. Review. Recent Progress in MOF-Derived Porous Materials as Electrodes for High-Performance Lithium-Ion Batteries. ... Subsequently, the problems that exist in the current application of MOF-based derivatives as electrodes in lithium-ion batteries are discussed along with possible and ...

Polymer electrode materials (PEMs) have become a hot research topic for lithium-ion batteries (LIBs) owing to their high energy density, tunable structure, and flexibility. They are regarded as a category of promising alternatives to conventional inorganic materials because of their abundant and green resources. Currently, conducting polymers, carbonyl polymers, radical polymers, ...

1 · The anode materials commonly used in lithium-ion batteries (also featuring anode reaction) do not match the sulfur cathodes. Therefore, the issues of the Li metal anode also ...

With the increasing awareness of global energy saving, the new energy storage devices represented by lithium-ion batteries (LIBs) have attracted more and more attention. The development of new materials of LIBs is crucial to the pursuit of energy efficiency and sustainable development. Polydopamine (PDA) is a synthetic analogue of natural melanin, which is ...

Functional Materials Lithium-ion Batteries

Advanced Functional Materials. Volume 32, Issue 16 2110046. Research Article. ... 2D Si materials exhibit very promising prospects as the high-performance anodes of lithium-ion batteries (LIBs). However, the facile synthesis of ultrathin 2D Si nanosheets (Si-NSs) and their efficient application still remain a great challenge. ...

Advanced Functional Materials, part of the prestigious Advanced portfolio and a top-tier materials science journal, publishes outstanding research across the field. Abstract Today, there is an urgent demand to develop all solid-state lithium-ion batteries (LIBs) with a high energy density and a high degree of safety.

A lithium-ion or Li-ion battery is a type of rechargeable battery that uses the reversible intercalation of Li + ions into electronically conducting solids to store energy. In comparison with other commercial rechargeable batteries, Li-ion batteries are characterized by higher specific energy, higher energy density, higher energy efficiency, a longer cycle life, and a longer ...

Abstract Fiber lithium-ion batteries (FLIBs) hold great promise for powering wearable electronics. ... Advanced Functional Materials. Early View 2408529. ... Institute of Fiber Materials and Devices, and Laboratory of Advanced Materials, Fudan University, Shanghai, 200438 China. Search for more papers by this author. Xiaocheng Gong,

Natural polymer nanofibers are attractive sustainable raw materials to fabricate separators for high-performance lithium ion batteries (LIBs). Unfortunately, complicated pore-forming processes, low ionic conductivity, and relatively low mechanical strength of previously reported natural polymer nanofiber-based separators severely limit their performances and ...

Qiu He is a Ph.D. student under the supervision of Prof. Yan Zhao at Wuhan University of Technology where she majors in transition metal oxide electrode materials of lithium-ion battery/lithium-sulfur battery and the ...

Lithium-ion batteries (LIBs) are extensively used in electric vehicles and portable electronics due to their high energy density. However, conventional carbonate electrolytes suffer from potential Li plating at high current density and high flammability, which hinder their fast charging capability. Herein, a Journal of Materials Chemistry A Emerging Investigators 2024

Lithium-ion batteries are highly favored by researchers, due to their advantages such as long cycle life, high energy density, and minimal self-discharging. 1-4 The choice of electrode materials is crucial to the battery"s overall performance. 5-7 Therefore, people have developed various electrode materials, such as carbon-based materials, 8-10 ...

[1] Lithium-ion batteries (LIBs) and sodium-ion batteries (SIBs) are part of this solution. LIBs and SIBs appeared in the late 1970 s [2] LIBs had rapid development because of their electrochemical performance, and they currently dominate the market share being used in many scenarios, such as smartphones, electric cars,

solar energy storage ...

Polymer electrode materials (PEMs) have become a hot research topic for lithium-ion batteries (LIBs) owing to their high energy density, tunable structure, and flexibility. They are regarded as a category of promising ...

1 · The carbon materials from pitch derivatives have exhibited high capacity and excellent rate performance in electrochemical energy storage devices such as lithium-ion batteries and ...

The lithium-ion battery with integrated functional electrode (IFE) and the assembling process. (a) Schematic synthetic process of the IFE and (b) the corresponding pouch cell fabrication and cycling performance testing. (c) Photograph of the two types of layouts for the 3D-printed substrate and the corresponding assembled pouch cell.

A review of the conversion of spent lithium-ion batteries into functional materials. Abstract. ... Recycling of LiNi 1/3 Co 1/3 Mn 1/3 O 2 cathode materials from spent lithium-ion batteries using mechanochemical activation and solid-state sintering. Waste Manage (2019) S. Natarajan et al.

a Center of Materials Science and Optoelectronics Engineering, University of Chinese Academy of Sciences, Beijing ... provide a future outlook on the opportunities and challenges of functional binders towards future high-specific ...

Qiu He is a Ph.D. student under the supervision of Prof. Yan Zhao at Wuhan University of Technology where she majors in transition metal oxide electrode materials of lithium-ion battery/lithium-sulfur battery and the application of density functional theory ...

Superior stability and high capacity of restacked molybdenum disulfide as anode material for lithium ion batteries. ... Jiangsu Key Laboratory for Carbon-Based Functional Materials & Devices ...

3 · Lithium-Ion Batteries. In article number 2410866, Jongsoon Kim, Jung-Keun Yoo, Hyeon-Gyun Im, and co-workers introduce a fluorine-free siloxane nanohybrid binder (SNH) for Ni-rich cathodes in lithium-ion batteries (LIBs) through a novel binder design strategy.With enhanced electrochemical stability, high affinity to active material, and improved mechanical ...

Among cathode materials for lithium-ion batteries (LIBs), the polyanionic type, particularly the olivine-structured LiMPO 4 (M = Fe, Mn, or Co) series materials, has been considered the most promising [1, 2].LiFePO 4, an outstanding representative, has found wide usage in electric vehicles (EVs) and is considered the optimal candidate for large-scale LIB ...

The binder adheres to each component of the electrode to maintain the structural integrity and plays an irreplaceable role in a battery despite its low content. Polyvinylidene difluoride (PVDF), as the dominant

binder in commercial battery systems (for cathodes), has acceptably balanced properties between ch Virtual Collections--ICM HOT Papers Virtual ...

Silicon oxides (SiO x, 0 < x < 2)-based anodes have been regarded as one of the most prospective candidate materials for lithium-ion batteries (LIBs) due to their high theoretical capacity.However, the inherent drawbacks of SiO x anodes, especially the severe volume expansion and the inferior Li + kinetic properties, greatly limit their industrial promotion.

Lithium-ion batteries (LIBs) are recognized as one of the most efficient clean energy storage devices. Solid polymer electrolytes (SPEs) have been a promising research direction to eliminate thermal instability by replacing liquid electrolytes, as well as to enhance energy density and power density further [4].Allcock et al. were the first group to confirm that ...

Advanced Functional Materials. Early View 2408348. Research Article. A Super-Foldable Lithium-Ion Full Battery. Kangze Dong, Kangze Dong. School of Chemical Science and Engineering, School of Aerospace Engineering and Applied Mechanics, Tongji University, Shanghai, 200092 P. R. China.

Advanced Functional Materials, part of the prestigious Advanced portfolio and a top-tier materials science journal, publishes outstanding research across the field. Abstract A high content of flame retardant in non-combustible electrolytes leads to deterioration of the electrochemical performance of lithium-ion batteries (LIBs).

1 · Recent Progress in Amorphous Carbon-Based Materials for Anodes of Sodium-Ion Batteries: Synthesis Strategies, Mechanisms, and Performance ChemSusChem, 14 (18) (...

Advanced Functional Materials, part of the prestigious Advanced portfolio and a top-tier materials science journal, publishes outstanding research across the field. Abstract Lithium-ion batteries have been long considered a promising energy storage technology for electrification of the transportation system.

Lithium-metal batteries have emerged as promising candidates for enabling beyond-Li-ion batteries with significantly enhanced energy storage capabilities. Guo et al. (article number 2301638) introduce a functional ...

The applications of polymer electrode materials for lithium-ion batteries face some challenges, including serious agglomeration of polymers and complicated synthesis processes. ... (Ministry of Education), and Tianjin Key Laboratory of Composite and Functional Materials, Tianjin University, Tianjin, 300072 P. R. China. Search for more papers by ...

1 Introduction. Ni-rich cathode active materials (CAMs) of LiNi x Co y Mn z O 2 (NCM/NMC) or LiNi x Co y Al z O 2 (NCA) type are at the forefront of commercial high-energy-density lithium-ion batteries (LIBs). []

Although similar capacities can be achieved with different generations of NCMs, increasing the nickel content lowers the cutoff potential at which high ...

19 · This study introduces an anode material for lithium-ion batteries, achieved by integrating tea polyphenols (TP) with the widely utilized polyacrylic acid (PAA) binder. The ...

Environmental issues related to energy consumption are mainly associated with the strong dependence on fossil fuels. To solve these issues, renewable energy sources systems have been developed as well as ...

Advanced Functional Materials. Volume 32, Issue 34 2203551. Review. Thio-/LISICON and LGPS-Type Solid Electrolytes for All-Solid-State Lithium-Ion Batteries. Boran Tao, Boran Tao. Liuzhou Key Laboratory of New-Energy Vehicle Power Lithium Battery, School of Microelectronics and Materials Engineering, Guangxi University of Science and Technology ...