Requirements for negative electrode materials of potassium ion batteries

Recent progress in polymeric carbonyl-based electrode materials for lithium and sodium ion batteries. Macromol Rapid Commumn. 2019;40:1800565. Article Google Scholar

The positive electrode materials of potassium ion batteries mainly include Prussian blue analogs, layered metal oxides, polyanionic compounds, and organic materials. ...

Electronically conducting polymers such as polyacetylene, polypyrrole, polyaniline and poly(p-phenylene) were proposed and tested as the electrode materials in 1987 . The conducting polymer can be used either positive or negative electrode in rechargeable batteries . Because, the polymer electrodes must up take or give off the ions during ...

As one strategy for increasing energy density of K-ion batteries, electrochemical behavior of Sn oxides (SnO and SnO2) was studied as a negative electrode material. X-ray photoelectron spectroscopy and X-ray diffraction revealed the following: SnO underwent phase separation at the first charge (reduction) process to form metallic Sn and ...

Fabricating and designing novel electrode material to improve battery performance mainly relies on: (i) expanding interlayer distance to accommodate more K + and ...

Nb 1.60 Ti 0.32 W 0.08 O 5-d as negative electrode active material for durable and fast-charging all-solid-state Li-ion batteries

Potassium-ion battery is a promising candidate for post-Li-ion energy storage but the lack of cathode materials hinders practical exploitation. Here the authors investigate defect-free potassium ...

Distinct from "rocking-chair" lithium-ion batteries (LIBs), the unique anionic intercalation chemistry on the cathode side of dual-ion batteries (DIBs) endows them with intrinsic advantages of low cost, high voltage, and eco-friendly, which is attracting widespread attention, and is expected to achieve the next generation of large-scale energy storage applications. ...

Efficient extraction of electrode components from recycled lithium-ion batteries (LIBs) and their high-value applications are critical for the sustainable and eco-friendly utilization of resources. This work demonstrates a novel approach to stripping graphite anodes embedded with Li+ from spent LIBs directly in anhydrous ethanol, which can be utilized as high efficiency ...

SIBs are known as "rocking chair batteries" because sodium ions swing back and forth, similar to a rocking chair, between the positive and negative electrodes. During the charging process, sodium ions are deintercalated from the positive electrode, pass through the electrolyte and separator, and eventually embed

themselves in the negative ...

The potassium ion battery is composed of a positive electrode, a negative electrode, an electrolyte, a separator, a current collector, and a battery shell [45]. The positive electrode materials of potassium ion batteries mainly include Prussian blue analogs, layered metal oxides, polyanionic compounds, and organic materials.

Abstract Recently, to ameliorate the forthcoming energy crisis, sustainable energy conversion and storage devices have been extensively investigated. Potassium-ion batteries (KIBs) have aroused widespread attention in these very active research applications due to their earth abundance and similar low redox potential compared to Li-ion batteries (LIBs). It is ...

In the present study, we focused on SnO and investigated its electrochemical behavior as a negative electrode material for K-ion battery. We demonstrated for the first time ...

As demand for lithium resources increases and supply capacity declines, ultimately, human needs will not be met in the future. Therefore, there is an urgent need to develop new energy storage devices, such as sodium-ion batteries (SIBs), potassium ion batteries (PIBs), etc., it is hoped that it can be used as a complement to LIBs in large-scale energy storage applications, thereby ...

Due to their abundance, low cost, and stability, carbon materials have been widely studied and evaluated as negative electrode materials for LIBs, SIBs, and PIBs, including graphite, hard carbon (HC), soft carbon (SC), graphene, and so forth. 37-40 Carbon materials have different structures (graphite, HC, SC, and graphene), which can meet the needs for efficient storage of ...

Organic potassium-ion batteries: The integrated advantages of organic electrode materials and potassium metal make the organic potassium-ion batteries (OPIBs) promising secondary batteries.

A review of the recent advances in negative electrode materials for potassium-ion batteries, with a focus on graphite and carbon-based materials. The article compares the performance, electrochemistry and challenges of ...

3 · Polyvinyl butyral (PVB) integrated with varying compositions of potassium chloride (KCl) was prepared through a solution-cast method in methanol, forming a PVB-based ...

The status of room-temperature potassium-ion batteries is reviewed in light of recent concerns regarding the rising cost of lithium and the fact that room-temperature sodium-ion batteries have yet to be commercialised thus far. Initial reports of potassium-ion cells appear promising given the infancy of the research area. This review presents not only an overview of the current ...

As mentioned, the development of PIBs is still in its infancy and their practical application is hampered by

challenges such as poor K + reaction kinetics, excessive volume variations, limited energy and power densities, battery safety hazards, etc [32].Numerous recent efforts focused on understanding the electrochemistry of PIBs and improving the ...

Aqueous electrolytes are praised for their inherent safety, cost-effectiveness, and minimal environmental impact, making aqueous potassium-ion batteries (APIBs) a viable alternative for sustainable and eco-friendly energy solutions. Researchers have endeavored to anode materials that align with the unique requirements of aqueous electrolytes, and some ...

With the widespread application of electrochemical energy storage in portable electronic devices and electric vehicles (EVs), users have higher requirements for lithium-ion batteries (LIBs) like fast charging (less than 15 min to get 80% of the capacity), which is crucial for the widespread use of EVs [1,2,3,4,5] nsequently, among the various performance ...

Potassium ions have a higher negative electrode structure (2.93 V for K + /K, 2.58 V for Na + /Na) than sodium ions, resulting in increased battery life and fast energy [23]. ...

Replacing lithium with sodium and potassium to develop sodium-ion batteries (SIBs) and potassium-ion batteries ... For the negative electrode, materials such as MOFs, ZIF, and MIL series are able to be used as ...

As an anode material for potassium-ion batteries, Co(OH)Se exhibited excellent cycling stability (414.7 mA h g -1 at 0.1 A g -1 after 60 cycles) and rate capability (194.7 mA h g -1 at 5.0 A g -1). Moreover, carbon-material composited Co(OH)Se@C delivered specific discharge capacity of 353.9 mA h g -1 at 0.1 A g -1 after 150 cycles ...

Inspired by high-entropy sulphides, Chang proposed an innovative idea of replacing S with Te and reported a novel NaCl-type AgSnSbSe 1.5 Te 1.5, which was applied as an anode material for potassium-ion batteries (PIBs) [74]. This HETe showed impressive performance when assembled into full PIBs, achieving a maximum energy density of 200 Wh/kg.