A review of negative electrode materials for potassium ion batteries

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

What materials are used in a cathode and anode electrode?
Herein, we review the cathode materials (Prussian blue and its analogues, layered oxides and polyanionic compounds) and the anode materials (antimony-based, selenium-based and bismuth-based compounds). On the basis of previous work, the structural design principles for improving the performance of electrode materials are reasonably summarized.

What is the role of inorganic cathode materials in potassium ion battery?
The performance of cathode materials is a critical factor of the potassium ion battery,which directly affects the battery energy density,cycle life,and safety. Nevertheless,inorganic cathode materials play an important role in the researchof potassium ion battery cathode materials.

What are rechargeable potassium-ion batteries?
Rechargeable potassium-ion batteries (PIBs) have great potential in the application of electrochemical energy storage devicesdue to the low cost,the abundant resources and the low standard reduction potential of potassium.

Are tin oxides a negative electrode material for potassium-ion batteries?
Shimizu M, Yatsuzuka R, Koya T, Yamakami T, Arai S. Tin oxides as a negative electrode material for potassium-ion batteries. ACS Appl Energy Mater. 2018;1:6865.

What is a good cathode material for potassium ion batteries?
This type of material has been extensively studied in LIBs and SIBs and is expected to be an excellent cathode material for PIBs. At present,in potassium ion batteries,polyanion compoundsthat have been reported include KFePO 4,K 3 V 2 (PO) 4,KVOPO 4,KFeSO 4 F,KVPO 4 F,etc . 5.3.2. Electrochemical performance and improvement approach

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 that metallic Sn formed in the first reduction process on SnO electrode reacts with K by an alloying to exhibit a reversible capacity of about 230 mA h g -1 and ...

In this study, submicron-sized tin particles were used as the negative electrode material for potassium

secondary batteries. With a bis(fluorosulfonyl)amide-based ionic liquid electrolyte,...

Left-top, electrochemical behavior and performance of few layer graphene electrode with carbonate based electrolyte. Left-bottom, in situ evolution of the Raman spectra during LSV at 0.5 mV/s.

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Here, in this mini-review, we present the recent trends in electrode materials and some new strategies of electrode fabrication for Li-ion batteries. Some promising materials with better electrochemical performance have also been represented along with the traditional electrodes, which have been modified to enhance their performance and stability.

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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 potassium-ion battery literature, but also attempts to provide context by ...

Different from the few previous review papers focused on electrode materials, this critical Review will focus on recent advances in carbon-based potassium storage devices, including potassium-based dual-ion batteries (PDIBs), conversion-type K-X (X=I 2, O 2, CO 2, S and Se) batteries and K-metal batteries. Finally, possible directions for ...

promising alternatives to potassium metal negative electrodes. This short review aims at gathering the recent advances in negative electrode materials for KIB, with critical comparison Abbreviations: LIB, Lithium-ion batteries; NIB, Sodium-ion batteries; KIB, Potassium-ion batteries; EC, ethylene carbonate; PC, propylene carbonate;

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 potassium oxide, and reversible ...

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Luckily, different materials react electrochemically with potassium ions at low potential, and consequently offer promising alternatives to potassium metal negative electrodes. This short review aims at gathering the recent advances in negative ...

CNTs become one of the most viable carbon materials among potential KIB anodes because of their inherent mechanical properties and connected conductive network, which makes them ...

The success story of the triphylite-type LiFePO 4 immediately boosted the development of numerous classes of polyanion-based electrode materials for metal-ion batteries. A number of advantages including thermal and structural stability, polyanionic inductive effect, and variety of crystal types and chemical compositions render these materials attractive for grid ...

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