

Can antimony materials be used in commercial production?

The composite modification means can realize more considerable electrochemical performance enhancement [5,58]. Therefore, choosing pure antimony material may be one of the first choices for commercial production. In the sequel, we present applications of Sb-based anode materials and their derivatives and discuss their practical feasibility.

Is antimony sulfide a good anode material?

Owing to its high theoretical specific capacity, effective working voltage, and abundant raw materials, antimony sulfide (Sb_2S_3) was regarded as one promising anode material for electrochemical energy conversion and storage, especially regarding alkali-ion (Li^+ , Na^+ , and K^+) batteries.

What is the theoretical capacity of antimony selenides?

The theoretical capacity of sodium storage contributed by the resulting material of the above two-step reaction is $670 \text{ mA}\cdot\text{h/g}$ ($1 \text{ mol Sb}_2\text{Se}_3 \rightarrow 9 \text{ mol Na}^+$) [7,17,18,20]. Evidently, the theoretical capacity of antimony selenides is less than that of antimony sulfides and oxides and it is equivalent to that of metal Sb.

Can antimony be commercialized?

Considerations are made in terms of the economics of the material and the fact that it can be commercialized. Pure antimony material, although energy density and power density are not as good as other materials. Its simple synthesis process can bring some economic benefits.

Why is antimony important in sodium ion batteries?

You have full access to this open access article The development of sodium-ion (SIBs) and potassium-ion batteries (PIBs) has increased rapidly because of the abundant resources and cost-effectiveness of Na and K. Antimony (Sb) plays an important role in SIBs and PIBs because of its high theoretical capacity, proper working voltage, and low cost.

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The increasing demand for safe, sustainable and cost-effective energy systems has spurred the development of battery systems beyond Li-based batteries due to the expensive ...

select article Assessing the thermal runaway characteristics of solid-state lithium batteries based on thermochemical reaction properties at material level. ... select article Failure mechanism of ...

This is mainly because the larger ionic radius of Na and K (0.138 nm for K^+ , 0.102 nm for Na^+ vs 0.076 nm

for Li⁺) can cause sluggish reaction kinetics and reduce the ...

Potassium-ion batteries (PIBs) are considered as a promising energy storage system owing to its abundant potassium resources. As an important part of the battery ...

Owing to its high theoretical specific capacity, effective working voltage, and abundant raw materials, antimony sulfide (Sb₂S₃) was regarded as one promising anode material for electrochemical energy conversion and ...

Antimony (Sb)-based materials, as a kind of potential high capacity and low cost materials, are the focus of attention in the anode materials of potassium ion batteries. ... In ...

nities and challenges of Sb-based material will be listed to provide guidance for future research on Sb-based electrode materials. Sodium-Ion Batteries Metallic Antimony for ...

a Distribution of element content in the earth. b Theoretical capacity of various materials based on alloying reaction mechanism. c The degradation mechanism of Sb-based anodes in SIBs. Reproduced ...

Antimony (Sb) is recognized as a potential electrode material for sodium-ion batteries (SIBs) due to its huge reserves, affordability, and high theoretical capacity (660 ...

The current methods to improve the energy storage performance of Sb-based materials include three aspects: (1) developing the potential of Sb ...

In this review article, we will focus on different categories of the emerging Sb based anode materials with distinct sodium storage mechanisms including Sb, two ...

Despite the significant enhancements in the performance of AZIBs achieved through various strategic augmentations, the energy storage mechanisms of cathode materials ...

Antimony-based materials are recognized as a promising anode candidate because of their high theoretical capacities, appropriate potassiation potential, and relatively low cost. ... Despite the fact that the potassium storage ...

This paper reviews the latest research on different types of Sb-based anode materials and provides an in-depth analysis of their optimization strategies. We focus on ...

BP, which is among the most promising 2D materials, is a potential next-generation material for energy storage [33] pared with other 2D materials such as MoS₂ and ...

Currently, depending on the energy storage mechanism, the reported anodes mainly fall into two types, including conversion-type ones and stripping/plating-type ones. ...

Rechargeable potassium-ion batteries (PIBs) have great potential in the application of electrochemical energy storage devices due to the low cost, the abundant resources and the ...

Antimony (Sb)-based materials have garnered considerable attention as potential anode candidates for potassium-ion batteries (PIBs) due to multi-electron alloying reactions, ...

Energy Storage Materials. Volume 13, July 2018, Pages 247-256. A mesoporous antimony-based nanocomposite for advanced sodium ion batteries. Author links open overlay ...

However, the majority of IHP materials with excellent characteristics are consisting of lead (Pb) which hurts the environment [22, 23]. Therefore, a large number of theoretical and ...

Antimony-based materials as promising anodes for rechargeable lithium-ion and sodium-ion batteries. Jun He a, Yaqing Wei a, Tianyou Zhai a and Huiqiao Li * ab a State Key Laboratory of Material Processing and Die & Mould Technology, ...

Tin antimony alloy anchored reduced graphene oxide (rGO-Sn_xSb_y (x ~ y = 1)) composite, prepared in bulk via a facile chemical route, is shown for its applicability in high ...

Herein, aiming at exploring the similarity and divergence of aqueous Bi anode for different AM-ion storage, we performed comparative studies of the (de)alloying intercalation ...

Here, the authors study two representative framework materials to elucidate the charge storage mechanisms based on metal-ligand coordination and organic linkers.

Bismuth (Bi)-based materials have been receiving considerable attention as promising electrode materials in the fields of electrochemical energy storage, due to their ...

The target is primarily to (1) investigate the adsorption behavior of Sb(III) on NiFeMnO_x, (2) explore the chemical structure and mechanism of adsorption by characterizing ...

This review discusses various antimony-based anode materials applied to potassium ion batteries from various perspectives, including material selection, structural ...

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Energy storage mechanism of antimony-based materials

Antimony-Based Anode Materials for Sodium Ion Batteries Ying Li 1,2, Xueqi Lai 1,2, Jinpeng Qu 1,2, Qinzhi Lai 1,2, Tingfeng Yi ... natural abundance of sodium resources ...

In this study, the recent progress of Sb-based materials including elemental Sb nano-structures, intermetallic Sb alloys and Sb chalcogenides for lithium-ion and sodium-ion batteries are introduced in detail along with their electrode ...

Antimony is a promising anode material for SIBs owing to its high theoretical specific capacity (660 mAh \cdot g⁻¹, corresponding to the full sodiation Na₃Sb alloy), small degree of electrode...

Antimonene show a mixture of surface-controlled and battery-like responses in acid. Power-law and kinetics simulation further confirm the energy storage mechanism. EQCM ...

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