



Tin active materials for lithium batteries

Tin-based materials are expected to be a commercial anode material candidate of next-generation rechargeable batteries due to their high gravimetric/volumetric capacity. However, tin anodes have large volume ...

The lithium-sulfur battery has high theoretical specific capacity (1675 mAh g⁻¹) and energy density (2567 Wh kg⁻¹), and is considered to be one of the most promising high-energy-density storage battery systems. However, the polysulfides produced during the charging and discharging process of the lithium-sulfur battery will migrate back and forth between the ...

Tin (Sn), as a potential lithium-ion batteries (LIBs) anode material, has acquired plentiful concern due to its low-cost, environmental benignity, high safety, and high theoretical capacity output (~994 mAh g⁻¹ for Li₂₂Sn₅) sides, some kinds of Sn-based ...

The anode active material plays a crucial role on the low-temperature electrochemical performance of lithium-ion batteries. In general, the lithiation (and delithiation) process at the anode can be divided into surface ...

The development and application of tin-based materials in LIBs also provide useful guidelines for sodium-ion batteries, potassium-ion batteries, magnesium-ion batteries ...

TiNb₂O₇ (TNO) has been regarded as a promising anode material for high-power lithium-ion batteries due to its high theoretical capacity and work voltage (387.6 mA h g⁻¹, 1.6 V vs. Li⁺/Li). Herein, a series of microspherical TNO anode materials are synthesized by a facile solvothermal method, and the effect of solvothermal time on the microstructure and ...

DOI: 10.1021/CM0504337 Corpus ID: 98389382 Monomer-Capped Tin Metal Nanoparticles for Anode Materials in Lithium Secondary Batteries @article{Noh2005MonomerCappedTM, title={Monomer-Capped Tin Metal Nanoparticles for Anode Materials in Lithium Secondary Batteries}, author={Mijung Noh and YooJin Kim and Min Gyu Kim and Hyo-Jin Lee and ...

Download Citation | Comparative study of the (Co/Mn/Ni)_xSn_y intermetallic compounds as anode active materials for lithium-ion batteries | Tin-based materials have been considered as next ...

Tin-graphene tubes as anodes for lithium-ion batteries with high volumetric and gravimetric energy densities Nat. Commun., 11 (2020), 10.1038/s41467-020-14859-z Google Scholar

Tin and tin compounds are perceived as promising next-generation lithium (sodium)-ion batteries anodes because of their high theoretical capacity, low cost and proper working potentials.

Reasonable design and applications of graphene-based materials are supposed to be promising ways to tackle



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many fundamental problems emerging in lithium batteries, including suppression of electrode/electrolyte side reactions, stabilization of electrode architecture, and improvement of conductive component. Therefore, extensive fundamental ...

Poor cyclic stability and low rate performance due to dramatic volume change and low intrinsic electronic conductivity are the two key issues needing to be urgently solved in silicon (Si)-based anodes for lithium-ion ...

Abstract Finding alternative materials components of lithium ion batteries (LIBs) with high performances is a key factor to improve this technology. The objective of the present study was to investigate the electrochemical performances of tin phosphite (SnHPO_3) as anode material for LIBs. SnHPO_3 has been synthesized through a simple hydrothermal method and ...

DOI: 10.1016/J.ELECTACTA.2021.137936 Corpus ID: 233925296 Understanding and modelling the thermodynamics and electrochemistry of lithiation of tin (IV) sulfide as an anode active material for lithium ion batteries @article{Cupid2021UnderstandingAM, title ...

Tin phosphide (Sn_xP_y) is considered as an alternative anode material for lithium-ion batteries (LIBs) due to high theoretical lithium-storage ability. Herein, carbon-coated SnP/C and ...

An effective strategy to achieve high-power electrode by tin doping: $\text{Sn}_x\text{-TiNb}_2\text{O}_7$ as a promising anode material with a large capacity and high-rate performance for lithium-ion batteries In this work, the Sn-doped titanium niobate $\text{Sn}_x\text{-TiNb}_2\text{O}_7$ ($\text{Sn}_x\text{-TNO}$, $x = 0.005, 0.01, 0.02, 0.04, 0.06, 0.08$) samples have been fabricated through a solid-state reaction method with ...

Tin phosphide (Sn_xP_y) is considered as an alternative anode material for lithium-ion batteries (LIBs) due to high theoretical lithium ... metallic tin (Sn) is chosen as an electrode active ...

Tin(II) oxalate was studied as a novel precursor for active electrode materials in lithium-ion batteries. The discharge of lithium cells using tin oxalate electrodes takes place by three irreversible steps: tin reduction, forming a lithium oxalate matrix; solvent decomposition to form a passivating layer; and oxalate reduction in a two-electron process. These are followed ...

Since the launch of lithium-ion batteries, elements (such as silicon, tin, or aluminum) that can be alloyed with lithium have been expected as anode materials, owing to larger capacity.

Refined structured tin dioxide gets the amount of attraction because of its low cost and stability. The C@SnO_2 nanospheres with mesoporous structures were produced using the hard template method in this work. The C@SnO_2 is primarily gained attributed to the dehydration condensation of $\text{C}_6\text{H}_{12}\text{O}_6$ and the hydrolysis of $\text{SnCl}_4 \cdot 5\text{H}_2\text{O}$. The morphology of the ...



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SnO₂-Based Composites Tin oxide materials were first discovered and applied in LIBs with a high specific capacity by Idato et al. from Fuji Photo Film in 1997 (Idota et al., 1997) om then on, SnO₂-based anodes ...

In this chapter, we have reviewed the work on tin, tin alloys, and tin dioxide for use as anode materials for next generation lithium-ion batteries. The interest in tin is obvious due to ...

TIN IN LITHIUM-ION BATTERIES 4 ©INTERNATIONAL TIN ASSOCIATION LTD 2018 Executive Summary This report has reviewed use of tin in lithium-ion batteries, identifying nine technology opportunities, mainly focussed on advanced anode materials. ...

Lithium-manganese-oxides have been exploited as promising cathode materials for many years due to their environmental friendliness, resource abundance and low biotoxicity. Nevertheless, inevitable problems, such as Jahn-Teller distortion, manganese dissolution and phase transition, still frustrate researchers; thus, progress in full manganese-based cathode ...

The rapid development of electric vehicles and consumer electronics places higher demands on the performance of secondary batteries. Tin-based materials are expected to be a commercial anode material candidate of next-generation rechargeable batteries due to ...

Tin (Sn), with a theoretical capacity of 994 mAh g⁻¹, is a promising anode material for lithium-ion batteries (LIBs). However, fundamental limitations like large volume expansion during charge ...

Herein, we utilized the centrifugal spinning process to fabricate tin-containing carbon (Sn/C) nanofibers for use as an anode in lithium-ion batteries. Sn was used as an active material considering its relatively high theoretical capacity (992 mAh g⁻¹, Li 4.4 Sn) [].Tin ...

Tin-based materials have been considered as next-generation candidates to replace carbon as anode materials for lithium-ion batteries (LIBs) owing to their high theoretical ...

Tin (IV) sulfide is a promising anode active material for lithium ion batteries due to its relatively high reversible capacity of 644 mAh/g, which is more than one and a half times that of graphite. During lithiation of tin (IV) sulfide, an inert Li₂S matrix is formed in the first discharge cycle, which serves to accommodate the mechanical stresses associated with the volume ...

The development and commercialization of lithium ion batteries is rooted in material discovery. Promising new materials with high energy density are required for achieving the goal toward alternative forms of transportation. Over the past decade, significant progress and effort has been made in developing the new generation of Li-ion battery materials. In the ...

DOI: 10.1002/APP.43914 Corpus ID: 138065634 Study of carbonization behavior of polyacrylonitrile/tin salt as anode material for lithium-ion batteries @article{Wang2016StudyOC, title={Study of carbonization



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behavior of polyacrylonitrile/tin salt as anode material for ...

Current lithium-ion batteries, however, adopt graphite-based anodes with low tap density and gravimetric capacity, resulting in poor ...

For a comparative study, we also fabricated Sn-C hybrid nanofibers with SnCl₂ as the precursor. The details about the fabrication of Sn-C hybrid nanofibers are described in supporting information, where P-ATO-0.9 is cited as the example. In other words, P-SnCl₂-0.9 was prepared with 0.9 g of SnCl₂ precursor (the content of active materials used is the same ...

2@TiN composite material in the cathode of lithium-sulfur batteries and provides a new way and direction for the research of Li-S batteries. 2. Experimental 2.1 Synthesis of the precursor to lychee-like TiO₂ spheres The experiment method has referred to the 33

Tin-based materials have proven to be promising new anode materials because of the high specific capacity, low toxicity and good safety [6], [7], [8]. In tin-anode lithium-ion batteries, alloying is one of effective ways to increase capacity.

Tin-based materials have proven to be promising new anode materials because of the high specific capacity, low toxicity and good safety [6], [7], [8]. In tin-anode ...

Tin-based metal organic complexes with breakable coordination bonds, multiple active sites, and high theoretical capacity have attracted wide attentions for lithium-ion batteries (LIBs). However, the inferior electrical conductivity and significant volume changes have limited their electrochemical stability and practical application performance. This work proposes a ...

DOI: 10.1021/acsaem.0c01688 Corpus ID: 225320234 Integrated Structure of Tin-Based Anodes Enhancing High Power Density and Long Cycle Life for Lithium Ion Batteries Tin-based materials have been considered as promising anode materials due to their ...

Lithium-ion batteries are promising energy storage devices used in several sectors, such as transportation, electronic devices, energy, and industry. The anode is one of the main components of a lithium-ion battery that plays a vital role in the cycle and electrochemical performance of a lithium-ion battery, depending on the active material. Recently, SiO₂ has ...

The widespread utilization of lithium-ion batteries has led to an increase in the quantity of decommissioned lithium-ion batteries. By incorporating recycled anode graphite into new lithium-ion batteries, we can effectively mitigate environmental pollution and meet the industry's high demand for graphite. Herein, a suitable amount of ferric chloride hexahydrate ...

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