

# Negative electrode material solid-state battery

Are metal negative electrodes reversible in lithium ion batteries?

Metal negative electrodes that alloy with lithium have high theoretical charge storage capacity and are ideal candidates for developing high-energy rechargeable batteries. However, such electrode materials show limited reversibility in Li-ion batteries with standard non-aqueous liquid electrolyte solutions.

What are anode-free solid-state batteries?

Provided by the Springer Nature SharedIt content-sharing initiative Anode-free solid-state batteries contain no active material at the negative electrode in the as-manufactured state, yielding high energy densities for use in long-range electric vehicles.

Can aluminum-based negative electrodes improve all-solid-state batteries?

These results demonstrate the possibility of improved all-solid-state batteries via metallurgical design of negative electrodes while simplifying manufacturing processes. Aluminum-based negative electrodes could enable high-energy-density batteries, but their charge storage performance is limited.

Can a negative electrode material be used for Li-ion batteries?

We have developed a method which is adaptable and straightforward for the production of a negative electrode material based on Si/carbon nanotube (Si/CNTs) composite for Li-ion batteries.

Can solid-state batteries be used for high-capacity electrodes?

Solid-state batteries (SSBs) can potentially enable the use of new high-capacity electrode materials while avoiding flammable liquid electrolytes. Lithium metal negative electrodes have been extensively investigated for SSBs because of their low electrode potential and high theoretical capacity (3861 mAh g<sup>-1</sup>)<sup>1</sup>.

Are metal negative electrodes suitable for high energy rechargeable batteries?

Nature Communications 14, Article number: 3975 (2023) Cite this article Metal negative electrodes that alloy with lithium have high theoretical charge storage capacity and are ideal candidates for developing high-energy rechargeable batteries.

Solid State Ionics 786, 86-88 (1996). Google Scholar . Takeda, Y. et al. Lithium secondary batteries using a lithium cobalt nitride, Li<sub>2.6</sub>Co<sub>0.4</sub>N, as the anode. Solid State ...

In all-solid-state batteries (ASSBs), silicon-based negative electrodes have the advantages of high theoretical specific capacity, low lithiation potential, and lower susceptibility ...

Since the inorganic solid electrolyte is a solid rather than a liquid, the combination of all-solid-state LIBs and Si negative electrode can mechanically suppress the ...

a The solid-state electrode with the inorganic solid-state electrolyte (b) undergoes pulverization after cycles owing to the large volume change of the electrode active ...

aluminum-foil-based negative electrodes with engineered microstructures in an all-solid-state Li-ion cell configuration. When a 30-mm-thick Al<sub>94.5</sub>In<sub>5.5</sub> negative electrode is combined with ...

An all strain-free solid-state battery, which consists of a strain-free Ti<sub>3</sub>C<sub>2</sub>T<sub>x</sub> negative electrode and a strain-free disordered rocksalt Li<sub>8/7</sub>Ti<sub>2/7</sub>V<sub>4/7</sub>O<sub>2</sub> positive ...

In this study, we clarified that the use of an inorganic solid electrolyte improves the cycle performance of the LIB with the Si negative electrode and the size of Si particles ...

Importantly, though, it is expected that SSB architectures could enable advantages for alloy-negative electrodes even at low stack pressures, since the SEI formation ...

Quasi-solid-state lithium-metal battery with an optimized 7.54 mm-thick lithium metal negative electrode, a commercial LiNi<sub>0.83</sub>Co<sub>0.11</sub>Mn<sub>0.06</sub>O<sub>2</sub> positive electrode, and a ...

All solid-state batteries are considered as the most promising battery technology due to their safety and high energy density. This study presents an advanced mathematical ...

In this work, a cell concept comprising of an anion intercalating graphite-based positive electrode (cathode) and an elemental sulfur-based negative electrode (anode) is ...

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