A nitride based strategy solid electrolytes batteries

What are nitride solid-state electrolytes?
Nitride solid-state electrolytes (SSEs) hold significant potential for addressing critical interfacial issues between SSEs and lithium metal in all-solid-state lithium metal batteries. These batteries are at the forefront of energy storage and materials science, and they promise to revolutionize electric vehicles.

Why is lithium nitride a good candidate for Sei construction?
Owing to Li 3N having a high ionic conductivity and being stable against lithium anodes,it is a favorable candidate for SEI construction (Fig. 1c). Furthermore,some organic or inorganic compounds working together with Li3 N may improve the interface to inhibit the growth of lithium dendrites . 3. Properties of lithium nitride

Does lithium nitride suppress the growth of dendrites during electrodeposition?
However, the growth of dendrites during electrodeposition still significantly hinders the practical application of lithium metal batteries. Lithium nitride (Li3N) modification of the surfaces of Li anodes is regarded as an effective strategy to suppress the growth of lithium dendrites.

What is an all-solid-state lithium battery?
The all-solid-state battery employing an LZC-N0.15 electrolyte and a LiCoO 2 cathode delivers a high discharge capacity of 218.4 mAh g -1 at 4.62 V. All-solid-state lithium batteries are widely regarded as the most promising next-generation energy storage technologydue to their exceptional combination of high energy density and intrinsic safety.

Does lithium nitride decompose if matched with an SSE?
The oxidation potential of Li3 N is only 0.5 V ,which means that lithium nitride will tend to decomposeand thus fail if the electrochemical potential exceeds 0.5 V when matched with an SSE . In this review,many successful cases of constructing Li 3 N-based SEIs/ASEIs on the surfaces of Li metal anodes are summarized carefully.

Can lithium nitric halides prevent adverse reactions with lithium anodes?
A series of lithium nitric halides in the Li 3a +b N a X b (X = Cl,Br,or I) systems have been identified as potential candidates for SEIs to prevent detrimental reactions with lithium anodes. The Li 3a +b N a X b systems consist of alternating layers of lithium nitrides and halides.

Abstract Sulfone-based electrolyte (SL) as a novel type electrolyte for lithium-ion batteries (LIBs) has attracted increasing attention due to its exceptional high-voltage stability ...

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issues between SSEs and lithium metal in all-solid-state lithium metal batteries. These batteries are at the forefront of energy ...

However, the inherent high reduction potential of halide electrolytes remains a critical bottleneck, limiting their practical performance. This work focuses on cost-effective ...

Based on the previous theoretical understanding and analysis, the strategies of using lithium nitride to construct solid electrolyte interlayers on the surfaces of lithium metal ...

An amorphous nitrogenchloride dual-anion solid-state electrolyte (Li 1.3 ZrN 0.4 Cl 4.1) with high ionic conductivity (3.01 mS cm -1 at 25 °C) and broad electrochemical stability ...

To fully realize the potential of LATP-based solid-state lithium batteries, further exploration into the design of more ideal intermediate layers is essential. Herein, a lithiophilic interface strategy is ...

Abstract Solid electrolytes (SEs) in all-solid-state batteries (ASSBs) are garnering considerable attention for their potential applications in next-generation energy ...

This new v-Li3N solid-state electrolyte demonstrates a vacancy-mediated superionic diffusion mechanism, achieving high ionic conductivity (2.14 × 10-3 S cm-1) and effectively suppressing ...

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Abstract In the quest to enhance the safety of lithium-ion batteries, substantial research is underway to develop all-solid-state batteries, facing challenges in achieving high ion conductivity in solid electrolytes. This ...

Based on these insights, we offer perspectives on the future opportunities and directions for the advancement of nitride SSEs in all-solid-state lithium metal batteries.

Overall, nitride-based SSEs offer a promising pathway to miti-gate interfacial issues between the electrolyte and lithium metal, thereby unlocking the potential for high-energy-density ASSLMBs.

In the quest to enhance the safety of lithium-ion batteries, substantial research is underway to develop all-solid-state batteries, facing challenges in achieving high ion ...

This review provides a concise historical overview of nitride SSEs, followed by a summary of recent key advances in their materials, crystal and local structures, and synthesis methods, ...

Sulfide-based solid electrolyte films with high room-temperature ionic conductivity will boost the energy

density of all-solid-state batteries. This Review covers the ...

Stabilizing Solid Electrolyte-Anode Interface in Li-Metal Batteries by Boron Nitride-Based Nanocomposite Coating Li1.3Al0.3Ti1.7(PO4)3 (LATP) solid electrolyte is inexpensive, light, ...

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