Lithium anode interlayer design for all-solid-state lithium-metal batteries

Are all-solid-state lithium-metal batteries effective?
All-solid-state lithium-metal batteries are at the forefront of battery research and development. Here C. Wang and colleagues have developed an interlayer design strategy to address issues associated with lithium dendrite growth and interface resistance,resulting in substantial improvements in battery performance.

Can a lithium anode solve lithium dendrite problems?
"Adding a special layer between the lithium anode and the solid electrolyte can potentially tackle lithium dendrites issues,but the properties of the interlayer are of key importance to attain this," Wang explained. "Our design principle correlates battery stabilities with several key properties of interlayer.

Is Li metal a good battery anode?
Li metal,with its high specific capacity of 3860 mAh g?¹,is considered an ideal anodefor next-generation high-energy-density batteries ,. The combination of Li metal with sulfide electrolytes is a critical approach for achieving high energy density in solid-state batteries .

Are sulfide solid electrolytes compatible with all-solid-state lithium metal batteries?
All-solid-state lithium metal batteries (ASSLMBs) with sulfide solid electrolytes (SSEs) are next-generation energy storage technology offering high theoretical energy density. However,interface issuesbetween the SSEs and lithium (Li) metal have plagued the performance of ASSLMBs.

What are all-solid-state batteries (assbs)?
All-solid-state batteries (ASSBs) are battery cells that include a solid electrolyte situated between two electrodes. These batteries,particularly all-solid-state lithium-metal batteries (ASSLBs),can exhibit high energy densities and greater safety,addressing some of the limitations of conventional lithium-ion battery (LiB) designs.

Can We design a mixed ionic-electronic conductive interlayer with high lithium dendrite suppression?
The successful demonstration of the Li//NMC811 cell using LNI-CNT interlayer and LNI-Mg interlayer indicates that our design principle can be used to design a mixed ionic-electronic conductive interlayer with high lithium dendrite suppression capability.

Here C. Wang and colleagues have developed an interlayer design strategy to address issues associated with lithium dendrite growth and interface resistance, resulting in ...

Abstract All-solid-state lithium metal batteries (ASSLMBs) are poised to surpass conventional graphite-anode lithium-ion batteries due to their enhanced safety and high energy density.

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"Instead of just reporting one single interlayer, this paper aims to develop an interface design principle that can guide the fabrication of a series of interlayers.

In this study, a three-dimensional (3D) aluminum (Al) foam coating with fine alumina (Al2 O 3) particles was introduced as an interlayer between the SSE and Li metal to ...

This study represents a comprehensive interlayer design for ASSLBs with a significantly improved dendrite suppression capability and reversibility. In the 4th chapter, we develop an LNI-Mg ...

Here we develop two types of porous lithiophobic interlayer (Li 7 N 2 I-carbon nanotube and Li 7 N 2 I-Mg) to enable Li to plate at the Li/interlayer interface and reversibly penetrate into the ...

This study represents a comprehensive interlayer design for ASSLBs with a significantly improved dendrite suppression capability and reversibility.

In this work, we developed an interlayer design principle for Li dendrite suppression in ASSLBs by considering both Li nucleation inside the interlayer and Li growth from the Li anode...