Built-in lithium battery interface

Could a macroscopically uniform interface layer achieve Li metal battery?
Thus,it is proved that a macroscopically uniform interface layer with lithium-ion conductive channels could achieve Li metal batterywith promising application potential. Lithium (Li) metal is considered as the ultimate anode material to replace graphite anode in high-energy-density rechargeable batteries 1,2,3.

What is a lithium ion layer?
The first layer is the inner inorganic layer toward the electrode/SEI interface, composed of, for example, Li 2 CO 3, Li 2 O, LiF, or stated, one sublayer of carbonate and another sublayer of fluoride, an oxide-type compound. This layer facilitates the conduction of lithium ions.

Why is CEI important in lithium ion batteries?
Electrolyte composition and additives enhances CEI on cathodes and SEI on anodes. Future LIB advancements will optimize electrode interfaces for improved performance. The passivation layer in lithium-ion batteries (LIBs), commonly known as the Solid Electrolyte Interphase (SEI) layer, is crucial for their functionality and longevity.

What is a lithium ion battery?
Since Sony introduced lithium-ion batteries (LIBs) to the market in 1991 , they have become prevalent in the consumer electronics industry and are rapidly gaining traction in the growing electric vehicle (EV) sector. The EV industry demands batteries with high energy density and exceptional longevity.

What is a passivation layer in a lithium ion battery?
The passivation layer in lithium-ion batteries (LIBs),commonly known as the Solid Electrolyte Interphase(SEI) layer,is crucial for their functionality and longevity. This layer forms on the anode during initial charging to avoid ongoing electrolyte decomposition and stabilize the anode-electrolyte interface.

Are solid-state lithium metal batteries a good energy storage system?
Solid-state lithium metal batteries (SSLMBs) are considered as one of the most promising energy storage systemsbecause of their high-energy density and intrinsic good safety. However,the practical application of SSLMBs is hindered by the huge interfacial resistance and growth of detrimental Li dendrites.

A lithium-ion or Li-ion battery is a type of rechargeable battery that uses the reversible intercalation of Li + ions into electronically conducting solids to store energy. In comparison with other ...

Xu, C. et al. Built-in superionic conductive phases enabling dendrite-free, long lifespan and high specific capacity of composite lithium for stable solid-state lithium batteries. Energy Environ ...

The synergistic regulation of the built-in electric field and interface effect is applied in this work to solve

problems of poor rate performance and short cycle life caused by low reaction kinetics and lattice expansion. Constructing ...

Li-based batteries (LBB), including lithium batteries and Li-ion batteries, are powering most of our modern portable electronic devices and (hybrid) electric vehicles ...

This study provides insights into the role of the Li 3 Bi/Li 2 O protective layer in inhibiting dendrite growth in lithium metal batteries. By mitigating dendrite formation, the protective layer holds ...

Sodium metal batteries have emerged as potential rivals to lithium-ion batteries. Nevertheless, maintaining a stable sodium metal anode under harsh conditions (current density >10 mA cm -2) is extremely ...

Lithium-ion batteries (LIBs), as one of the most important energy storage devices, have dominated the mass market ranging from consumer electronics to electric vehicles thus far. ... Additionally, the PDMS-contained batteries had lower interface resistance and bulk resistance after cycling than the bare batteries, indicating the fast transport ...

Interface modifications, such as coating electrodes with thin layers of lithium phosphate or aluminum oxide, help to form robust SEI and CEI layers, prevent side reactions, ...

Interfaces within batteries, such as the widely studied solid electrolyte interface (SEI), profoundly influence battery performance. Among these interfaces, the solid-solid interface between electrode materials and current collectors is crucial to battery performance but has received less discussion and attention. This review highlights the latest research ...

Then, the corresponding interface characteristics and engineering strategies are thoroughly analyzed from the perspective of the cathode/electrolyte interface, the anode/electrolyte interface, and battery structure design. Finally, future research directions for the interface modification of ...

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