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Elastomeric electrolytes for high-energy solid-state lithium batteries

What is an elastomeric solid-state electrolyte system?

The elastomeric electrolyte system presents a powerful strategy for enabling stable operation of high-energy,solid-state lithium batteries. An elastomeric solid-state electrolyte shows desirable mechanical properties and high electrochemical stability,and is used to demonstrate a high-energy solid-state lithium battery at ambient temperature.

Are solid polymer electrolytes suitable for lithium batteries?

Solid polymer electrolytes (SPEs) are promisingfor solid-state lithium batteries,but their practical application is significantly impeded by their low ionic conductivity and poor compatibility. H...

What is elastomeric electrolyte system?

The elastomeric electrolyte system presents a powerful strategy for enabling stable operation of high-energy,solid-state lithium batteries. Design of plastic-crystal-embedded elastomer electrolyte a,Schematic illustration of the design and structure for PCEE.

Are elastomeric electrolytes scalable?

This work develops a novel protocol for the scalable manufacturingof high-performance elastomeric electrolytes. The elastomeric electrolytes enable the solid-state lithium metal battery to show unprecedented performances.

Which polymer electrolyte enables ultra-long cycle-life in a high-voltage lithium metal battery?

Lu, Q. et al. Dendrite-free, high-rate, long-life lithium metal batteries with a 3D cross-linked network polymer electrolyte. Adv. Mater. 29, 1604460 (2017). Dong, T. et al. A multifunctional polymer electrolyte enables ultra-long cycle-life in a high-voltage lithium metal battery. Energy Environ. Sci. 11, 1197-1203 (2018).

Is solid-state electrolyte safe for rechargeable Li metal batteries?

Inorganic solid-state electrolyte (SSE) has offered a promising optionfor the safe rechargeable Li metal batteries. However,the solid-solid interfacial incompatibility greatly hampers the practical use. The interface becomes even worse during repeated Li plating/stripping,especially under high current density and long cycling operation.

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??: The use of lithium metal anodes in solid-state batteries has emerged as one of the most promising technologies for replacing conventional lithium-ion batteries. Solid-state electrolytes ...

Elastomeric electrolytes for high-energy solid-state lithium batteries

Solid-state lithium (Li)-metal batteries (LMBs) are garnering attention as a next-generation battery technology that can surpass conventional Li-ion batteries in terms of energy density and operational safety under the ...

Commercial uses of lithium metal batteries (LMBs) that are based on organic electrolyte systems have been negatively affected by concerns of safety and the already known challenges of Li metal anodes. Several ...

To facilitate the use of solid polymer electrolytes (SPEs) with high-nickel (Ni) cathodes in high-voltage lithium (Li) metal batteries (LMBs), it is crucial to address the challenges of low oxidative stability and the formation of ...

Elastomeric electrolytes for high-energy solid-state lithium batteries The use of lithium metal anodes in solid-state batteries has emerged as one of the most promising technologies for ...

This work develops a novel protocol for the scalable manufacturing of high-performance elastomeric electrolytes. The elastomeric electrolytes enable the solid-state ...

?????"Elastomeric electrolytes for high-energy solid-state lithium batteries"??,????Nature??? ?1:??????????????Prof.

The elastomeric electrolyte system presents a powerful strategy for enabling stable operation of high-energy, solid-state lithium batteries. DOI: 10.1038/s41586-021-04209-4

4 ???· All-solid-state lithium batteries (ASSLBs) have garnered significant attention as a next-generation energy storage technology, providing superior safety, enhanced stability, and high ...

The structure-property-electrochemical performance relationship of the elastomeric electrolyte system is established to demonstrate the importance of balancing Li-ion transport and ...

Here we report a class of elastomeric solid-state electrolytes with a three-dimensional interconnected plastic crystal phase. The elastomeric electrolytes show a combination of ...

4 ???· Abstract Electrolyte solidification holds great promise in addressing safety concerns. Nevertheless, integrating high electrochemical stability and intrinsic interfacial compatibility ...

All-solid-state lithium-sulfur (Li-S) batteries have emerged as one of the most promising alternative energy storage solutions ascribed to their potentials of high energy ...

Solid-state lithium (Li)-metal batteries (LMBs) are garnering attention as a next-generation battery technology that can surpass conventional Li-ion batteries in terms of energy density and ...

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Elastomeric electrolytes for high-energy solid-state lithium batteries

Although solid-state lithium (Li)-metal batteries promise both high energy density and safety, existing solid ion conductors fail to satisfy the rigorous requirements of ...

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