Solid state battery 2019

Are solid-state batteries sustainable?
Nature Materials 18, 1278-1291 (2019) Cite this article In the critical area of sustainable energy storage, solid-state batteries have attracted considerable attention due to their potential safety, energy-density and cycle-life benefits.

Which solid-state electrolyte materials are used for sodium-ion batteries?
This paper gives a comprehensive review on the recent progress in solid-state electrolyte materials for sodium-ion battery,including inorganic ceramic/glass-ceramic,organic polymer and ceramic-polymer composite electrolytes,and also provides a comparison of the ionic conductivity in various solid-state electrolyte materials.

Are inorganic solid electrolytes relevant to solid-state batteries?
Fast-ion conductors or solid electrolytes lie at the heart of the solid-state battery concept. Our aim in this Review is to discuss the current fundamental understanding of the material properties of inorganic solid electrolytes that are relevantto their integration in solid-state batteries,as shown in Fig. 1.

Are solid-state batteries safe?
The main proposed benefit of solid-state batteries has been their increased safety,which stems from the absence of flammable liquid electrolytes typically employed in Li-ion cells. Detailed thermal and mechanical abuse investigations are still pending,but preliminary thermal analysis results are promising 3.

Can solid-state batteries be used in large-scale systems?
The use of metallic anodes and high-voltage cathodes with solid electrolytes has been demonstrated in solid-state microbatteries 4; however,their applicability to large-scale systems remains to be proven. In view of the advantages of solid-state batteries,intensive efforts have been dedicated to their development.

Can solid-state batteries be made by cold-pressing?
Fabrication of solid-state batteries by cold-pressing of dry components has been most popular at the lab scale but its applicability for scale up and hard oxide solid electrolytes is limited 118.

Herein, we report the first all-solid-state rechargeable chloride ion battery (ASS-RCIB) that uses a polyethylene oxide (PEO)-based material as a solid polymer electrolyte ...

In recent years, the expansion of demand for lithium ion batteries has resulted in soaring prices of the constituent resources. From the viewpoint of safety, studies on all-solid-state batteries are ...

A high performance monolithic all solid-state sodium battery is designed by integrating a 3D Ca-doped Na 3 Zr 2 Si 2 PO 12 electrolyte with sodium metal anode. It is found that the artificial sodiophilic surface and 3D

ion ...

Abstract In literature, the ionic conductivity of solid electrolytes is often discussed as one of the most important properties of an all solid-state battery. However, the behavior of ...

This study reveals a universal strategy to address the well-known dissolution issue of organic compounds in liquid electrolytes and to reduce interfacial barriers in solid-state ...

The development of solid-state electrolytes suggests a bright future direction: all solid-state sodium-ion battery could be fully used to power all electric road vehicles, portable ...

Solid polymer electrolytes: materials designing and all-solid-state battery applications: an overview Achieving high performance for aluminum stabilized Li7La3Zr2O12 solid electrolytes for all solid-state Li-ion batteries: a ...

Herein, we report the first all-solid-state rechargeable chloride ion battery (ASS-RCIB) that uses a polyethylene oxide (PEO)-based material as a solid polymer electrolyte (SPE), an iron oxychloride material as a cathode, and ...

Bruce Dunn???? "The work by [the University of Maryland research team] effectively solves the lithium metal-solid electrolyte interface resistance problem, which has been a major barrier to the development of a ...

In spite of the above merits, the performance and application of solid state Li-S batteries are strongly constrained by their low discharge capacity, poor rate performance and ...

By switching to a solid-state electrolyte, the dissolution of lithium polysulfides is eliminated. Alloy-anodes, such as indium-lithium, are commonly used in solid-state, Li-S ...

Recent progress in understanding inorganic solid electrolytes considering multiscale ion transport, electrochemical and mechanical properties, and processing are ...

Solid composite polymer electrolytes are the optimal candidate for all solid-state lithium batteries, because of their enhanced ionic conductivities, long-life cycle ability and ...

The combination of indium and lithium provides an electrode that is popular in the field of solid-state lithium-ion battery research. The authors study the phase behavior of this electrode and determine the corresponding ...

As high energy density and enhanced safety are required for the lithium-ion battery development, all-solid-state battery has attracted significant attention. Herein, we report ...

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Recent progress made in developing anodes, cathodes, solid electrolytes, advanced detection techniques, and challenges related to the integration of various components in solid-state ...

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