High power all solid state batteries using sulfide superionic conductors

Are lithium superionic conductors suitable for all-solid-state batteries?
Despite extensive research e?orts, the development of all-solid-state batteries still falls short of expectation largely because of the lack of suitable candidate materials for the electrolyte required for practical applications. Here we report lithium superionic conductors with an exceptionally high conductivity (25mScm1for Li

What is a lithium superionic conductor?
Here we report lithium superionic conductors with an exceptionally high conductivity(25 mS cm -1 for Li 9.54 Si 1.74 P 1.44 S 11.7 Cl 0.3),as well as high stability (~ 0 V versus Li metal for Li 9.6 P 3 S 12). A fabricated all-solid-state cell based on this lithium conductor is found to have very small internal resistance,especially at 100 ? C.

What is a sulphide lithium super ion conductor?
Seino, Y. et al. A sulphide lithium super ion conductor is superior to liquid ion conductors for use in rechargeable batteries. Energy Environ. Sci. 7, 627-631 (2014). Kamaya, N. et al. A lithium superionic conductor. Nature Mater. 10, 682-686 (2011). Wang, Y. et al. Design principles for solid-state lithium superionic conductors.

Do all-solid-state batteries have high power density?
The development of all-solid-state batteries requires fast lithium conductors. Here,the authors report a lithium compound,Li9.54Si1.74P1.44S11.7Cl0.3,with an exceptionally high conductivity and demonstrate that all-solid-state batteries based on the compound have high power densities.

What is a fabricated all-solid-state cell based on a lithium ion conductor?
9.54Si1.74P1.44S11.7Cl0.3), as well as high stability (?0V versus Li metal for Li9.6P3S12). A fabricated all-solid-state cell based on this lithium conductor is found to have very small internal resistance, especiallyat100C.Thecellpossesseshighspecificpowerthatissuperiortothatofconventionalcellswithliquidelectrolytes.

Which ionic conductor has the highest electrochemical stability?
In the present study,we discovered that lithium superionic conductors,Li 9.54 Si 1.74 P 1.44 S 11.7 Cl 0.3 and Li 9.6 P 3 S 12,showed the highest ionic conductivity reported for lithium conductivity,and high electrochemical stability versus lithium metal.

High-power all-solid-state batteries using sulfide superionic conductors 2016321 Nature Energy 1: 16030 doi: 10.1038/nenergy.2016.30 ?? × ?????? ...

All-solid-state batteries can greatly improve safety and energy/power density, bringing superionic conductors

to the research frontier of this field. Among all studied solid ...

Sulfide-based all-solid-state lithium metal batteries (ASSLMBs) are promising next-generation batteries due to their high energy density and safety. However, lithium anodes face ...

Recent studies have shown that sulfide-based lithium-ion conductors such as Li 3 ... to the best of our knowledge, direct observation of the crystallization process in sodium ...

A review. Lithium batteries are characterized by high specific energy, high efficiency and long life. These unique properties have made lithium batteries the power sources of choice for the consumer electronics market ...

High-rate and durable sulfide-based all-solid-state lithium battery with in situ Li 2 O buffering. ... High-power all-solid-state batteries using sulfide superionic conductors. Nat. ...

solid electrolytes. All-solid-state batteries built using the solid electrolytes exhibit excellent properties, including high power and high energy densities, and could be usedin long ...

A sulphide lithium super ion conductor is superior to liquid ion conductors for use in rechargeable batteries. ... Y. et al. High-power all-solid-state batteries using sulfide superionic ...

Here we report lithium superionic conductors with an exceptionally high conductivity (25 mS cm -1 for Li 9.54 Si 1.74 P 1.44 S 11.7 Cl 0.3), as well as high stability (~0 V versus Li ...

Sulfide solid-state electrolytes (SEs) are the most promising candidate to be employed in high-energy-density all-solid-state lithium batteries due to high ionic conductivity. ...

Compared with lithium-ion batteries with liquid electrolytes, all-solid-state batteries o er an attractive option owing to their potential in improving the safety and achieving both high power ...

Kato, Y., Hori, S., Saito, T., Suzuki, K., Hirayama, M., Mitsui, A., ... Kanno, R. (2016). High-power all-solid-state batteries using sulfide superionic conductors.

Addressing these challenges, this study presents a novel, scalable, and cost-efficient wet synthesis approach to produce superionic conductive sulfide-based SEs. This ...

Materials with high ionic conductivity are urgently needed for the development of solid-state lithium batteries. Now, an inorganic solid electrolyte is shown to have an ...

High-power all-solid-state batteries using sulfide superionic conductors Y Kato, S Hori, T Saito, K Suzuki, M

High power all solid state batteries using sulfide superionic conductors

Hirayama, A Mitsui, ... Discharge performance of all-solid-state battery using a ...

Compared with lithium-ion batteries with liquid electrolytes, all-solid-state batteries offer an attractive option owing to their potential in improving the safety and achieving both high power ...

High-power all-solid-state batteries using sulfide superionic conductors ... Here we report lithium superionic conductors with an exceptionally high conductivity (25 mS cm -1 for ...

Toward high performance all-solid-state lithium or sodium metal batteries: Potential application on Li/Na-rich antiperovskites (LiRAPs/NaRAPs) electrolyte for energy storage.

In March 2018, the All-Solid-State Battery Unit was established under the Institute of Innovative Research, Tokyo Tech. In April 2021, based on the Unit, the Research Center for All-Solid ...

"High power all-solid-state batteries using sulfide superionic conductors", Nature Energy, 1, Article number: 16030 (2016) ? Exploration of oxide-based lithium conductors Oxide materials are ...

Web: https://www.bardzyndzalek.olsztyn.pl