Solid Electrolyte with I-4 Crystal Structure
Technology #18423

Applications

Solid electrolytes with I-4 crystal structure improve the performance of lithium-ion batteries. Lithium-ion batteries are used in many applications ranging from portable electronics to electric vehicles.

Problem Addressed

Current electrolytes in lithium-ion batteries are flammable organic solvents and can be unstable. In addition to their inherent stability, solid-state electrolytes are nonflammable and may allow the use of metal anodes, increasing battery energy density considerably.

Technology

LiZnPS4 was investigated and found to be a good ionic conductor especially if the lithium content is increased beyond 1 Li per 4 S atoms. The conductivity is comparable to current solid state electrodes (5.7 x 10^-4 S/cm); however, LiZnPS4 does not require expensive elements such as germanium, which is a key component of previous electrolytes. LiZnPS4 and other I4 structured materials improve Li-ion batteries by replacing flammable electrolytes, improving electrochemical stability, and decreasing production cost.

Advantages

- Removes flammability associated with organic electrolyte
- Improves electrochemical stability
- Easily synthesizable

Categories For This Invention:

Energy
Energy Storage
Batteries
Lithium Batteries

Intellectual Property:

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Publications:

Going Solid-state Could Make Batteries Safer and Longer-lasting
MIT News
August 17, 2015