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Safer High-Voltage Solid-State Batteries

A new polymer electrolyte improves conductivity, thermal stability, and safety for next-gen lithium batteries.

Researchers at Purdue University have developed new safer high-voltage solid-state batteries. Current solid polymer electrolyte (SPE) battery technologies have poor thermal stability, ionic conductivity that is limited to low temperatures, and are not adaptable to high energy density solid-state lithium batteries. Purdue researchers have fine-tuned a new SPE composite material for batteries with a wide voltage window of ~4.8V, optimized ionic conductivity ~2.4*10^-4 S/cm, and excellent thermal stability at up to ~330 degrees C. In testing, coin cells made from the new composite SPE exhibited 189 J/g of exothermic heat whereas coin cells made from traditional SPEs produced 812 J/g of exothermic heat. The thermally stable composite SPE created by Purdue researchers can be used in lithium-ion batteries.

Advantages:

-Compatible with Higher-Energy Density Batteries

-Excellent Thermal Stability

-Improved Ionic Conductivity

-Optimized Voltage Window

-Safer

-High-Voltage

Potential Applications:

-Lithium-Ion Batteries

-Materials Science and Engineering

Technology Validation:

The new material shows a wide voltage window of ~4.8V, high ionic conductivity ~2.4*10^-4 S/cm, and excellent thermal stability at up to ~330

Technology ID

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Category

Chemicals & Advanced Materials/Polymer Science & Smart Materials

Energy & Power Systems/Energy Storage

Materials Science & Nanotechnology/Composites & Hybrid Materials

Further information

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