

How solid state batteries work

What is the difference between a solid-state battery and a lithium-ion battery?

The big difference between solid-state batteries and other types of batteries is the use of solid electrolytes, rather than the liquid electrolytes used in other batteries. Lithium-ion batteries have seen technological advances, but experts widely believe that lithium-ion technology has reached the limits of its efficiency.

How does a solid state battery work?

Solid-state batteries can use metallic lithium for the anode and oxides or sulfides for the cathode, increasing energy density. The solid electrolyte acts as an ideal separator that allows only lithium ions to pass through.

What is a solid-state battery?

Solid-state batteries are one of the discoveries to come out of that process, using different electrolytes to achieve the same goal as any other type of battery, but faster, cheaper, and less prone to exploding. The electrolyte best poised to replace lithium-ion batteries is a sodium-based glass electrolyte.

How do solid-state batteries improve lithium-ion batteries?

Solid-state batteries improve lithium-ion batteries by using a solid electrolyte in place of a liquid or polymer electrolyte. It just so happens that this change improves nearly all the battery's characteristics. Solid-state batteries tick all the boxes of our fantasy battery tech.

What is the difference between a solid-state battery and a conventional battery?

In conventional batteries, lithium ions move through a liquid electrolyte, which can leak or evaporate. In contrast, solid-state batteries allow ions to migrate through a stable solid medium. This shift reduces the risk of leakage and increases the battery's lifespan.

Do solid-state batteries store more energy?

Higher Energy Density: Higher energy density means solid-state batteries can store more energy in a smaller volume. Research indicates that solid-state batteries can offer energy densities exceeding 300 Wh/kg, compared to around 150-200 Wh/kg for conventional lithium-ion batteries (Chen et al., 2020).

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