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How do lithium-ion batteries store energy





Overview

Lithium-ion batteries store electricity through a chemical process involving the movement of lithium ions between two electrodes. Why are lithium ion batteries so popular?

Lithium-ion batteries, in particular, have revolutionized portable electronics. With their high energy density, lightweight design, and long life, they power everything from phones to cars to spacecraft. The physics behind them is intricate, involving layers of nanostructured materials and precise control of ionic diffusion paths.

How does a battery work?

This animation walks you through the process. A battery is made up of an anode, cathode, separator, electrolyte, and two current collectors (positive and negative). The anode and cathode store the lithium. The electrolyte carries positively charged lithium ions from the anode to the cathode and vice versa through the separator.

Are lithium ion batteries safe?

Lithium-ion batteries are pivotal in powering modern devices, utilizing lithium ions moving across electrodes to store energy efficiently. They are preferred for their long-lasting charge and minimal maintenance, though they must be managed carefully due to potential safety and environmental challenges.

How do rechargeable batteries work?

Rechargeable batteries—like nickel-metal hydride (NiMH), nickel-cadmium (NiCd), and lithium-ion (Li-ion)—operate on the same principles but use different materials that can be returned to their original state via charging. In a rechargeable battery, the chemical reactions that produce electricity can be reversed by applying an external voltage.



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