

Are rechargeable lithium-ion batteries sustainable?

The evolution of modern society demands sustainable rechargeable lithium-ion batteries (LIBs) with higher capacity and improved safety standards. High voltage Ni-rich layered transition metal oxides (i.e.,  $\text{LiNi}_{1-x-y}\text{Co}_x\text{Mn}_y\text{O}_2$ , NCM) have emerged as one of the most promising cathode materials in meeting this demand.

How stable is a Ni-rich lithium ion (SSE) battery?

Incorporating this SSE in Ni-rich  $\text{LiNi}_{0.83}\text{Co}_{0.11}\text{Mn}_{0.06}\text{O}_2$  cathode-based all-solid-state batteries, we achieve substantial cycling stability (90.35% capacity retention over 1500 cycles at 0.5 C) and high areal capacity (4.8 mAh/cm<sup>2</sup> in pouch cells).

Are solid-state lithium-ion batteries a viable energy storage solution?

To support the transition from fossil fuels to renewable energy, energy storage solutions must effectively store surplus energy and release it during peak consumption. Solid-state lithium-ion batteries (SSLIBs) meet these criteria, offering high energy capacity, rapid response times, and exceptional energy conversion efficiency.

Are carbon nanotubes a stable anode material for lithium-ion batteries?

Chen YM, Yu XY, Li Z, et al. Hierarchical  $\text{MoS}_2$  Tubular Structures Internally Wired by Carbon Nanotubes as a Highly Stable Anode Material for Lithium-ion Batteries [J]. Science Advances, 2016, 2 (7): e1600021  
Choi JW, Aurbach D. Promise and Reality of Post-lithium-ion Batteries with High Energy Densities [J].

The high reversibility, high capacity, and high rate capability of SF@G reflect stable and fast electron and ion transport from and to the silicon, together with favorable lithium storage kinetics.

The evolution of modern society demands sustainable rechargeable lithium-ion batteries (LIBs) with higher capacity and improved safety standards. High...

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Solid-state lithium-ion batteries (SSLIBs) meet these criteria, offering high energy capacity, rapid response times, and exceptional energy conversion efficiency. Their versatility allows them to adapt ...

With high energy density and low cost, lithium sulfur batteries are considered as promising next-generation energy storage technology. However, issues such as the poor conductivity ...

Here, a fluoride shielding layer,  $\text{LiCl}_4\text{Li}_2\text{TiF}_6$ , enables high-voltage, high-capacity all-solid-state batteries because of its combined oxidative stability and  $\text{Li}^+$  conductivity.

Silicon suboxide ( $\text{SiO}_x$ ) is a promising anode material for high-energy-density lithium-ion batteries, but its large volume change and low intrinsic conductivity hinder practical application. ...

We synthesized size-controllable nanoparticles with homogeneous distribution of carbon and Sn/SnO<sub>2</sub> by a solvothermal method. The effects of different carbon content and hydrothermal ...

Phosphorus has emerged as a promising anode material due to its high specific capacity of 2594 mA h g<sup>-1</sup> and medium redox potential of about 0.7 V (vs. Li<sup>+</sup>/Li). However, large volume ...

In this study, we report a high-performing vacancy-rich Li<sub>9</sub>N<sub>2</sub>Cl<sub>3</sub> SSE demonstrating excellent lithium compatibility and atmospheric stability and enabling high-areal capacity, long-lasting all-solid-state ...

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