Lithium-ion battery electrolyte solvent

Different electrolytes are used in lithium-ion batteries for enhancing their efficiency. These electrolytes have been divided into liquid, solid, and polymer electrolytes and explained on the basis of different solvent-electrolytes.

Commercial lithium battery electrolytes are composed of solvents, lithium salts, and additives, and their performance is not satisfactory when used in high cutoff voltage lithium batteries. Electrolyte modification strategy can achieve satisfactory high-voltage performance by reasonably adjusting the types and proportions of these three components.

Rechargeable lithium batteries using 5 V positive electrode materials can deliver considerably higher energy density as compared to state-of-the-art lithium-ion batteries.

Electrolyte solutions based on fluorinated solvents were studied in high-voltage Li-ion cells using lithium as the anode and Li 1.2 Mn 0.56 Co 0.08 Ni 0.16 O 2 as the cathode. Excellent performance was achieved by replacing the conventional alkyl carbonate solvents in the electrolyte solutions by fluorinated cosolvents.

Herein, the authors design multifunctional solvent molecules and propose a practical design principle to stabilize the electrolyte/electrode interfaces for high-voltage Li ion batteries.

Electrolyte engineering is critical for developing Li metal batteries. While recent works improved Li metal cyclability, a methodology for rational electrolyte design remains lacking....

We demonstrated the usefulness of this solvating power series in designing more reliable electrolyte system by selecting an appropriate fluorinated electrolyte solvent for a high-voltage lithium metal battery (LMB) as an example.

Typical charging and discharging processes of Li-ion batteries include the Li + transport through the electrode material, electrolyte, and electrode-electrolyte interphase (SEI/CEI), as well as the solvation and desolvation processes that occur as Li + move in and)

The building of safe and high energy-density lithium batteries is strongly dependent on the electrochemical performance of working electrolytes, in which ion-solvent interactions play a vital role.

At present, there are some excellent reviews on the electrolytes of Li batteries, such as high-voltage electrolytes, 54 additive modifications, 55 and solvent optimization. 56 Different from them, this review will focus on the structural regulation chemistry of Li ...

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