

Positive Film-forming Effect of Fluoroethylene Carbonate (FEC) On Improving for High-Voltage Cycling of LiCoO₂/Graphite Pouch Cell

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Fluoroethylene carbonate (FEC) is studied as electrolyte additive to improve the high-voltage performance of LiCoO₂/graphite pouch cells. It is found that the cells exhibit improved cycling performance in FEC containing electrolyte in the voltage range of 3.0-4.4 V. Electrochemical impedance spectroscopy (EIS) results reveal the gradual film formation process in FEC electrolyte is not a negative lithium consumption process, which is different from that of the base electrolyte. The characterizations from scanning electron microscopy (SEM), transmission electron microscopy (TEM), X-ray photoelectron spectroscopy (XPS) and X-ray diffraction (XRD) demonstrate that FEC facilitates the formation of stable solid electrolyte interfaces (SEI) simultaneously on anode and cathode of the LiCoO₂/graphite pouch cells, which can effectively protect electrodes and prevent electrolyte decomposition on both electrodes.