Short Communication

LiPO₂F₂ as a LiPF₆ Stabilizer Additive to Improve the high-temperature Performance of the NCM811/SiO_x@C Battery

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Fluoroethylene Carbonate (FEC) is an indispensable additive to improve the cycle stability of silicon cathode, but the incompatibility between FEC and LiPF₆ seriously damages the high temperature performance of NCM811/SiO_x@C. In this paper, the LiPO₂F₂, tris(trimethylsilyl) borate (TMSB) and tris(trimethylsilyl) phosphate (TMSP) were added as stabilizer to increase the compatibility between LiPF₆ and FEC at elevated temperatures. The visual experiments show that the traditional LiPF₆ stabilizer additive, such as (TMSB) and (TMSP) additive, would accelerate the decomposition of LiPF₆ when FEC is present in the electrolyte solution. However, the introduction of LiPO₂F₂ additive can effectively inhibits the decomposition of LiPF₆, then obviously inhibits the side reactions and decrease the self-discharge of the NCM811/SiO_x@C pouch cells under high temperature storage conditions. The high-temperature (45°C) cycling performance of pouch cells with LiPO₂F₂ additive is 90.3% for 200 cycles and the swelling ratio is only 1.96% after storage at 55 °C for 7days, which are all far superior to the contrast sample.

Keywords: LiPF₆ stabilizer, LiPO₂F₂, fluoroethylene carbonate, electrolyte additive, lithium battery

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