Stabilizing the SEI layer for Lithium Plating-Free Graphite‖NCM811 Full-cell under Subzero-temperature

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Improving the interfacial stability between electrode-electrolyte is a key science to high safety, energy density of LIBs, in particular, under subzero-temperatures. To attain safe LIBs in the absence of Li-plating and dendrite growth at graphite anode and improve cycling performance under subzero-temperature, we developed a nonflammable electrolyte. Herein, we present for the first time a Li plating-free and unprecedented high-performance graphite‖NCM811 Li-ion full-cell with our electrolyte under subzero-temperature and high voltage of 4.45V with the stabilized SEI layers. On the contrary, conventional electrolyte-based full-cell showed a drastic performance failure in early cycles and distinguishing marks of Li plating at graphite and irreversible phase transformation of NCM811 under the same condition. The strong correlation among electrode-electrolyte interfacial stabilization and bulk structural stabilization of both anode and cathode and highly reversible performance would be discussed in the meeting.

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