Tris (trimethylsilyl) Phosphate as Electrolyte Additive for Lithium - Ion Batteries with Graphite Anode at Elevated Temperature

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In this work, the tris(trimethylsilyl) phosphite (TMSP) was used as an electrolyte additive to improve the cycling performance of graphite anode at elevated temperature (60°C). The electrochemical properties were characterized by CV, galvanostatic cycling and EIS. The CV and galvanostatic cycling results showed as the concentration of TMSP added in the electrolyte was 5 vol. %, the graphite had good cycle stability to reach 332.27 mAh/g at 60°C, with a capacity retention of 96.1% after 70 cycles. SEM and EIS revealed that the TMSP additives effectively suppress the electrolyte decomposition and stabilized the SEI of the graphite at elevated temperature. In addition, the TMSP can drastically decrease the resistances of SEI and charge transfer at elevated temperature.

Keywords: lithium ion battery, electrolyte additive, tris(trimethylsilyl) phosphite, cycling performance, Electrochemical impedance spectroscopy

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