

# 锂离子电池用低温电解质溶液研究

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**摘要:** 电解液的溶剂组成是影响锂离子电池低温电性能的关键因素。为发展高电导率的低温电解液, 研究了由环状的乙烯碳酸酯 EC 和几种脂肪烷基碳酸酯混合组成的二元及多元溶剂电解液体系的低温导电行为。结果显示: 由乙烯碳酸酯、二甲基碳酸酯、二乙基碳酸酯和甲基乙基碳酸酯四元溶剂组成的电解质溶液在低于 $-30^{\circ}\text{C}$ 的低温下的离子电导率最高。组装成的锂离子电池在 $-40^{\circ}\text{C}$ 下, 以 $0.1\text{C}$ 率放电仍能放出常温容量的 $59\%$ 以上。

**关键词:** 锂离子电池; 低温性能; 电解质溶液

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## Research on low temperature electrolyte for Li-ion batteries

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**Abstract:** The solvent composition of electrolyte was a key factor in determining the low temperature performance of Li-ion batteries. To develop the high conductive electrolyte at low temperature, the binary and multicomponent solvent systems were studied based on the mixed solvent of cyclic ethyl carbonate (EC) and several aliphatic alkyl carbonates and the conduction behaviors of these electrolytes were also investigated. The results showed that the quaternary solvents consisting of ethylene carbonate(EC), dimethyl carbonate(DMC), ethyl methyl carbonate(EMC) and diethyl carbonate(DEC) had the highest ion conductivity below  $-30^{\circ}\text{C}$ , and the batteries using these quaternary electrolytes could deliver over  $59\%$  of the discharge capacity at room temperature at  $0.1\text{C}$  rate and  $-40^{\circ}\text{C}$ .

**Key words:** Li-ion battery; low temperature performance; electrolyte solution