

C/LiCoO₂ 系锂离子电池低温充放电性能

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摘要: 研究了低温(-20℃)对锂离子电池充放电性能的影响, 并与其常温(25℃)性能作了比较。结果表明: 在低温条件下电池的放电性能显著变差, 0.2 C 放电时, 放电容量仅为常温放电容量的 77%, 放电平台比常温时降低了 0.5 V; 1 C 放电时, 放电容量仅为 0.2 C 放电容量的 4%。低温充电性能也明显恶化, 恒压充电时间增长。锂离子电池低温电化学性能变差, 主要是低温条件下锂离子在正负极颗粒中固相扩散阻抗增大引起的。

关键词: 锂离子电池; 低温性能(-20℃); 放电电压平台

中图分类号: TM912.9 文献标识码: A 文章编号: 1001-1579(2004)02-0090-03

Charge-discharge performance of Li-ion batteries based on C/LiCoO₂ at low-temperature

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Abstract: The charge and discharge characteristics of Li-ion batteries based on C/LiCoO₂ at low temperature (-20℃) were investigated. The effect of low temperature upon the performance of Li-ion battery was discussed. Results showed that Li-ion batteries had poor charge and discharge performance at low temperature. When discharge was carried out at -20℃, the discharge capacity fell significantly and the voltage plateau lowered. As discharged at a current of 0.2 C rate at -20℃, the battery only retained 77% of the capacity at room temperature(25℃), and the discharge voltage plateau reduced 0.5 V. The high rate discharge capability of the battery also got poor significantly when discharged at low temperature, the rate discharge capacity of 1 C rate only retained 4% of 0.2 C rate value. High rate charge got more difficult and constant voltage charge time extended. The poor low temperature performance of the batteries were due to slow kinetics of Li-ion diffusion in cathode and anode materials.

Key words: Li-ion battery; low-temperature performance(-20℃); discharge voltage plateau