

自由基聚合物锂二次电池正极材料

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摘要: PTMA [聚(2,2,6,6-四甲基哌啶-4-甲基丙烯酸酯-1-氮氧自由基)]的循环伏安曲线(扫描速度: 10 mV/s)表明 PTMA 具有良好的氧化还原反应可逆性和循环稳定性。PTMA 的最大放电比容量为 78.4 mAh/g [以 0.3 mA(0.2 C)充放电], 是它理论比容量(111 mAh/g)的 70.6%, 充放电曲线分别在 3.65 V(vs. Li/Li⁺)和 3.56 V(vs. Li/Li⁺)处有一个很平稳的平台, 经过 100 次循环后电池的放电比容量相对于最大放电比容量只衰减了 2%, 以 10 C 的充电速度 6 min 能充满电池容量的 85.5%, 表明锂/PTMA 扣式电池具有优良的循环性能和快速充放电性能。

关键词: 自由基; 锂二次电池; 正极

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Polyradical cathode materials for lithium secondary batteries

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Abstract: Cyclic voltammetry (scan rate: 10 mV/s) of PTMA [poly (2,2,6,6-tetramethylpiperidinyloxy methacrylate)] showed that PTMA possessed an excellent reversibility and cyclic stability. The maximum discharge specific capacity of PTMA was 78.4 mAh/g, which was 70.6 % of the theoretical special capacity (111 mAh/g), at a constant discharge current of 0.3 mA (0.2 C). In the charging /discharging curves, there were obvious voltage plateaus at 3.65 V and 3.56 V, respectively. After 100 cycles, about 2% of the maximum specific capacity of PTMA was lost. Furthermore, 85.5% of the maximum specific capacity of PTMA could be charged just in 6 min at a constant charge rate of 10 C. It indicated excellent stability and fast charging-discharging properties of PTMA/Li button cell.

Key words: polymer radical; lithium secondary battery; cathode