

Synthesis of LiFePO₄/C with Fe₃O₄ as Iron Source by High Temperature Ball Milling

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doi: 10.20964/2018.03.17

Received: 3 November 2017 / Accepted: 3 January 2018 / Published: 5 February 2018

LiFePO₄/C cathode material was prepared with Fe₃O₄ as iron source by a high temperature ball milling (HTBM) method and the effects of milling temperature were experimentally investigated in this work. The results indicated that high milling temperature improved the crystallinity of LiFePO₄, but that an unfavorable crystal agglomeration and the phase transformation from LiFePO₄ into LiFeP₂O₇ could occur when the temperature becomes too high. LiFePO₄/C synthesized by HTBM at 650°C exhibited the optimal electrochemical performance: the initial discharge capacities were 152.7, 146.6, 140.3, 130.0, 119.1 and 108.3 mAhg⁻¹ at rates of 0.5, 1.0, 2.0, 5.0 and 10C, respectively; after 50 cycles, the capacities of LiFePO₄/C sample were 147.0, 135.0, 126.4, 115.4, 105.6 and 95.3 at rates of 0.1, 0.5, 1.0, 2.0, 5.0 and 10C, and their capacity retention were 96.3%, 92.1%, 90.0%, 88.8%, 88.7% and 88.1%, respectively. No obvious capacity decay was observed demonstrating the excellent electrochemical performance of the product prepared by this work.

Keywords: LiFePO₄/C; Fe₃O₄; High temperature ball milling method; Electrochemical performance

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