Effect of the Carbon Source on Facile Synthesized Si/Graphite Composites and their Electrochemical Performance

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Silicon as the most promising candidate of anode for Li-ion batteries has high capacity (4200 mAh g⁻¹), but the poor performance limits its practical application. In this paper, we explore the effects of different carbon sources on silicon/graphite composites. It is found that the sucrose as the carbon source can bind with the silicon particles and graphite well and form a continuous three-dimensional conductive network, resulting in improving the electrochemical properties of the materials. This silicon/graphite composites using sucrose as carbon source exhibit an excellent cyclic performance. The capacity retention is 88.5 % with a high capacity of 606 mAh g⁻¹ after 50 cycles. Moreover, the effect of sucrose concentration on the electrochemical performance is investigated. When the additive amount of sucrose is 1.0 g, the materials can achieve the best electrochemical performance, which demonstrates that a suitable carbon layer is beneficial to the silicon/graphite composites.

Keywords: lithium-ion battery, Si/G composites, anode, carbon sources.

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