Improved Lithium Storage Properties of the Reduced Graphene Oxide/Graphite Composites Based on Functional Groups Control Synthesis

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For lithium-ion batteries (LIBs), poor initial coulombic efficiency and poor cyclic performance of graphene oxide (GO) are facing great challenge in commercial application. This paper describes a class of active composites consisting of reduced graphene oxide (rGO) and graphite used as promising LIBs anodes. In addition to adjust the functional groups to decrease the irreversible capacity effectively, the construction of a conductive network between rGO and graphite synthesized during an ultrasonic process shortened the lithium ion migration path. The residual stable functional groups after thermal treatment also enhance the cyclic performance of the electrodes. Electrochemical test results revealed a high reversible Li-storage capacity of 446 mAh g⁻¹ at 0.1 C (1 C=372 mAh g⁻¹), improved initial coulombic efficiency of 84.2% and superior cyclic performance with capacity retention of 93.8% after more than 400 cycles, showing great potential of this rGO/graphite anode material.

Keywords: lithium storage, graphene oxide, functional groups, initial columbic efficiency

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