Nanorod-structured Fe₃O₄/Graphene Nanocomposite as High Performance Anode for Lithium-Ion Batteries

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High capacity Fe₃O₄ nanorod/graphene composites with good rate capability were prepared by a two-step synthesis process: FeOOH/graphene composites were first synthesized by uniformly dispersed, hydrothermal prepared FeOOH nanorods on functionalized graphene sheets, and then they were annealed in an argon atmosphere at 450°C for 2 h to make Fe₃O₄/graphene composites. The graphene functions as a reducing reagent during the annealing process. Thus synthesized Fe₃O₄ nanorods with small diameters ranging from 50 nm to 100 nm have an intimate electrical contact with graphene sheet and exhibit excellent electrochemical properties. The Fe₃O₄ nanorod/graphene nanocomposite shows a superior high reversible specific capacity (1155 mAh g⁻¹) and good rate capability, demonstrating it is a promising alternative electrode material for high-performance lithium-ion batteries.

Keywords: graphene; Fe₃O₄ nanorod; anode; lithium-ion batteries; high rate

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