Fe_2O_3@Ag nanocomposites by hydrothermal process for anode materials of lithium ion batteries

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Fe_2O_3 is extensively used in industrial production for products used daily life. Due to its high theoretical capacity of 900 mAhg-1 has received a promising electrode material for lithium ion batteries (LIB) with multiple electron transfer per metal cluster. However, lithiation and delithiation of Fe_2O_3 can effectively reduce the obviously volume change that result in capacity fade and poor performance. In this study, Fe_2O_3 nanoparticles have been synthesized by using a one-step hydrothermal method. Electrochemical impedance spectroscopy (EIS) was used to investigate the as-prepared and cycled cells from 1cycle to 100 cycles in the charged state. The rate performance of hematite Fe_2O_3 nanoparticles was measured using a rate capability test. EIS showed that Fe_2O_3 and Fe_2O_3@Ag@carbon nanoparticles compare to its submicron size had higher lithium diffusion coefficients during the charging.