MnFe₂O₄ Colloidal Nanocrystal Assemblies as Anode Materials for Lithium-Ion Batteries

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Submicrometer colloidal nanocrystal assemblies (CNAs) of MnFe₂O₄ have been synthesized solvothermally and have been used as the electrode materials for Lithium ion batteries. Large MnFe₂O₄ CNAs, which were prepared with the assistance of CH₃COONH₄, possessed the size of about 950 nm showed a larger pore size but a smaller specific surface area, compared with that of 160 nm MnFe₂O₄ CNAs with the help of CH₃COONa•3H₂O. The capacitance of MnFe-NH can reach 1200 mAh g⁻¹ at the first circle at the current density of 0.1 A g⁻¹. However, the capacitances were decreased drastically under the further measurements. MnFe-Na showed about 50 mAh g⁻¹ lower capacity and worse cycle stability than MnFe-NH. Cyclic voltammetry and electrochemical impedance spectroscopy profile indicated the higher electronic conductivity of MnFe-NH, thanks to the larger size of primary crystalline particle and interspace between them.

Keywords: lithium ion battery; anode materials; manganese ferrite; electrochemical properties

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