3D-NiO microspheres with ultra-thin porous nanoflakes as high performance anode material for lithium-ion batteries

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Among various metal oxides, nickel oxide (NiO) has been intensively investigated as a promising anode material for LIBs owing to its high theoretical capacity (718 mAh g^{-1}). However, NiO suffers from poor capacity retention and low rate capability, because of a large volume change and serious aggregation during charge/discharge cycling. Herein, NiO microspheres synthesized by simple urea-assisted chemical co-precipitation strategy with porous structure. The synthesized sample exhibited the cubic spinel structure and microspheres like morphology, composed of many ultra-thin interconnected nanoflakes, which is porous in nature and formed with several interconnected nanoparticles. A high reversible capacity up to 795 mA h g^{-1} after 150 cycles at a rate of 0.5 C, and a capacity higher than 460.2 mA h g^{-1} at a rate as high as 10 C were obtained for optimized NiO sample. This research was supported by NRF funded by the Ministry of Education (No. 2009-0093816).