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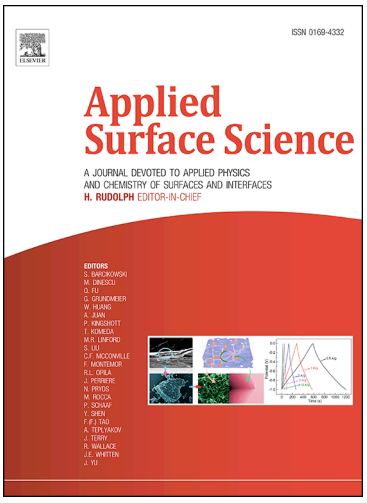

Full Length Article

Facile Preparation of N-doped MnO/rGO Composite as an Anode Material for High-performance Lithium-ion Batteries

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Facile Preparation of N-doped MnO/rGO Composite as an Anode Material for High-performance Lithium-ion Batteries

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Abstract: An N-doped MnO/rGO composite (N-MnO/rGO) was successfully fabricated by a one-step hydrothermal method in which histidine and potassium permanganate ($KMnO_4$) reacted in water containing graphene oxide, and the product was then calcinated in a nitrogen (N_2) atmosphere. The N-MnO/rGO presents an excellent lithium-storage capability. It shows a high reversible specific capacity of 1020 mA h g^{-1} at a current density of 200 mA g^{-1} after 150 cycles and 760 mA h g^{-1} at a current density of 500 mA g^{-1} after 200 cycles. Meanwhile, the N-MnO/rGO sample presents a stable rate capability from 100 to 2000 mA g^{-1}. Even at 2000 mA g^{-1}, the electrode delivers 335 mA h g^{-1}, which is higher than the capability for the pure MnO particles and rGO sheets. The outstanding electrochemical performances of the N-MnO/rGO electrodes may be attributed to the combined effect of the rGO with N-doping that can effectively buffer the large volume expansion of the MnO particles and can enhance the transport rates of lithium ions and electrons during lithium cycling.

Key words : MnO/rGO composite, N-doped, anode, high-performance, lithium-ion batteries