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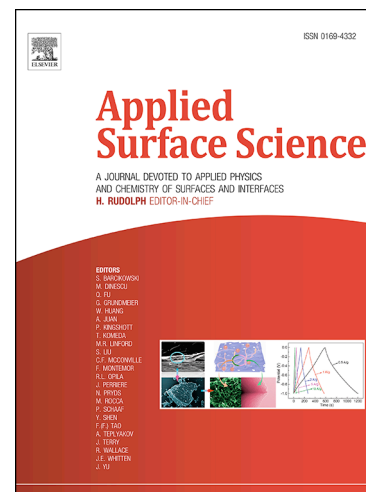
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Facile Preparation of N-doped MnO/rGO Composite as an Anode Material for High-performance Lithium-ion Batteries

Xian-Yinan Pei^{a,b}, Dong-Chuan Mo^{a,b},

Shu-Shen Lyu^{a,b}, Jian-Hui Zhang^{b,c}, Yuan-Xiang Fu^{a,b} *

^a School of Chemical Engineering and Technology, Sun Yat-sen University, Guangzhou 510275, P. R. China.

^b Guangdong Engineering Technology Research Centre for Advanced Thermal Control Material and System Integration (ATCMSI), Guangzhou 510275, P. R. China.

^c School of Chemistry, Sun Yat-sen University, Guangzhou 510275, P. R. China.

* E-mail: fuyx8@mail.sysu.edu.cn; Tel: +86-20-84111073

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 (KMnO₄) reacted in water containing graphene oxide, and the product was then calcinated in a nitrogen (N₂) 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

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