

A scalable in-situ surfactant-free synthesis of uniform MnO/graphene composite for highly reversible lithium storage

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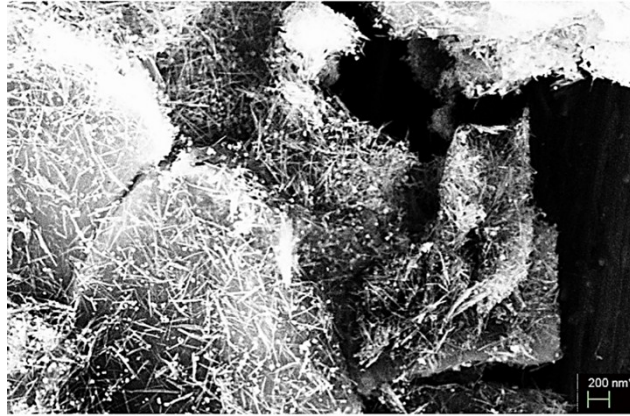


Figure S1. SEM image of the Mn₃O₄/graphene oxide

The uniform Mn₃O₄ nanowire were uniformly adhered on the surface of grapheme oxide and no big agglomeration. After calcining, it transformed to spherical MnO.

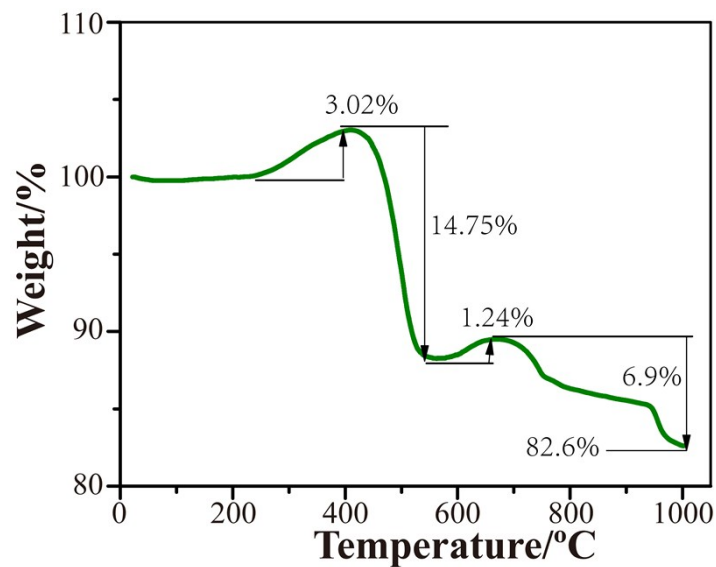


Figure S2. TG curve of the MnO/grapheme composite.

The weight change between 200 to 1000 °C is owing to both the oxidation of MnO and the combustion of reduced grapheme. Among this temperature range, in addition to $C + O_2 = CO_2$, a reaction also occurs from the reference we learn it as : $MnO + O_2 = Mn_2O_3$. [B. Liu, X. Hu, H. Xu, W. Luo, Y. Sun, Y. Huang, Sci. rep., 2014, 4: 4229.] Based on the theoretical value (11.3 wt. %) of the weight increase from MnO to Mn₂O₃, the content of the MnO in the product is evaluated to be about 74.2 wt. %.

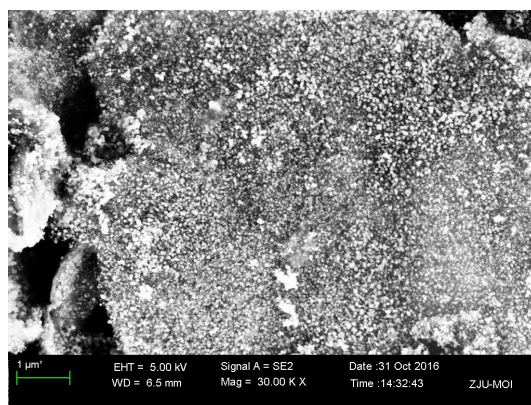


Figure S3. The SEM image of the MnO/graphene composite.

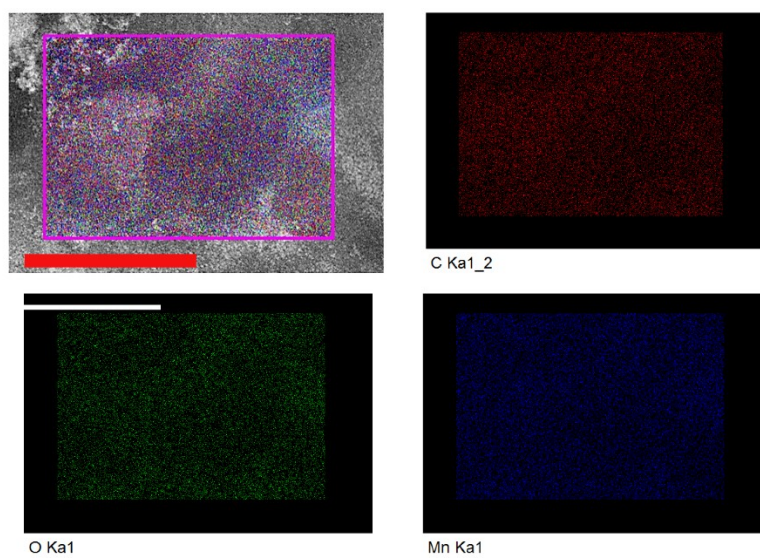


Figure S4. The SEM image and the corresponding element mapping. Scar bar 5 μm.

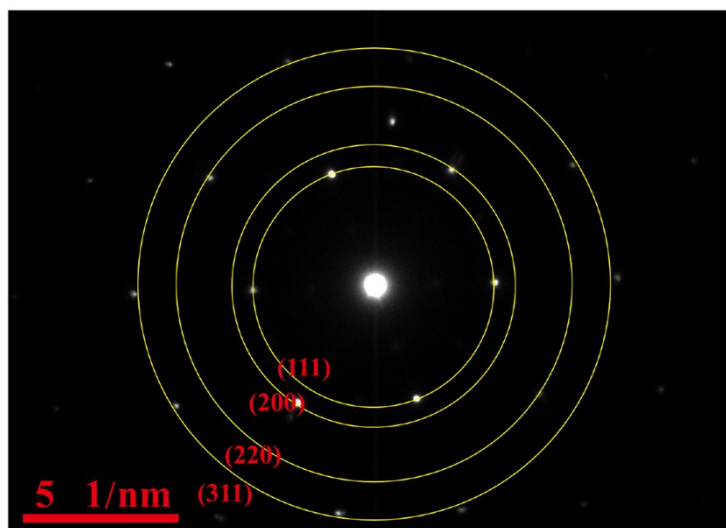


Figure S5. The SAED pattern of MnO in the MnO/graphene hybrid material.

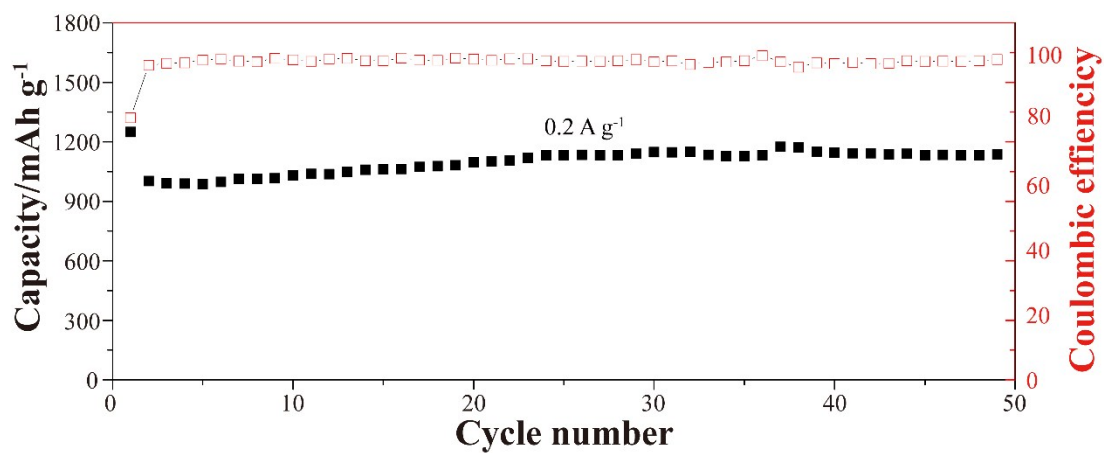


Figure S6. Cycling performance of MnO/graphene electrode at a current density of 0.2 A g⁻¹ during the first 50 cycles.

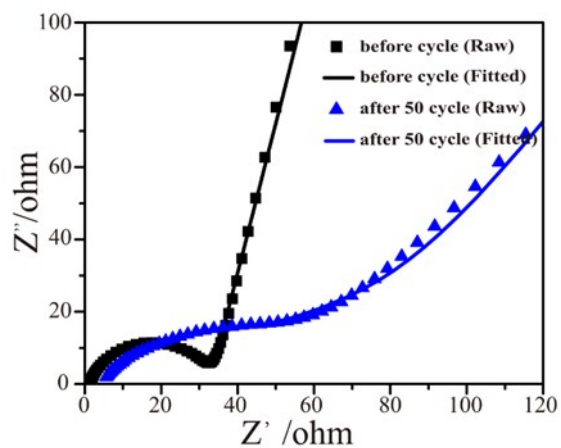


Figure S7. Nyquist plots of MnO/graphene electrode before cycling and charge state after 50 cycles at 0.2 A g^{-1} , and the corresponding simulation results.

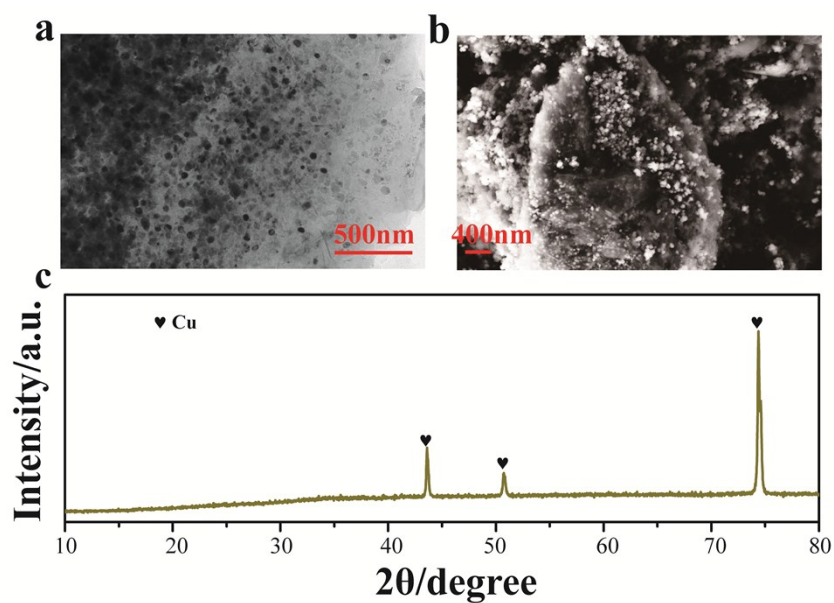


Figure S8. (a) TEM image, (b) SEM image and (c) XRD pattern of the MnO/grapheme composite charged to 3V after 50 cycles at a current density of 2 A g^{-1} .