

Enhanced Activity of Hierarchical Nanostructural Birnessite-MnO₂-Based Materials Deposited onto Nickel Foam for Efficient Supercapacitor Electrodes

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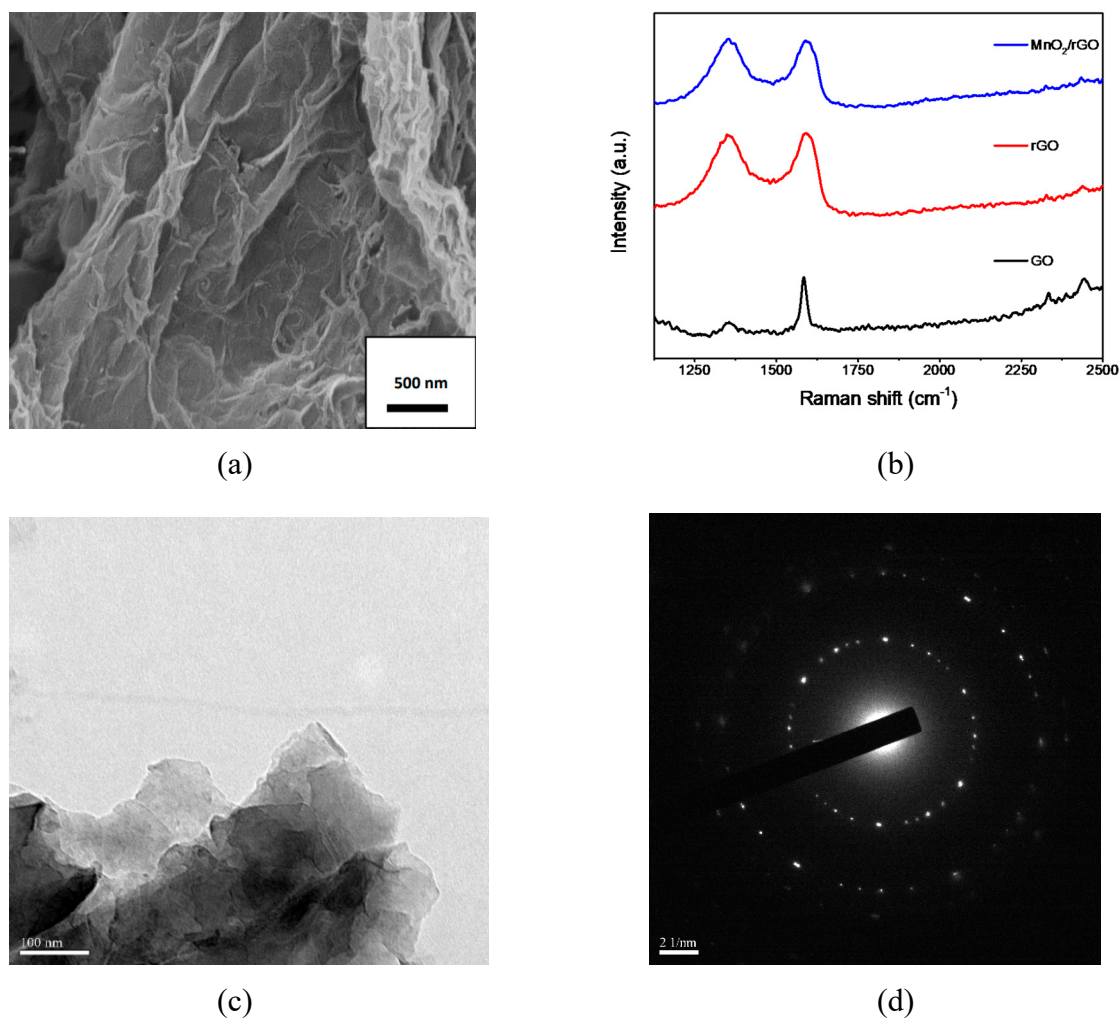


Figure S1. The properties of the as-obtained materials. (a) HRSEM image of the as-prepared rGO; (b) Raman shift of GO ($R = 0.86$, G band at 1597.8 cm^{-1}), rGO ($R = 0.87$, G band at 1585.5 cm^{-1}), and MnO₂/rGO ($R = 1.02$, G band at 1587.3 cm^{-1}); (c) TEM image of as-prepared rGO; and (d) electron diffraction patterns of rGO.

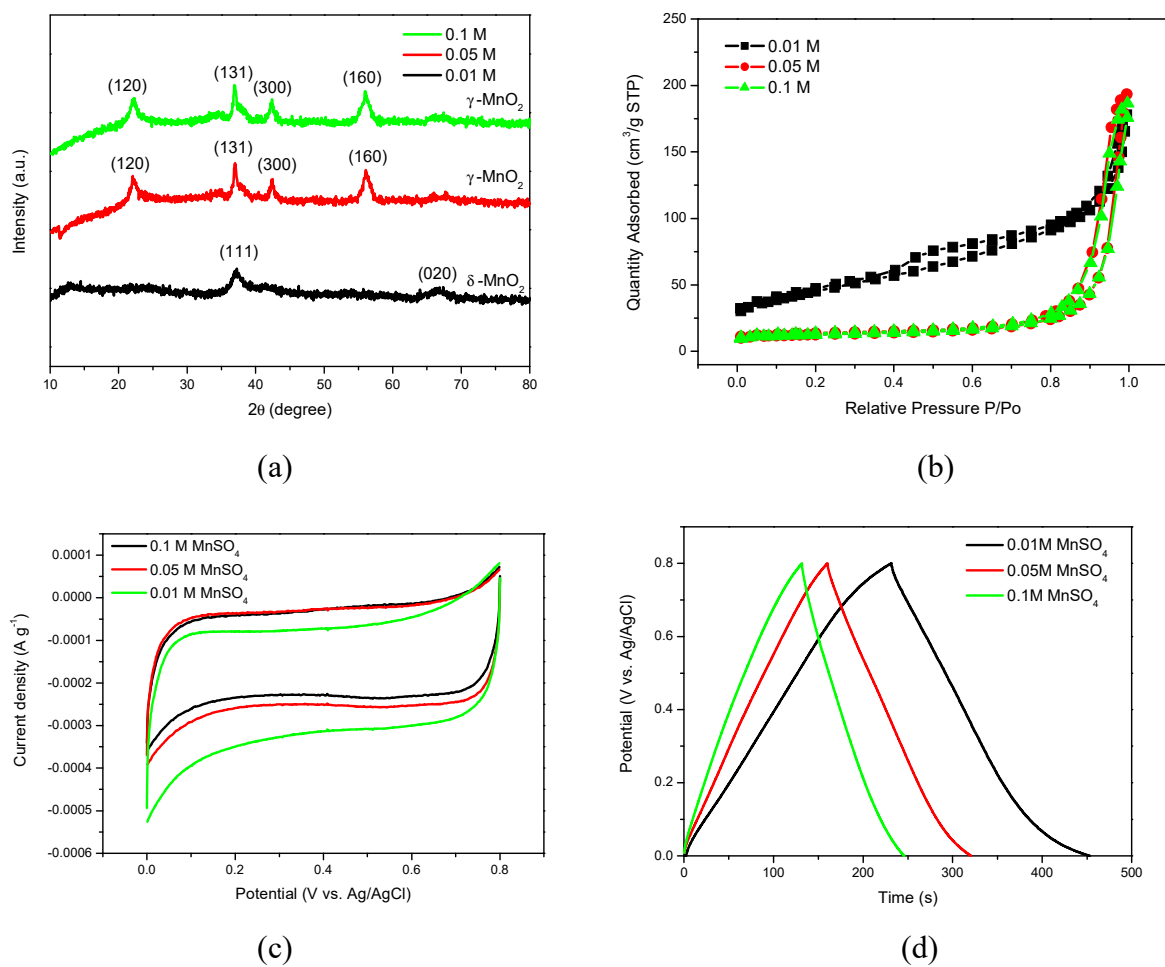
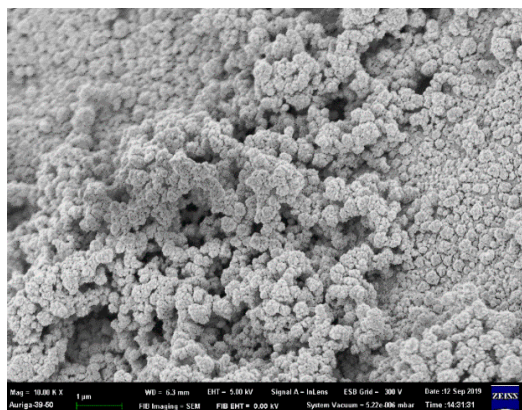
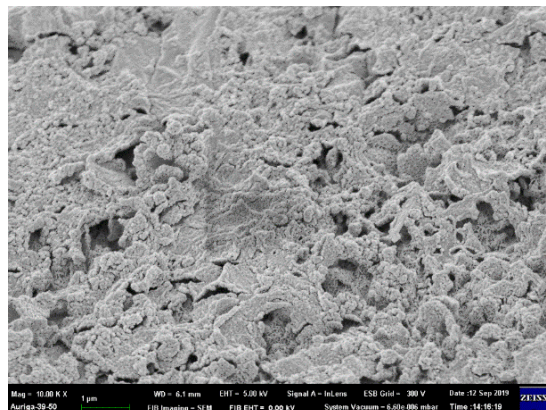


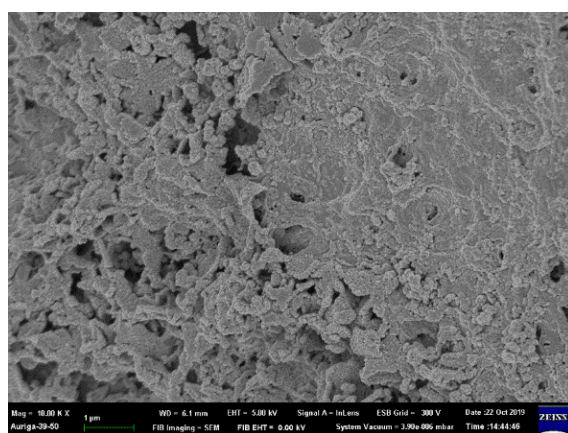
Figure S2. The material properties and electrochemical characterization of the as-obtained MnO₂ from different concentrations of MnSO₄. (a) XRD analysis, (b) BET N₂ absorption-desorption analysis, (c) C-V curve characterization of MnO₂, and (d) GCD test.



(a)



(b)



(c)

Figure S3. The FESEM images for the as-obtained MnO_2/NF material (a), $\text{MnO}_2/\text{rGO}/\text{NF}$ material (b) and $\text{MnO}_2/\text{rGO-MWCNT}/\text{NF}$ electrode (c), respectively.