Supporting Information for

Graphene-Wrapped Mesoporous MnCO₃ Single Crystals Synthesized from Dynamic Floating Electrodeposition Method for High Performance Lithium-ion Storage

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1. Control experiment I

**Figure S1.** (a) The setup of the comparative experiment, in which the electrolyte was separated by a membrane at the center. All other parameters were controlled exactly the same as those in DFE method in Figure 1a. (b) XPS and (c) TEM analyses of the products collected from anode and cathode.
2. Control experiment II

**Figure S2.** TEM and EDX analyses of the products collected from the plating solution of 0.3 M MnSO$_4$ and 0.3 M sodium EDTA. All other parameters were controlled exactly the same as those in DFE method in Figure 1a.
3. More SEM and EDX results of graphene-wrapped MnCO$_3$ MSCs

![Figure S3](image1)

**Figure S3.** (a) EDX analysis and (b) SEM image of graphene-wrapped MnCO$_3$ MSCs. (c) Secondary and (d) back-scattered SEM images taken from the same location of the novel composite.

![Figure S4](image2)

**Figure S4.** Cross-sectional SEM images of MnCO$_3$ MSCs.
4. More XPS data

Figure S5. XPS analyses of GO (a) C1s and (b) C1s, (c) Mn 3s, and (d) O 1s of graphene-wrapped MnCO$_3$ MSCs.
5. Nanocrystalline MnCO$_3$ with RGO (nc-MnCO$_3$-RGO)

**Figure S6.** (a) TEM image, XPS spectra of (b) C 1s and (d) Mn 3s of nc-MnCO$_3$-RGO composite, (c) electron diffraction from the selected area in the white circle in (a).
6. Nanoflake MnO$_2$ with RGO (nano-MnO$_2$-RGO)

Figure S7. (a) TEM image, (b) TGA, (c) electron diffraction from the selected area in the white circle in (a). (d) XPS spectrum of Mn 3s of nano-MnO$_2$-RGO composite.
7. More electrochemical data

Figure S8. The 1\textsuperscript{st}, 2\textsuperscript{nd} and 10\textsuperscript{th} activation charging-discharging curves of (a) nc-MnCO\textsubscript{3}-RGO and (b) nano-MnO\textsubscript{2}-RGO, compared with the 10\textsuperscript{th} activation cycle of graphene-wrapped MnCO\textsubscript{3} MSCs.
8. Characterization of graphene-wrapped MnCO$_3$ MSCs and nc-MnCO$_3$-RGO after hundreds of cycles

![SEM and TEM images of graphene-wrapped (GW) MnCO$_3$ MSCs and nc-MnCO$_3$-RGO before and after cycles.](image)

**Figure S9.** SEM and TEM images of graphene-wrapped (GW) MnCO$_3$ MSCs and nc-MnCO$_3$-RGO before and after cycles.