# Supporting Information

## Free-standing Reduced Graphene Oxide/ $MnO_2$-Reduced Graphene Oxide-Carbon nanotube nanocomposite flexible membrane as Anode for High Capacity Lithium Ion Batteries

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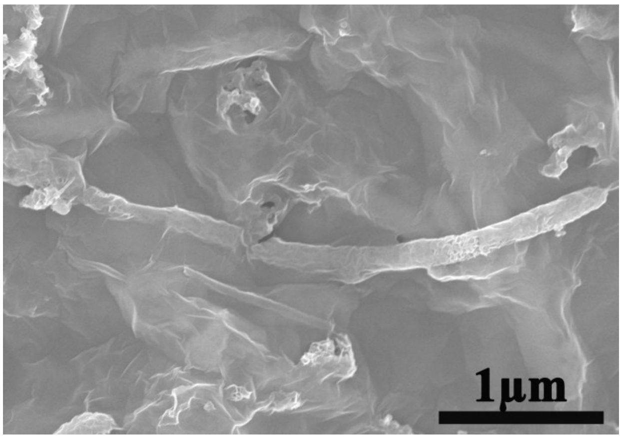


**Figure S1** top-view SEM images of G-MGC composite membrane.

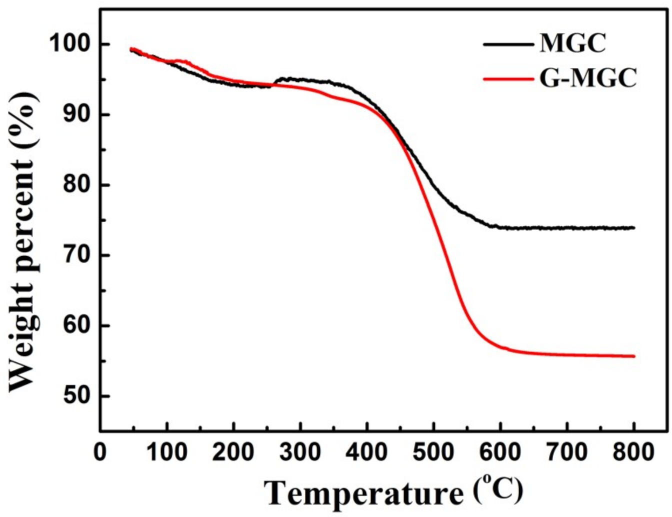

**Figure S2** TG curves for MGC and G-MGC from room to 800 ℃ at a heating rate of 10 ℃ min-1 under air.

**Table S1** Comparison of $MnO_2$ contents of G-MGC freestanding flexible membrane-electrode with previous works.

| Types | $MnO_2$ content in composite | $MnO_2$ content in electrode (not including current collector) | $MnO_2$ content in electrode (including current collector) |
|---|---|---|---|
| PPy/MWNTs/$MnO_2$ composite[1] | 48 wt% | 38.4 wt% | 7.68 wt% |
| Pure $MnO_2$ nanorods[2] | 100 wt% | 40 wt% | 20 wt% |
| $MnO_2$/carbon composite [3] | 42 wt% | 33.6 wt% | 16.8 wt% |
| $MnO_2$/N-doped carbon composite [4] | 81.4 wt% | 61.05 wt% | 30.5 wt% |
| Polythiophene/ $MnO_2$ composite [5] | 86 wt% | 68.8 wt% | 34.4 wt% |
| manganese oxide/ carbon yolk-shell nanorods composite [6] | 70.07 wt% | 49.63 wt% | 24.8 wt% |
| MnO/graphene composite [7] | 82.6 wt% | 66.08 wt% | 33.0 wt% |
| G-MGC freestanding membrane | | 56 wt% | 56 wt% |

**Note**: $MnO_2$ contents in electrode (including current collector) were calculated based on the areal density of copper foil (7.5 mg $cm^{-2}$, almost the least value in the Li-ion battery market) and electrode of the reported paper (if not mentioned, supposed the value is 7.5 mg $cm^{-2}$ ).

**References**

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