## **Supporting Information**

## Graphene/Carbon-Coated Fe<sub>3</sub>O<sub>4</sub> Nanoparticles Hybrids for Enhanced Lithium Storage

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Fig. S1. (a) Low-magnification SEM image of the G/ $\beta$ -FeOOH when mixed solution (part B) wasn't filtered with a PTFE membrane and (b) the corresponding high-magnification SEM image for the square region (dashed line) in (a). (c) SEM image of the G/ $\beta$ -FeOOH when both PTEE membrane and CTAB weren't used.



Fig. S2. The EDS spectrum for (a)  $G/Fe_3O_4$  and (b)  $G/Fe_3O_4@C$  (1.0/6), in which the Al signal originates from the aluminum foil support for SEM observation.



Fig. S3. (a) TEM and (b) HRTEM images of G/Fe<sub>3</sub>O<sub>4</sub>@C (1.0/4).

![](_page_2_Figure_2.jpeg)

Fig. S4. TG curves of Fe<sub>3</sub>O<sub>4</sub> and graphene.

![](_page_3_Figure_0.jpeg)

g. S5. Rate performance comparison of obtained electrodes at various current rates (0.1 C - 20 C).

![](_page_3_Figure_2.jpeg)

Fig. S6. The equivalent circuit used to fit the EIS.