# Supporting Information for

## Nitrogen-doped graphene–$Fe_3O_4$ architecture as Anode Material for Improved Li-ion Storage

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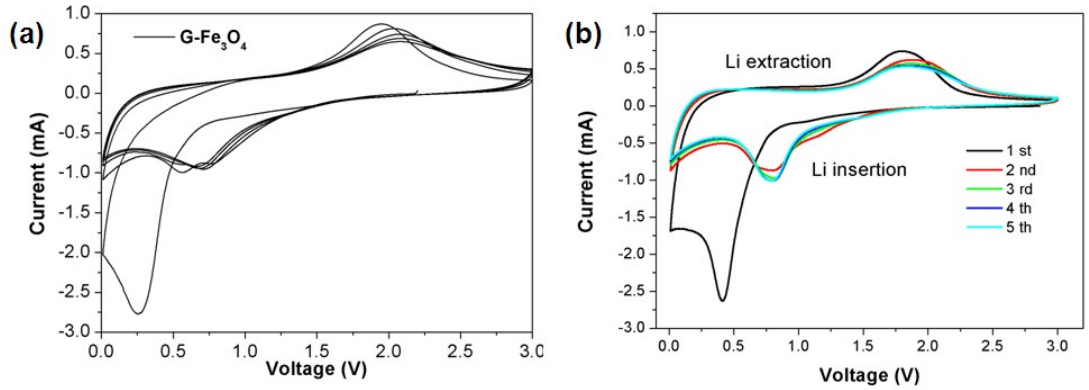


Figure S1. CV curves of the first five cycles of the (a): G-$Fe_3O_4$ and (b): N-G-$Fe_3O_4$ composite at a scan rate of 0.2 $mVs^{-1}$.

From the CV curves of the G-$Fe_3O_4$ and N-G-$Fe_3O_4$, an improved electrical conductivity of graphene and stable SEI layer can be obtained.

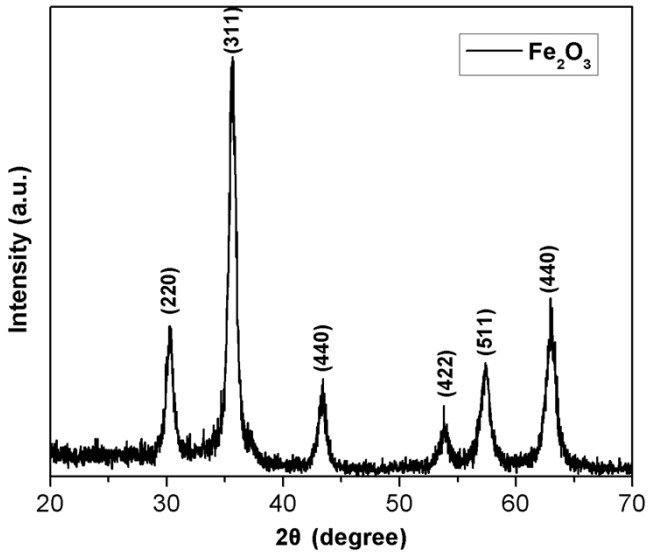


Figure S2. X-ray diffraction pattern for the $Fe_2O_3$ composite.

The N-G-$Fe_3O_4$ composite after TGA was tested by XRD, and the result shows that the $Fe_3O_4$ has changed into $Fe_2O_3$ (Maghemite-Q, Tetragonal, PDF-#:25-1402). According to $(Fe_3O_4)_2 \rightarrow (Fe_2O_3)_3$, we calculate that the $Fe_3O_4$ content is about 62.8%, and the electrochemical capacity also has been recalculated in the manuscript.

## Table 1

Comparison on reversible capacity and rate capability with recent literatures.

| Label | Reversible capacity | Rate capability |
|---|---|---|
| Carbon Coated $Fe_3O_4$ Nanospindles[1] | 745mAhg$^{-1}$ after 100cycles | 600 mAhg$^{-1}$ at 463mAg$^{-1}$ |
| porous hollow $Fe_3O_4$ beads[2] | 700mAhg$^{-1}$ after 50cycles | 573.1mAhg$^{-1}$ at 500mAg$^{-1}$ |
| Graphene Foam Supported $Fe_3O_4$[3] | 785mAhg$^{-1}$ after 500cycles | 400mAhg$^{-1}$ at 5500mAg$^{-1}$ |
| Coaxial $Fe_3O_4$@ C Hollow Particles[4] | 864mAhg$^{-1}$ after 100cycles | 582mAhg$^{-1}$ at 500mAg$^{-1}$ |

The comparison on reversible capacity and rate capability with recent literatures are given in table 1, the parameters of reversible capacity with Coaxial $Fe_3O_4$@ C Hollow Particles is better than literatures due to its coaxial and penetrated hollow mesochannel based on the concept of "confined nanospace pyrolysis". However, the rate capability are difficult to comparative analysis for their different current densities.

## References

1 Zhang W M, Wu X L, Hu J S, et al. Carbon Coated $Fe_3O_4$ Nanospindles as a Superior Anode Material for Lithium-Ion Batteries[J]. Advanced Functional Materials, 2008, 18(24): 3941-3946.

2 Chen Y, Xia H, Lu L, et al. Synthesis of porous hollow $Fe_3O_4$ beads and their applications in lithium ion batteries[J]. Journal of Materials Chemistry, 2012, 22(11): 5006-5012.

3 Luo J, Liu J, Zeng Z, et al. Three-Dimensional Graphene Foam Supported $Fe_3O_4$ Lithium Battery Anodes with Long Cycle Life and High Rate Capability[J]. Nano letters, 2013, 13(12): 6136-6143.

4 Lei C, Han F, Sun Q, et al. Confined Nanospace Pyrolysis for the Fabrication of Coaxial $Fe_3O_4$@ C Hollow Particles with a Penetrated Mesochannel as a Superior Anode for Li-Ion Batteries[J]. Chemistry-A European Journal, 2014, 20(1): 139-145.