Supplementary Information

One-step thermolysis synthesis of two-dimensional ultrafine Fe_3O_4 particles/carbon nanonetworks for high-performance lithium-ion batteries

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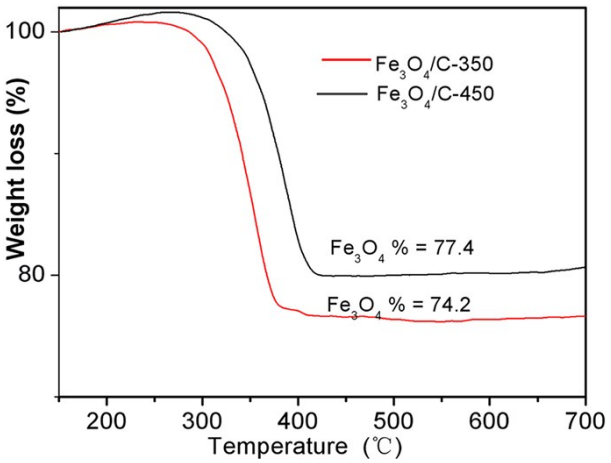

Figure S1. TGA results of Fe_3O_4/C-350 and Fe_3O_4/C-450.

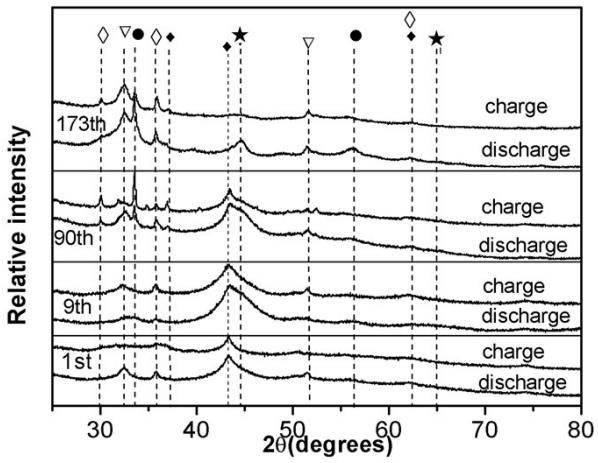

Figure S2. Comparison of powder XRD patterns of the lithiated and delithiated Fe_3O_4/C-350 electrodes after 1, 9, 90 and 173 lithiation-delithiation cycles, respectively. The ★,●,◆,◇,and ▽ labels indicate the Fe (JCPDS card no. 065-4899), Li_2O (JCPDS no. 065-2972), $LiFeO_2$ (JCPDS card no. 070-2711), Fe_3O_4 (JCPDS card no. 076-0956) and Fe_2O_3 (JCPDS card no. 052-1449), respectively.

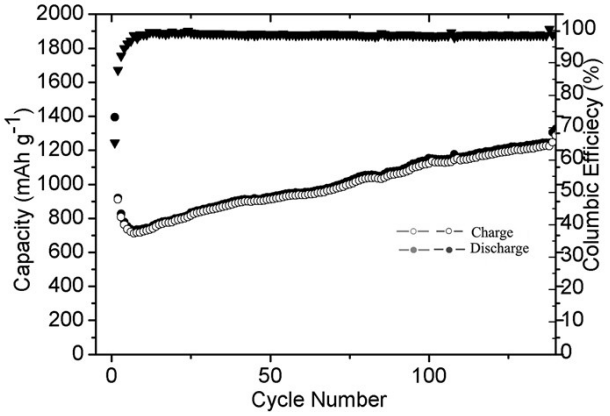

Figure S3. Capacity vs. cycle number curves and Coulombic efficiency of Fe_3O_4/C-350 composites at the current of 0.1 A g^{-1}.

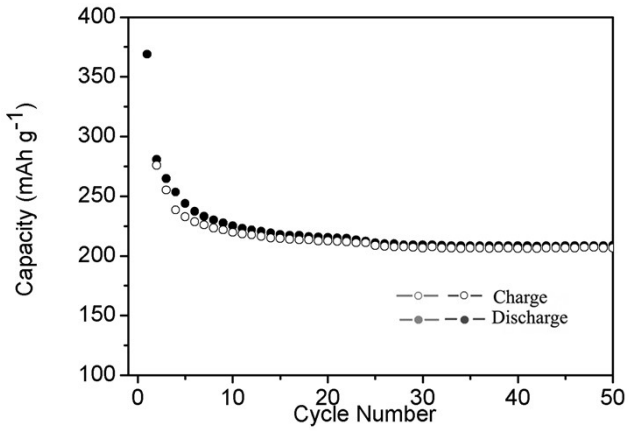

Figure S4. Reversible capacity and Coulombic efficiency of Fe_3O_4/C-350 composites at 1 A g^{-1} after Fe_3O_4 was dissolved in HCl

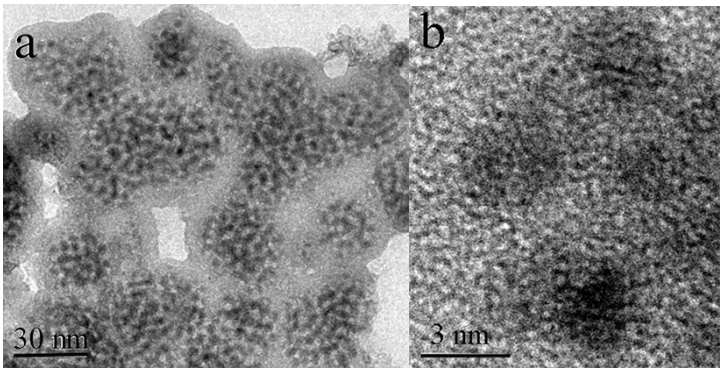

Figure S5. TEM and HRTEM images of Fe_3O_4/C-350 composite electrode after 500 electrochemical cycles at the current of 1 A g^{-1}.

Table. S1 A comparison of electrochemical performance of the Fe_3O_4/C-350 electrode with recent studies on Fe_3O_4/carbon composites. (Composition of the all compared electrodes: 80 wt % active material, 10 wt % acetylene black, and 10 wt % PVDF binder dissolved in NMP)

Material	Fe_3O_4 (wt %)	Reversible capacity/m Ah g^{-1}	Rate	Ref.
Fe_3O_4/C nanonetworks	77.4	1534/500th cycle	1 C	This work
		845/500th cycle	5 C	
		647/500th cycle	10 C	
Fe_3O_4 nanoparticles/graphene	80.4	830/10th cycle	1 C	42
Fe_3O_4/ Graphene	-	1260/250th cycle	1 C	44
Fe_3O_4 nanoflakes /NC	56	662/500th cycle	1 C	17
		600/200th cycle	5 C	
Fe/Fe_3O_4/NC	24	293/5th cycle	1 C	50
		116/5th cycle	10 C	
Graphene/Fe_3O_4 nanoparticles/C	61.8	1048/20th cycle	1 C	52
		405/20th cycle	5 C	
		227/20th cycle	10 C	
A Foamlike Fe_3O_4/C	46.4	580/10th cycle	5 C	21
Fe_3O_4/grapheme	87.1	540/10th cycle	1 C	59
Fe_3O_4/mesoporous carbon	41.57	670/100th cycle	1 C	60
Fe_3O_4/FC	83.5	620/10th cycle	1 C	30
Fe_3O_4/C nanospheres	62.64	784/50th cycle	1 C	34
Fe_3O_4 /C	55.24	834/60th cycle	1 C	35
		588/50th cycle	5 C	
		382/50th cycle	10 C	
Fe_3O_4/C/PGC nanosheets	68.7	998/100th cycle	1 C	9
		858/350th cycle	5 C	
		587/10th cycle	10 C	
Fe_3O_4/grapheme	73.65	982/10th cycle	1 C	67