Supplementary Information

Ultra-Small and Highly Crystallized $ZnFe_2O_4$ Nanoparticles within Double Graphene Networks for Super-Long Life Lithium-ion Batteries

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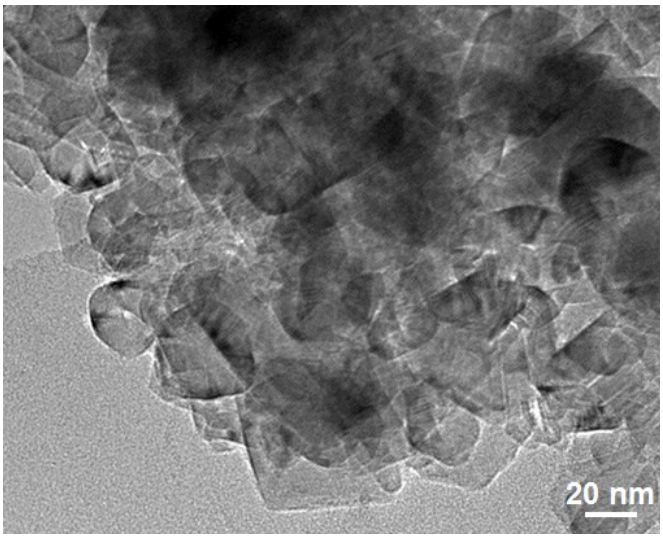

Fig. S1. TEM image of ultra-small graphene oxide with the sizes of 20-50 nm after photo-Fenton reaction in a 80 W UV lamp for 10 h.

Table S1. Specific surface area, total pore volume and average pore diameter of samples.

Samples	S_{BET} ($m^2\ g^{-1}$)	V_{total} ($cm^3\ g^{-1}$)	Average pore diameter (nm)
$ZnFe_2O_4$/USGN/GN	122.5	0.19	3.8
$ZnFe_2O_4$/USGN	75.4	0.26	4.3
$ZnFe_2O_4$/GN	52.4	0.17	3.8
$ZnFe_2O_4$	27.6	0.16	17.7

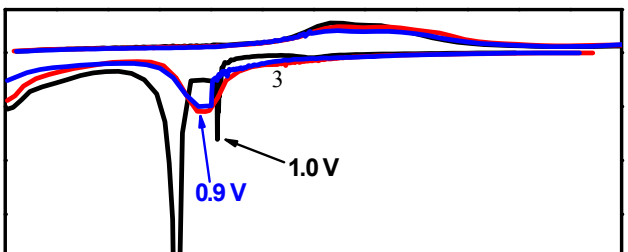

Fig. S2. Differential capacity curves of the $ZnFe_2O_4$/USGN/GN electrode for 1st, 2nd and 20th cycle.

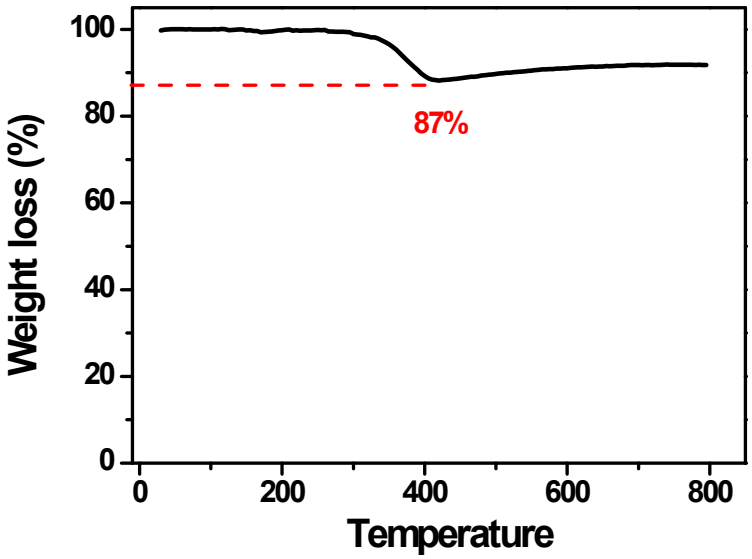

Fig. S3. TGA curve of the $ZnFe_2O_4$/USGN/GN in air.

Table S2. Electrode resistances obtained from equivalent circuit by fitting experimental data.

Samples	**Cycles**	**R_s (Ω)**	**R_{ct} (Ω)**	**D_{Li+} (cm^2 s^{-1})**
$ZnFe_2O_4$	0	31.24	400.8	1.1×10^{-16}
$ZnFe_2O_4$/GN	0	28.76	217.2	0.9×10^{-16}
$ZnFe_2O_4$/USG	0	17.92	209.7	1.4×10^{-16}
$ZnFe_2O_4$/USG/GN	**0**	**11.86**	**156.4**	$\mathbf{1.2\times10^{-15}}$