Controllable synthesis of graphene nanoscroll-wrapped Fe_3O_4 nanoparticles and their lithium-ion battery performances

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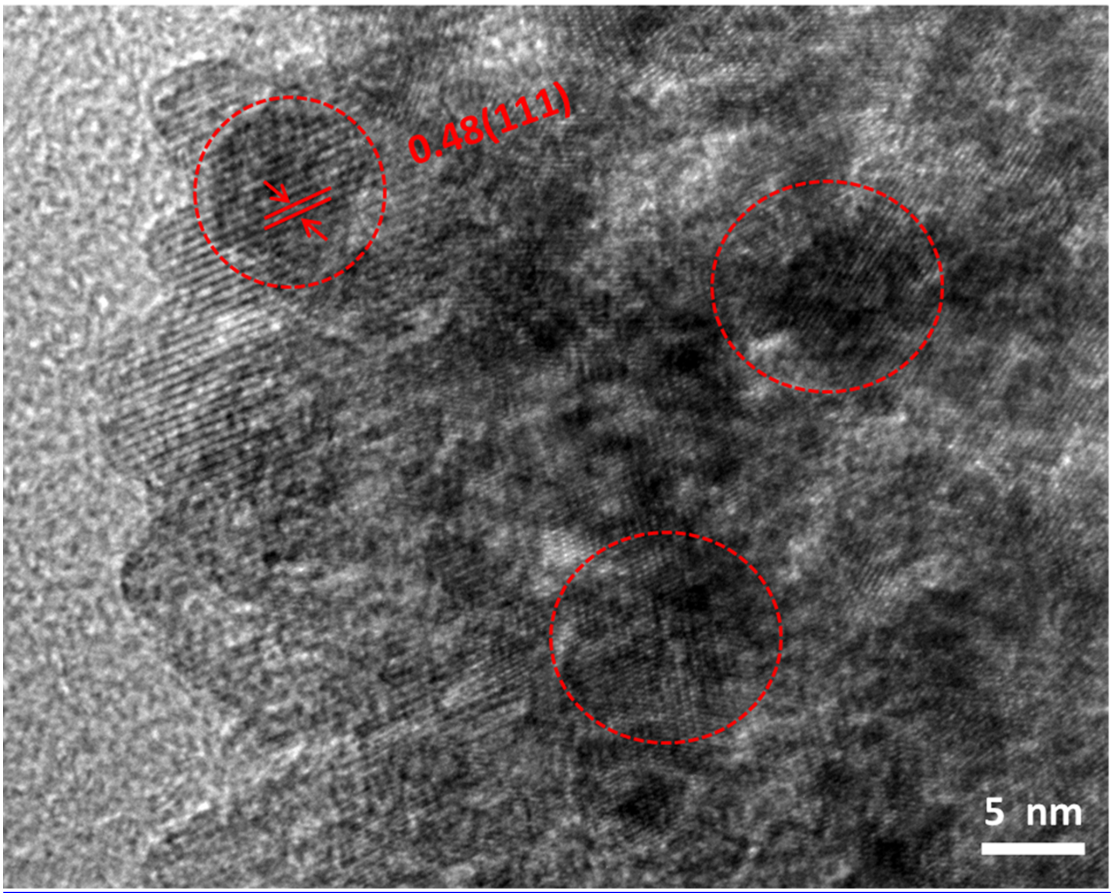

Figure S1.HR-TEM of pure Fe_3O_4.

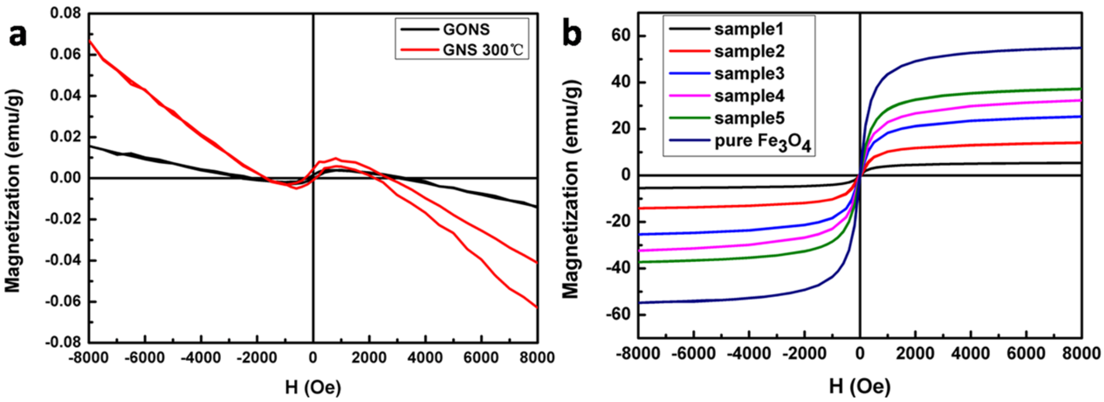

Figure S2. (a) Magnetization hysteresis loops of graphene oxide nanoscroll(GONS) and GNS, (b) Magnetization hysteresis loops of pure Fe_3O_4 NPs and sample 1-5.

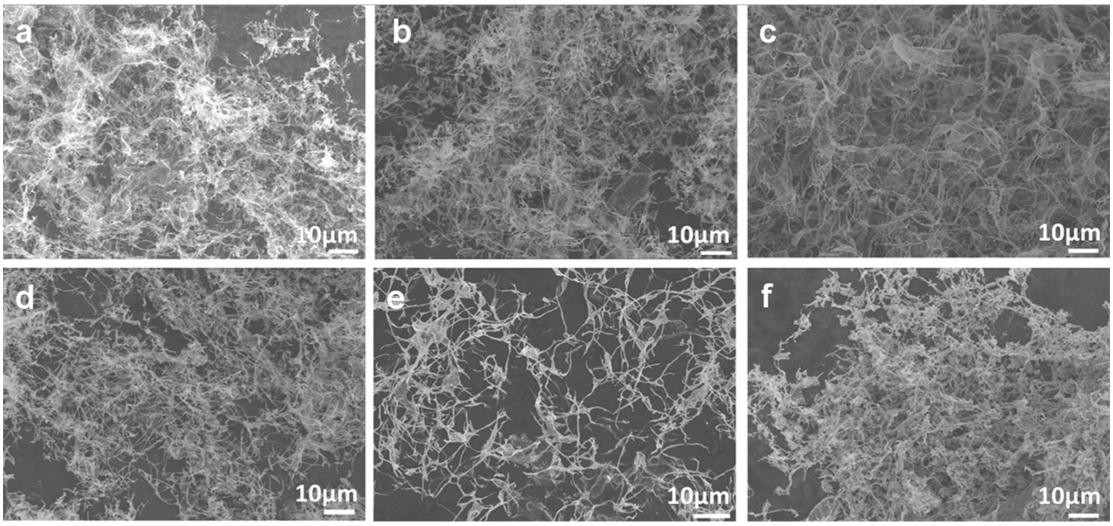

Figure S3. Low magnification SEM images of (a) pure GNS and (b-f) sample 1-5.

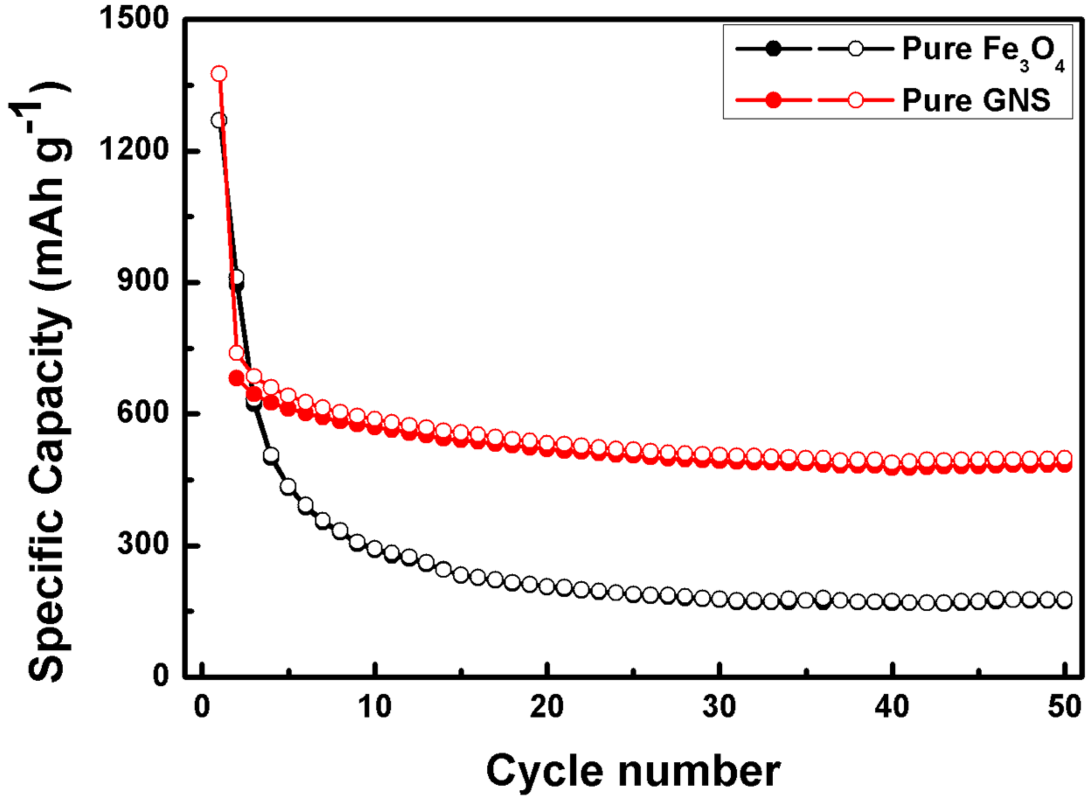

Figure S4. Cycle performances of pure Fe_3O_4 and GNS at 100 mA g^{-1}.

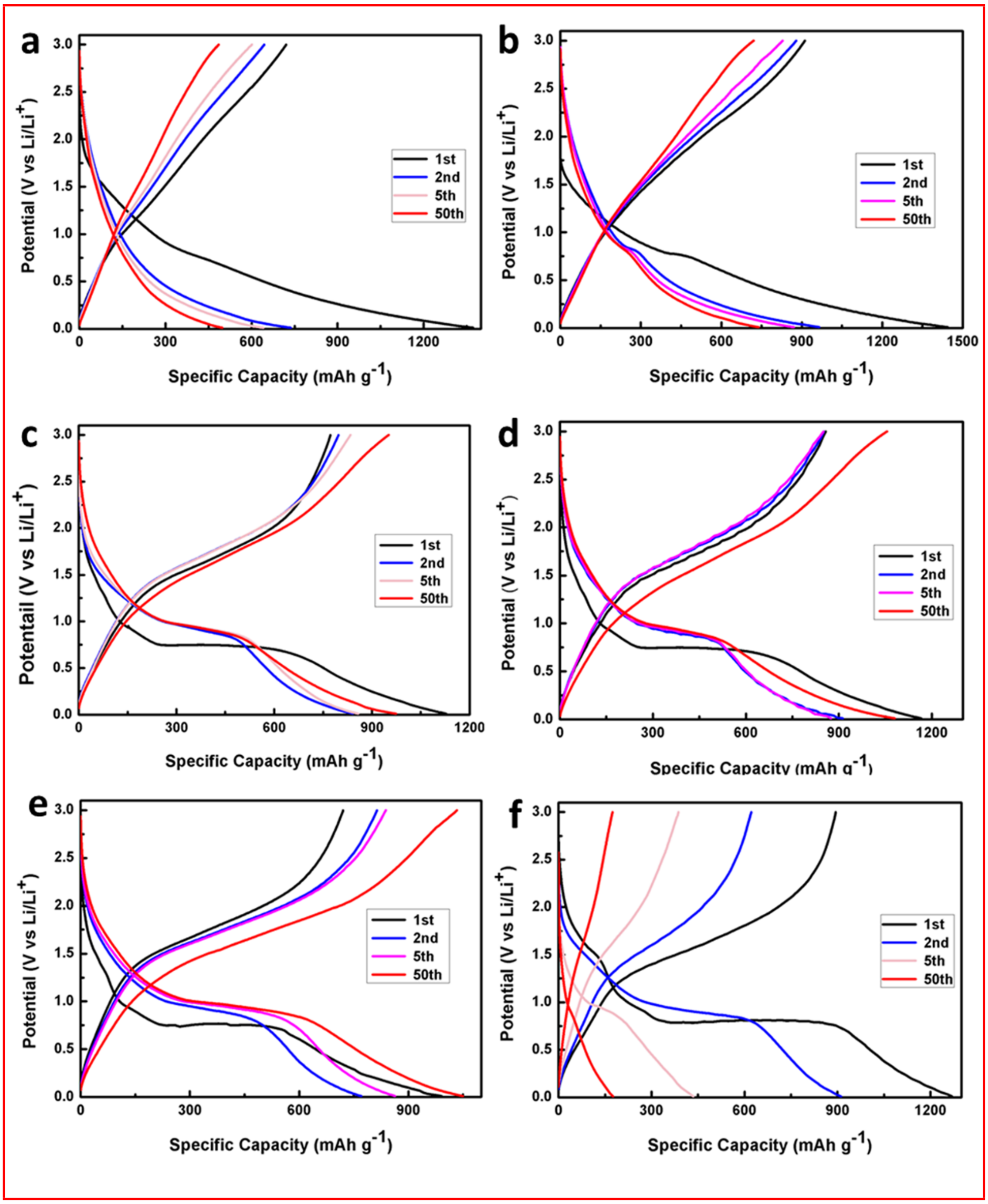

Figure S5. The charging–discharging curves of (a) pure GNS, (b) sample 1, (c) sample 2, (d) sample 3, (e) sample5 and (f) pure Fe_3O_4 at 100 mA g^{-1}.

Table S1 Comparison of the electrochemical performance for Fe3O4@CNS composite as anode materials of LIBs in the reported Literature (1C=1A g^{-1})

Materials	Charge capacity after cycling (mAh/ g)	Rate properties (mAh/g)	Ref.
Fe_3O_4/Graphene	842.7 at 0.2C (100 cycles)	200 at 5C	1
	1039 at 0.1C (170 cycles)	193 at 2C	2
	940 at 0.2C (50 cycles)	420 at 2C	3
	612 at 1C (50 cycles)	543 at 3C	4
	860 at 0.2C (100 cycles)	282 at 2C	5
	960 at 0.2C (100 cycles)	440 at 2C	6
Graphene@Fe_3O_4@C	920 at 0.2C(100 cycles)	550 at 5C	7
Fe_3O_4@Carbon	900 at 0.1C (40 cycles)	600 at 1C	8
	1050 at 0.1C(50 cycles)	800 at 1C	9
Fe3O4@nanotube	693 at 0.3C (200 cycles)	282 at 1.2C	10
Our work	1176 at 0.1C (200 cycles) 524 at 2C(1000 cycles)	480 at 5C 648 at 2C	

Notes and references

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