Supporting Information for

CO_2-expanded ethanol chemical synthesis of a Fe_3O_4@graphene composite and its high electrochemical properties as anode material for Li-ion batteries

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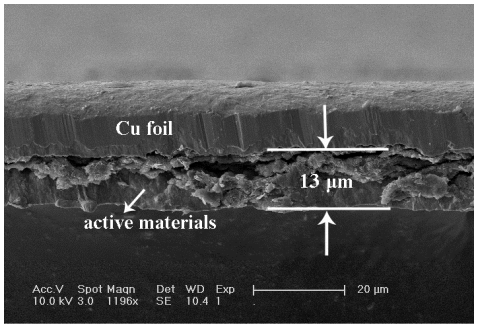

Fig. S1 SEM image of the cross section of an electrode

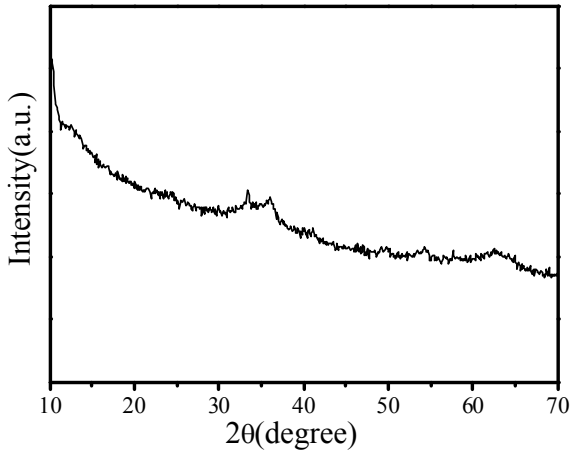

Fig. S2 XRD patterns of the intermediate of Fe-salt@GO-CE-20 composite.

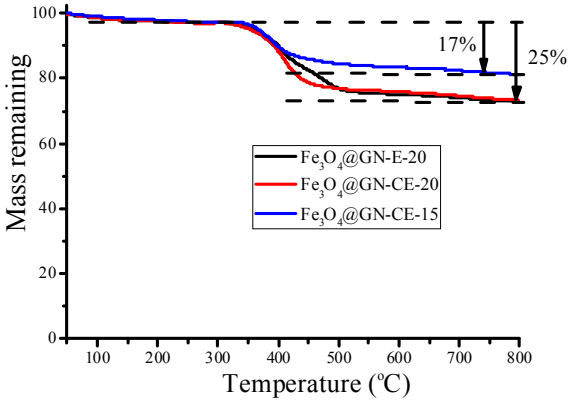

Fig. S3 TGA analysis for the Fe_3O_4@GN-E-20, Fe_3O_4@GN-CE-20, and Fe_3O_4@GN-CE-15.

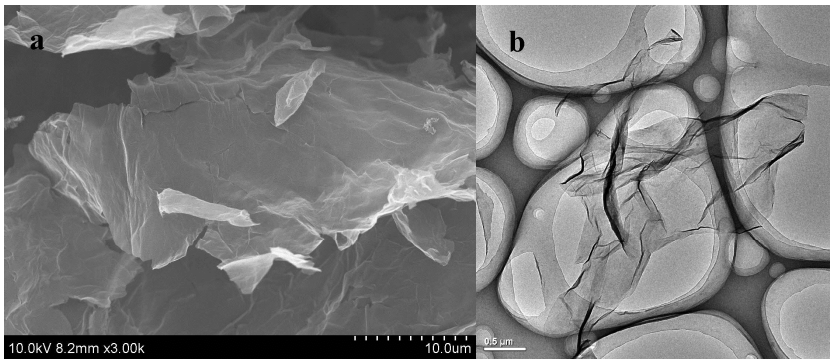

Fig. S4 SEM (a) and TEM (b) images of GO.

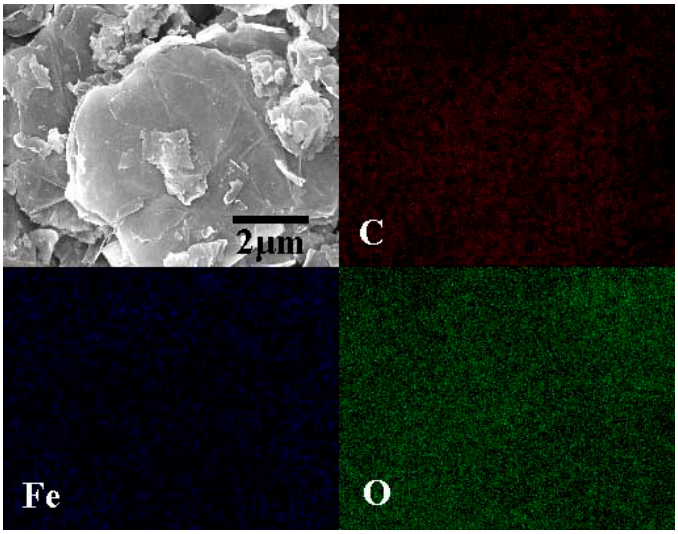

Fig. S5 SEM image and corresponding carbon, iron, and oxygen elemental mapping of Fe_3O_4@GN-CE-20 composite synthesized in CO_2-expanded ethanol.

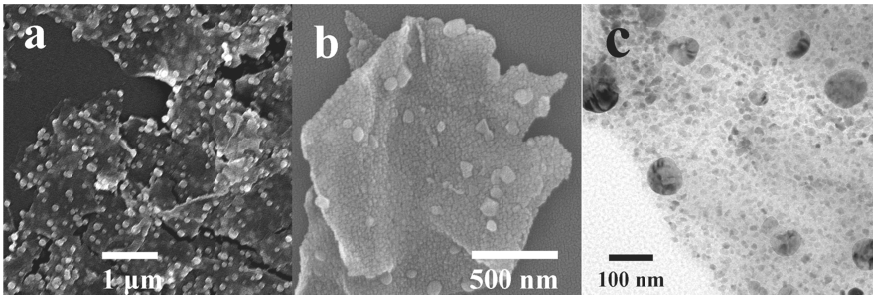

Fig. S6 SEM images of (a) Fe-salt@GO-CE-15. (b) Fe_3O_4@GN-CE-15. (c) TEM image of Fe_3O_4@GN-CE-15

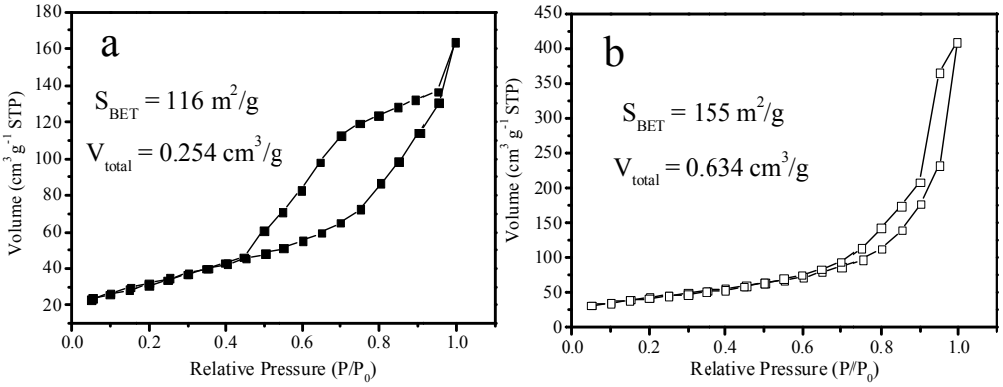

Fig. S7 Nitrogen adsorption/desorption isotherms for (a) Fe_3O_4@GN-CE-20, and (b) Fe_3O_4@GN-E-20.

Table S1 A comparison of electrochemical performance of the Fe_3O_4@GN-CE-20 with the recent studies on Fe_3O_4@graphene composites

Type of material	Initial efficiency	Reversible capacity ($mA\ h\ g^{-1}$)	0.5 C	1 C	2 C	5 C	Reference
Fe_3O_4–rGO	65 %	993 (50 $mA\ h\ g^{-1}$)	647	396	193	-	[1]
Fe_3O_4-GNS	61.5 %	664 (100 $mA\ h\ g^{-1}$)	-	-	-	-	[2]
Fe_3O_4/graphene	50 %	1160 (200 $mA\ h\ g^{-1}$)	-	-	-	-	[3]
GN-Fe_3O_4	65.6 %	1073 (100 $mA\ h\ g^{-1}$)	-	-	-	-	[4]
Fe_3O_4/GNSs-1	55 %	612.5 (92.5 $mA\ h\ g^{-1}$)	-	-	-	-	[5]
FGCs	-	755.6 (1A $h\ g^{-1}$)	-	755.6	-	-	[6]
GCF	-	842.7 (200 $mA\ h\ g^{-1}$)	~ 700	~ 600	~ 400	~ 200	[7]
RGO-Fe_3O_4	71 %	877 (46.3 $mA\ h\ g^{-1}$)	736	703	-	607	[8]
G-HM	-	900 (100 $mA\ h\ g^{-1}$)	-	-	-	-	[9]

Fe3O4–graphene	70 %	1280 (100 mA h g^{-1})	1080	1010	940		[10]
GNS/Fe_3O_4	-	900 (35 mA h g^{-1})	-	-	-	-	[11]
Fe_3O_4@GN-CE-20	73.5 %	941 (100 mA h g^{-1})	~ 930	~ 850	~ 730	~ 460	This work

(Note, in this table, 1c = 1000 mA g^{-1})

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