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Research Article

Pure Phase Nano Co_3O_4 Anchored on Nitrogen-Doped Porous Carbon for High-Performance Lithium-ion Batteries

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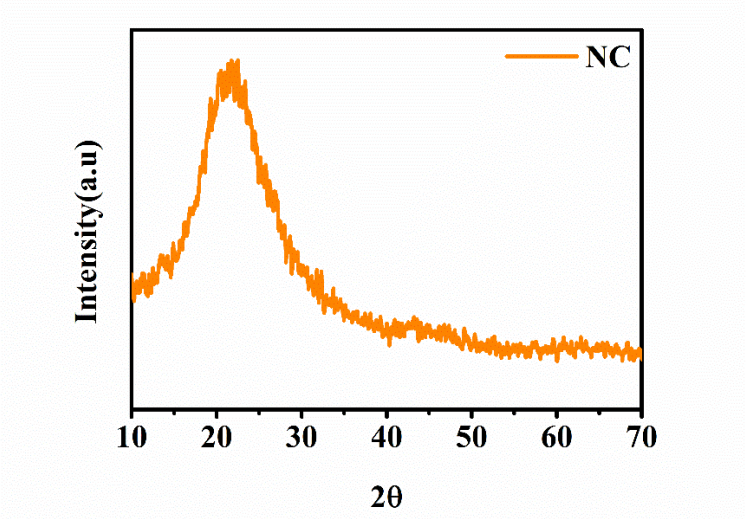

Figure S1. The XRD patterns of NC.

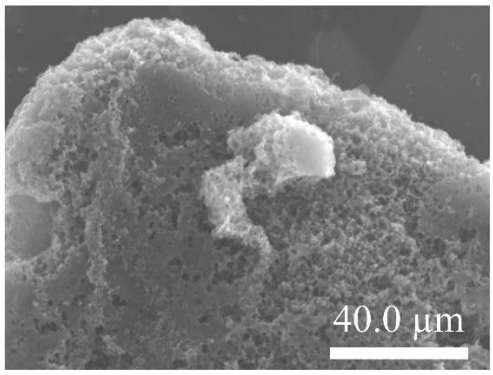

Figure S2. SEM images of NC.

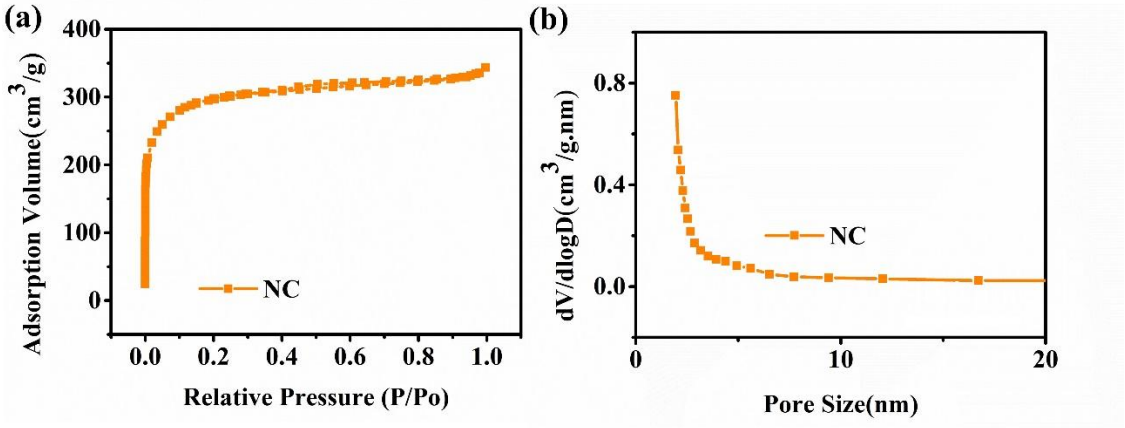

Figure S3. (a) N_2 adsorption-desorption isotherms NC. (b) corresponding pore size distribution curves of NC.

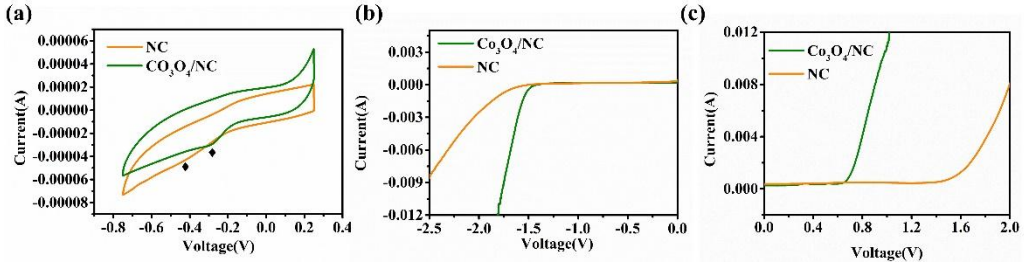

Figure S4. Catalytic characteristics of Co_3O_4/NC and NC catalysts: (a) cyclic voltammograms, (b) LSV curves of HER between Co_3O_4/NC and NC in 1M KOH solution, (c) LSV curves of OER between Co_3O_4/NC and NC in 1M KOH solution, with a scanning rate of 5 mV s^{-1}.

Table S1. The XPS element content of Co_3O_4/NC.

Name	Atomic %
C1s	16.29
N1s	1.29
O1s	53.89
Co 2p	28.53

Table S2. Cycling performance of Co_3O_4-based composite electrodes previously reported for LIBs.

Sample	Current density (A/g)	Cycle number	Capacity (mAh/g)	Ref.
L-Co_3O_4@NC	1	200	1183	[1]
Co_3O_4nanoparticles	0.1	50	1074	[2]
Co_3O_4nanoparticles	0.05	50	880	[3]
CF@Co-Co_3O_4/CNT	0.5	100	505	[4]
NiO/Co_3O_4nanoflowers	1	600	686.6	[5]
Co_3O_4/C-2	1	1500	620	[6]
Co_3O_4 nanofibers	1	800	1109	[7]
Ag-C@Co_3O_4	0.5	500	853.7	[8]
MC/Co_3O_4-FC	0.1	200	530	[9]
Co_3O_4/NC nanowires	1	1000	897	[10]
Co_3O_4/NC	**1**	**2000**	**1134.1**	**This work**

Table S3. Lithium-ion diffusion coefficient of different Co_3O_4 matrix composites as anode materials.

Sample Name	D_{Li}($cm^2\ s^{-1}$)	Ref.
Co_3O_4/rGO/C	2.11×10^{-14}	[11]
PW_{12}@Co_3O_4@GO-2	1.53×10^{-12}	[12]
Co_3O_4/C-2	2.03×10^{-16}	[6]
Co_3O_4/NC	4.16×10^{-14}	[10]
YSS Co_3O_4@C	2.08×10^{-14}~7.54×10^{-11}	[13]
CO_3O_{4-x}	2.94×10^{-16}~8.34×10^{-14}	[14]
Co_3O_4/NC	**1.01×10^{-11}/1.29×10^{-11}**	**This work**

Table S4. Fitted results of the equivalent circuit.

Sample Name	R_e(before)	R_{ct}(before)	R_e(after)	R_{ct}(after)
Co_3O_4/NC	3.75	310.2	3.32	117.9

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