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Electronic Supplementary Information

C_xN_y particles@N-doped porous graphene: a novel cathode catalyst with a remarkable cyclability for Li-O_2 batteries

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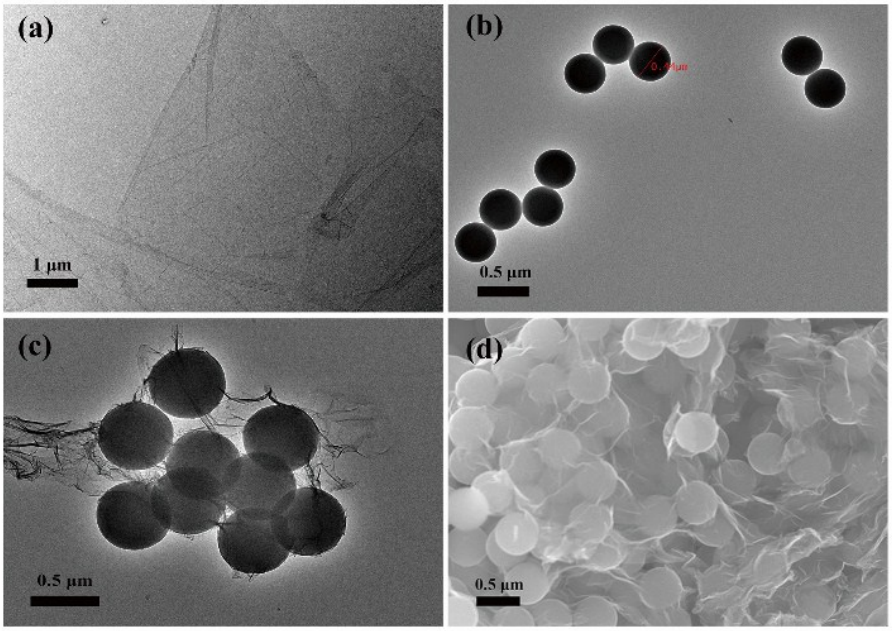

Fig. S1 (a, b, c) TEM images of GO, monodispersed PS spheres and rGO/PS composite, (d) SEM image of rGO/PS composite.

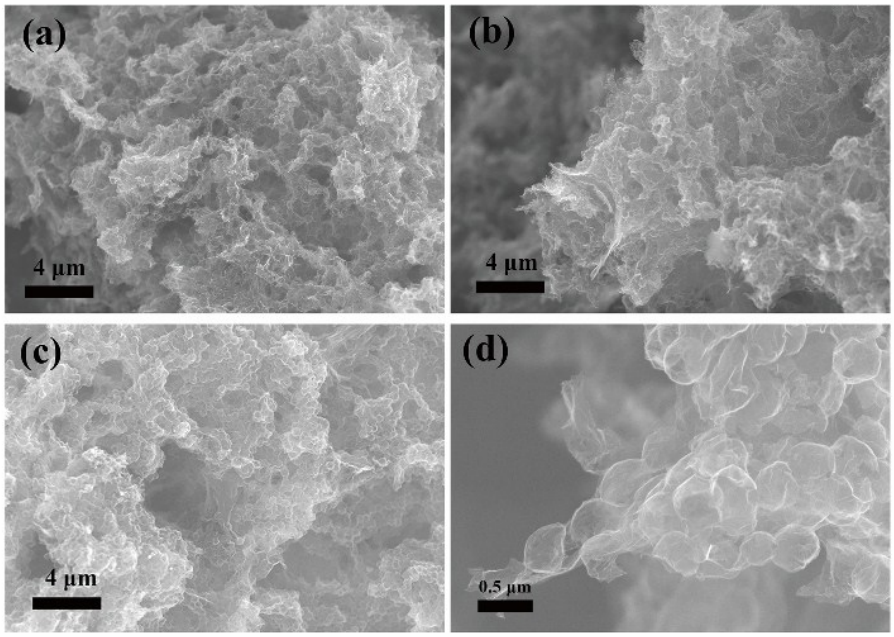

Fig. S2 (a, b) SEM images of porous-rGO, (c, d) SEM images of C_xN_y@NPG.

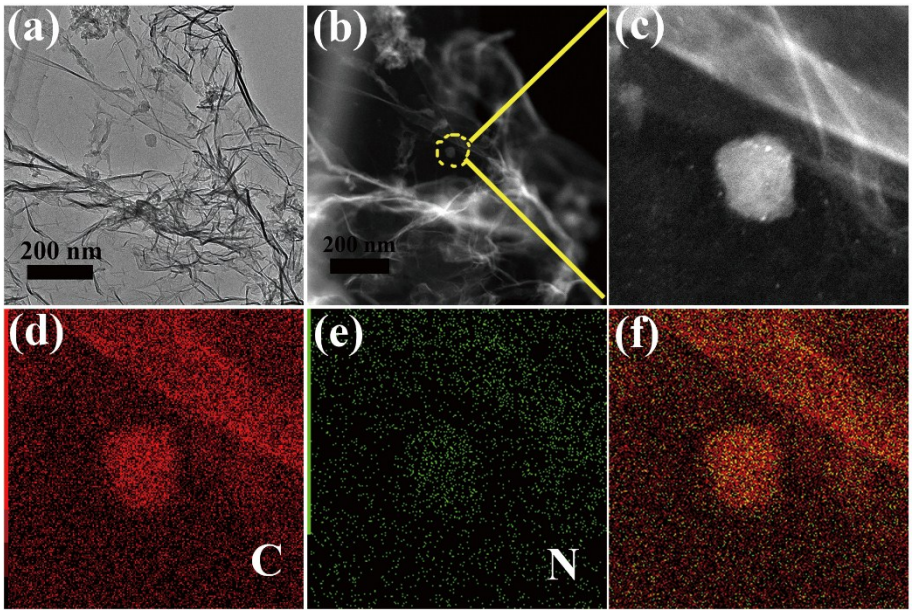

Fig. S3 STEM-EDS elemental mapping for C_xN_y particle on NPG matrix.

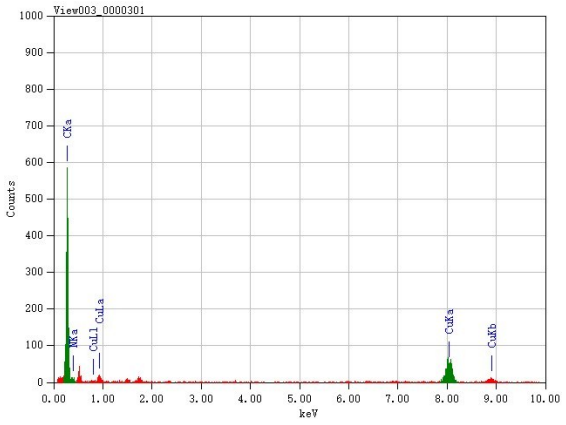

Fig. S4 The typical EDS spectrum with the characteristic peaks of elements C and N.

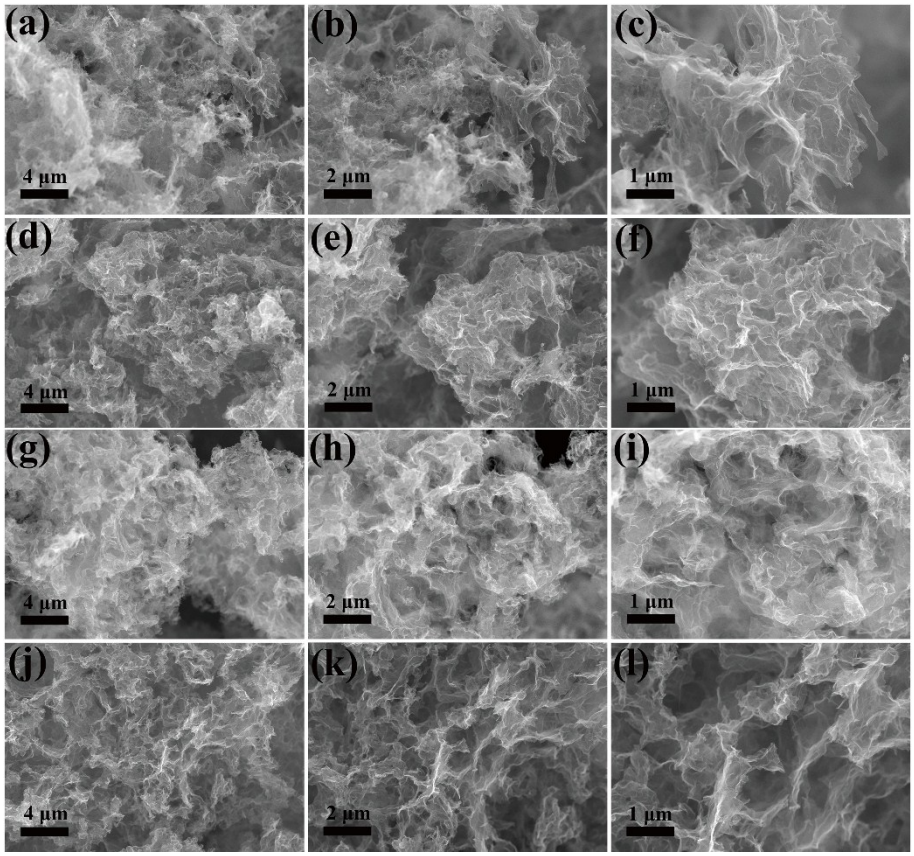

Fig. S5 SEM images of C_xN_y@NPG at different pressures. (a-c) 0 kg cm^{-2}, (d-f) 25 kg cm^{-2}, (g-i) 50 kg cm^{-2}, (j-k) 75 kg cm^{-2}.

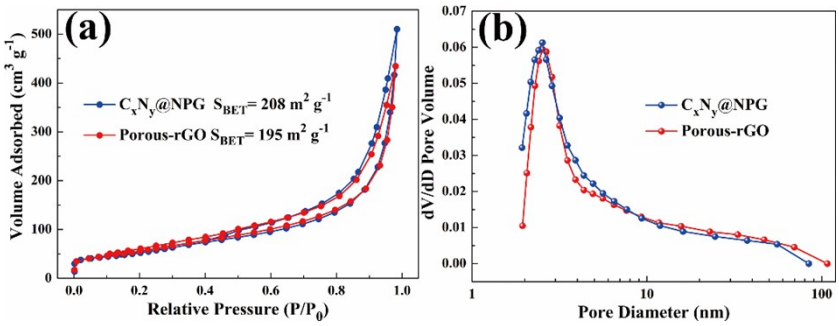

Fig. S6 (a) N_2 adsorption-desorption isotherms and (b) pore size distribution of C_xN_y@NPG and porous-rGO.

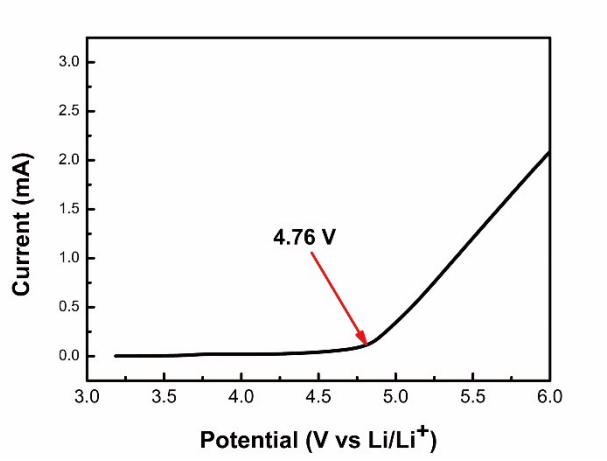

Fig. S7 Electrochemical window of 1.0 M TEGDME/LiTFSI electrolyte used in Li-O_2 batteries at the oxygen atmosphere.

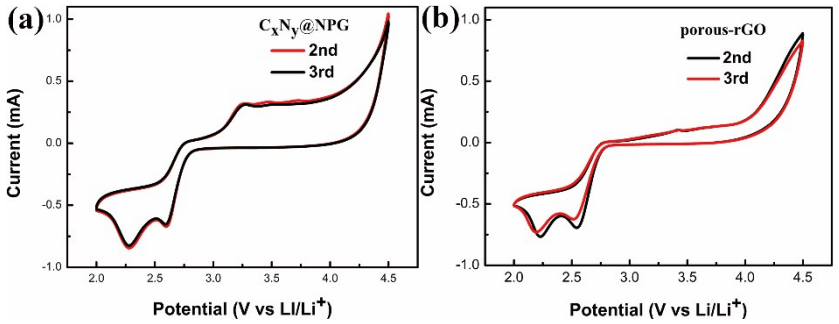

Fig. S8 Subsequent CV curves of C_xN_y@NPG (a) and porous-rGO cathodes (b) at a scan rate of 0.5 mV s^{-1}.

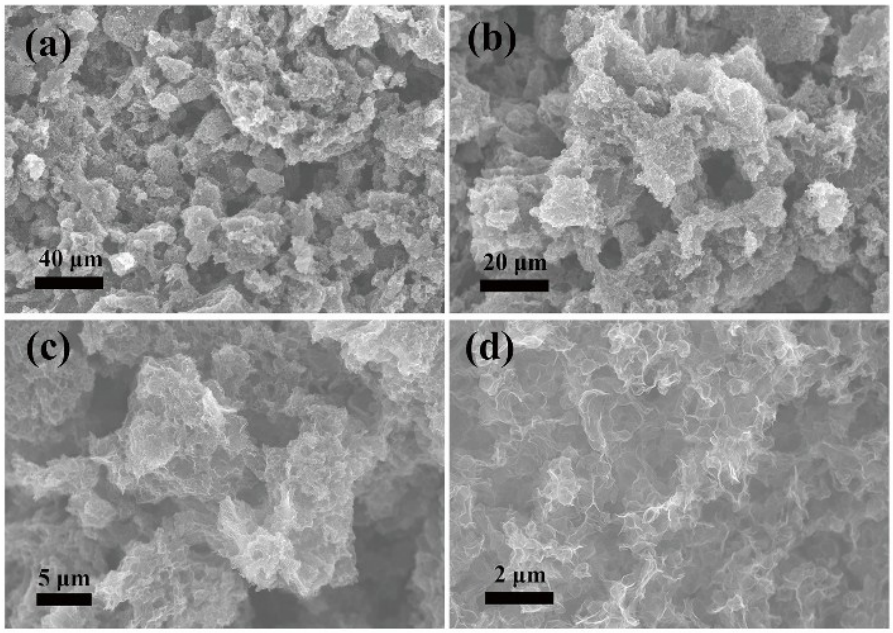

Fig. S9 SEM images of the oxygen electrode with different magnifications.

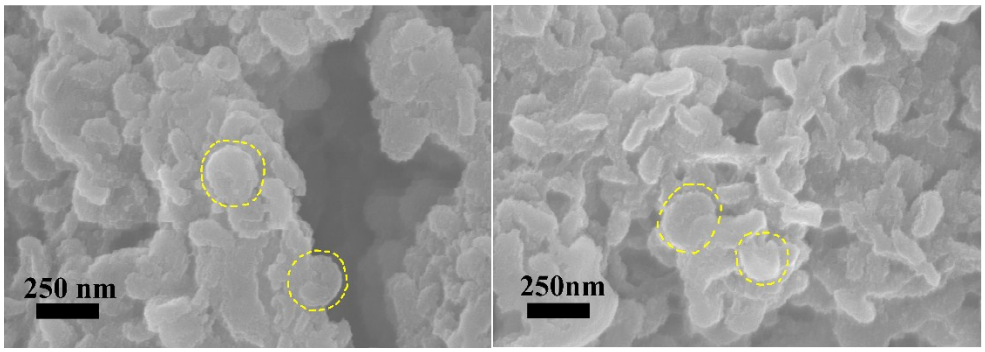

Fig. S10 High-resolution SEM images of the C_xN_y@NPG electrode after discharge.

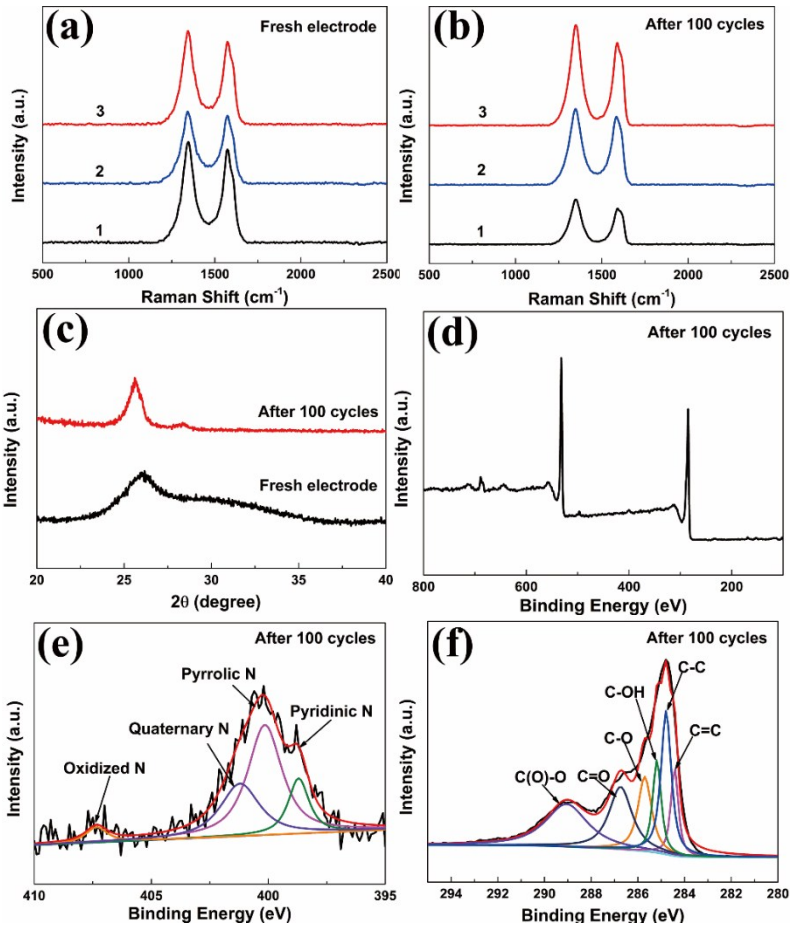

Fig. S11 Raman spectra, XRD patterns and XPS of C_xN_y@NPG electrode after 100 cycles at 1000 mA g^{-1} by curtailing capacity to 1000 mA h g^{-1}.

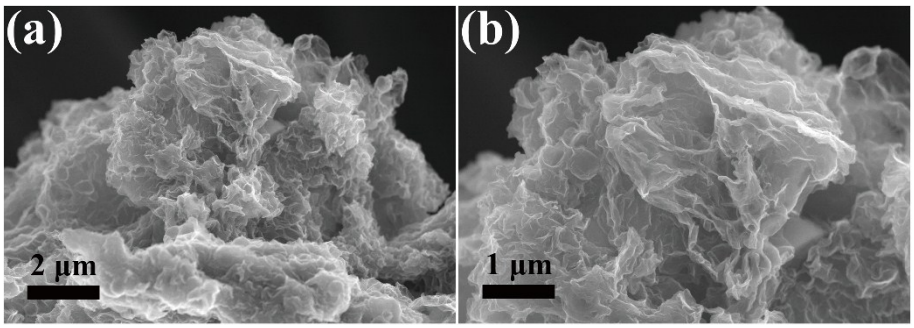

Fig. S12 SEM images of the cathode based on C_xN_y@NPG after 100 cycles.

Table 1 The I_D/I_G intensity ratio of Raman spectra of C_xN_y@NPG electrode before cycling and after 100 cycles at 1000 mA g^{-1} by curtailing capacity to 1000 mA h g^{-1}.

Selected points	I_D/I_G	
	Fresh electrode	After 100 cycles
1	1.15	1.25
2	1.14	1.12
3	1.21	1.22