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Electronic Supplementary Information

Facile construction of highly redox active carbons with regular micropores and rod-like morphology towards high-energy supercapacitors

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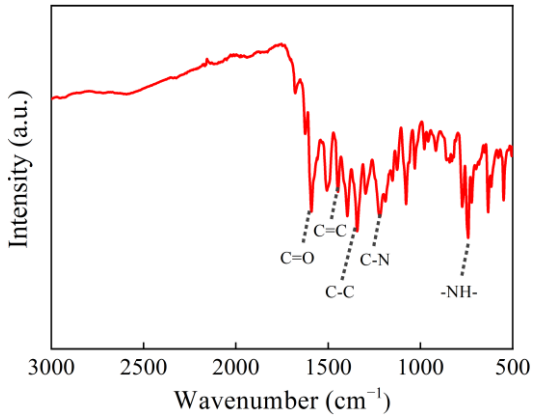

Fig. S1 FT-IR spectrum of the benzoquinone/*p*-phenylenediamine precursor.

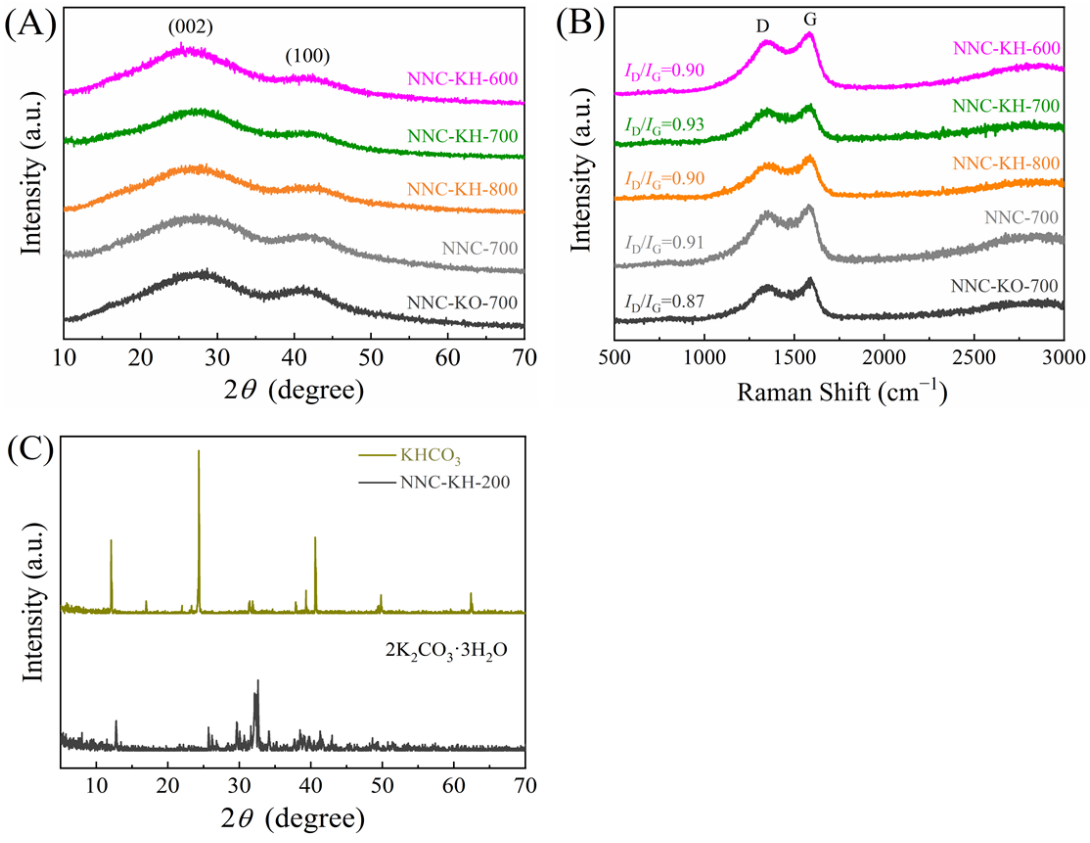

Fig. S2 XRD patterns of NNCs (A). Raman spectra of NNCs (B). XRD patterns of $KHCO_3$ and NNC-KH-200 (C).

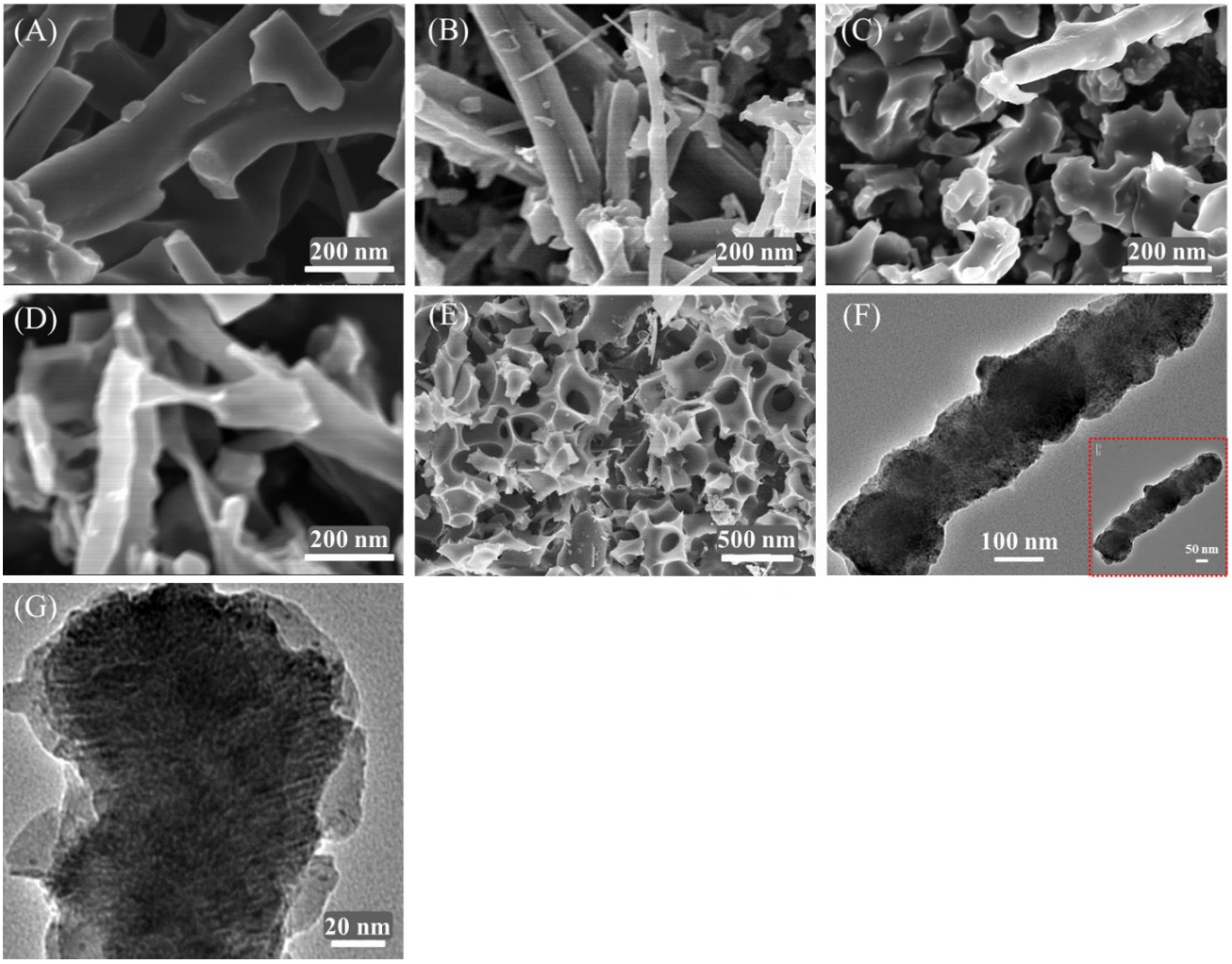

Fig. S3 SEM images of precursor (A), NNC-KH-600 (B), NNC-KH-800 (C), NNC-700 (D), NNC-KO-700 (E). TEM images of typical NNC-KH-700 (F, G).

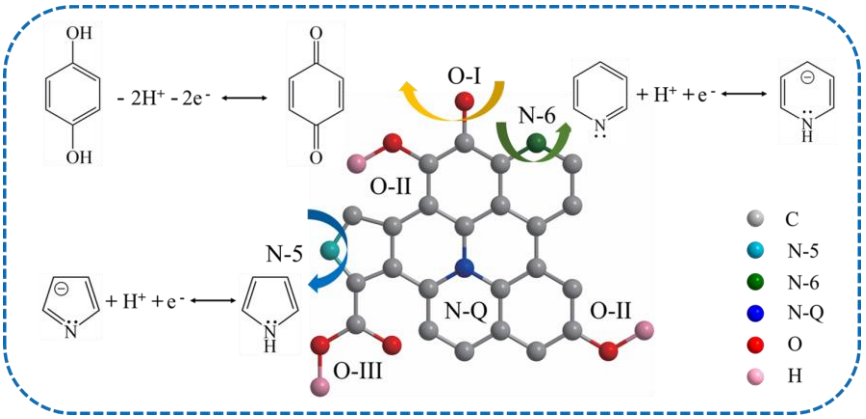

Fig. S4 The locations of faradaic-active species (N-6, N-5 and O-I) in the carbon farmework and corresponding redox reactions in acidic solution.

Table S1. The detailed electrochemical data of the devices.[a]

Samples	R (Ω)	R_s (Ω)	R_{ct} (Ω)	τ (Ω)	σ (Ω $s^{-0.5}$)	C_E (F g^{-1})	C_P (F g^{-1})	C_T (F g^{-1})	C_P/C_T (%)
NNC-KH-600	3.11	1.69	1.42	2.32	0.91	166.9	40.1	207	19.4
NNC-KH-700	1.64	0.56	1.08	0.94	0.74	284.3	80.7	365	22.1
NNC-KH-800	2.64	0.68	1.96	2.95	0.76	231.9	50.1	282	17.8
NNC-700	3.53	1.52	2.01	4.72	0.88	193.7	32.3	226	14.3
NNC-KO-700	3.65	0.76	2.89	2.57	0.80	296.2	39.8	336	11.8

[a]All capacitance values are measured at 1 A g^{-1}.

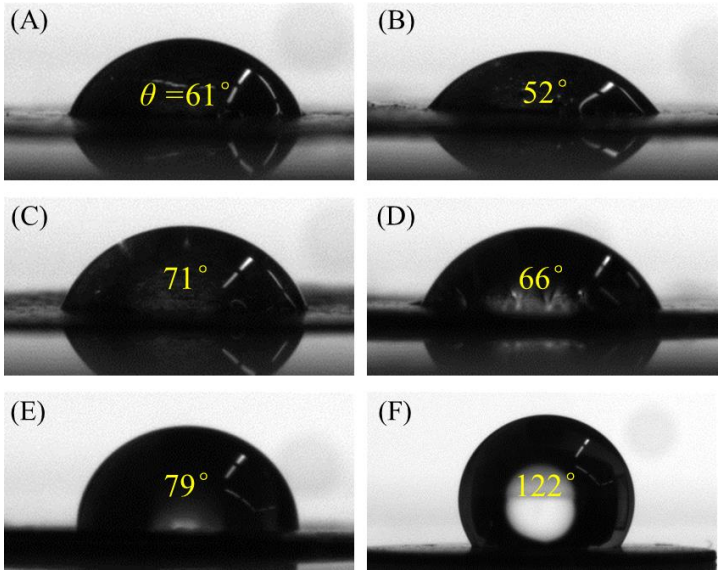

Fig. S5 The water contact angle (θ) measurement results of NNC-KH-600 (A), NNC-KH-700 (B), NNC-KH-800 (C), NNC-700 (D), NNC-KO-700 (E), commercial activate carbon (F).

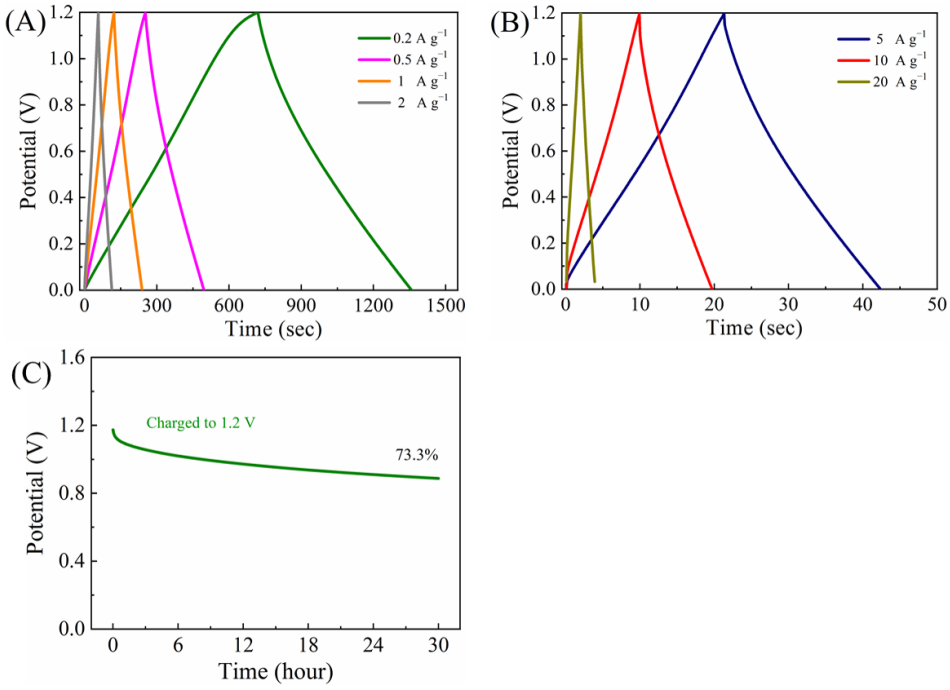

Fig. S6 Electrochemical performances of the symmetric coin-typed cell based on NNC-KH-700 electrode using H_2SO_4+KBr electrolyte: GCD curves of NNC-KH-700 at different current densities from 0.2 to 20 A g^{-1} (A, B). Self-discharge curve within the potential window of 0–1.2 V (C).

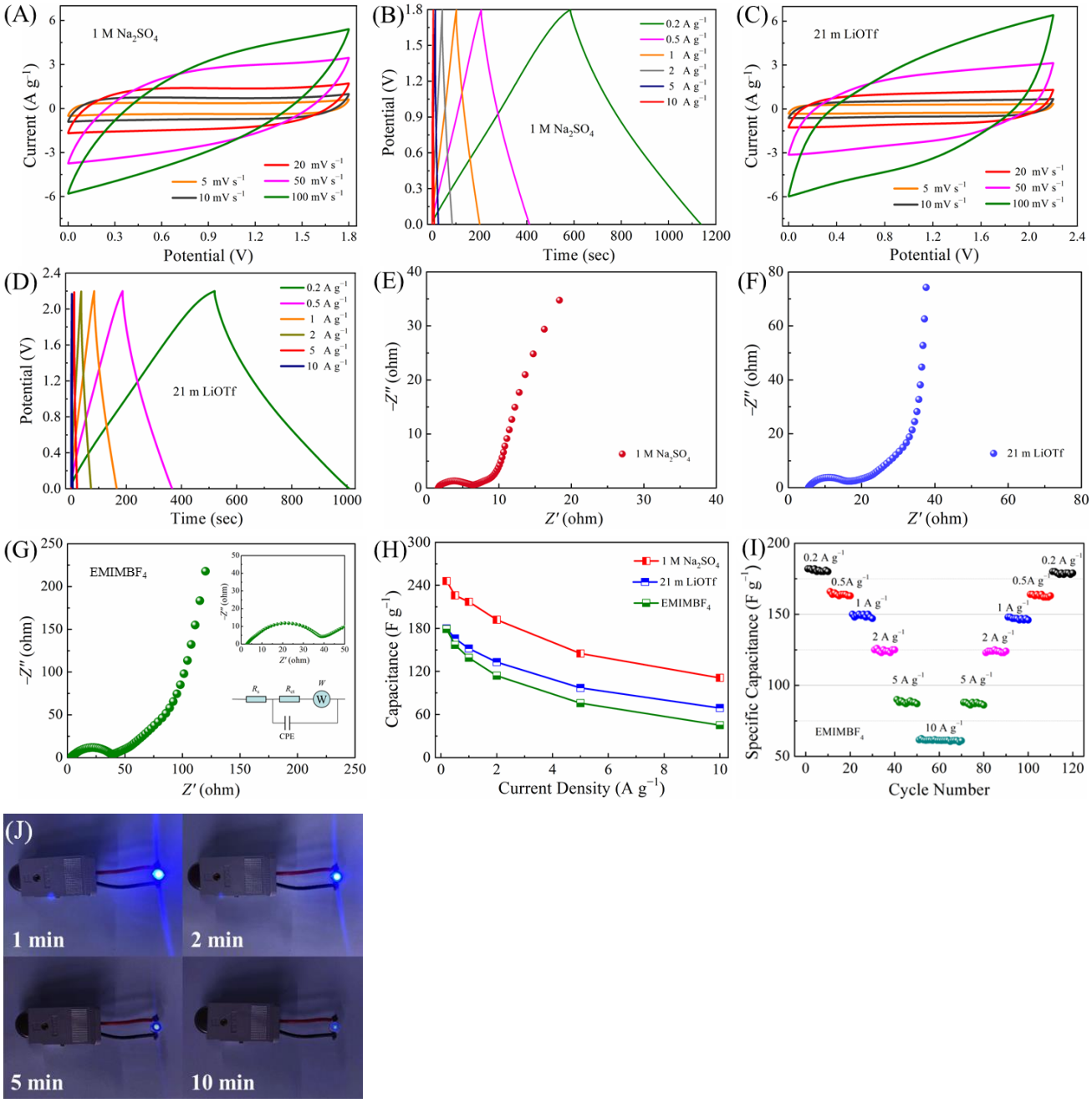

Fig. S7 Electrochemical performances of the symmetric coin-typed cell based on NNC-KH-700 electrode: CV curves at different scan rates for 1 M Na_2SO_4 (A). GCD curves at various current densities for 1 M Na_2SO_4 (B). CV curves at different scan rates for 21 m LiOTf (C). GCD curves at various current densities for 21 m LiOTf (D). Nyquist plots for 1 M Na_2SO_4 (E) and for 21 m LiOTf (F). Nyquist plot and equivalent series resistance for $EMIMBF_4$ (G). Capacitances *vs* current densities (H). Rate performance (I). Images of powered up LED using $EMIMBF_4$ electrolyte (J).

Table S2. Performance comparisons of reported carbon-based devices.

Samples	N/O Content (wt.%)	Specific Surface Area ($m^2\ g^{-1}$)	Electrolyte	Specific Capacitance ($F\ g^{-1}$)	Energy Density ($W\ h\ kg^{-1}$)	References
NNC-KH-700	11.46/10.11	1840	H_2SO_4+KBr	365	18.25	**This work**
			1 M Na_2SO_4	248	24.4	
			21 m LiOTf	180	30.1	
			$EMIMBF_4$	179	89.5	
TCNQ-CTF-800	8.13/−	3663	$EMIMBF_4$	100	42.8	1
Ta-NCa_{850}	7.26/8.24	706	1 M H_2SO_4	362	−	2
NO-PC	2.2/4.8 at.%	3794	6 M KOH	269	18.9	3
a-CNS/EG-10	5.3/−	1532	PVA/KOH	234	6.3	4
HMC-800	4.74/5.53	1306	1 M $LiPF_6$	126	29	5
N1-GDY	3.7/2.65	−	7 M KOH	250	8.66	6
C-silkworm	2.15/12.58 at.%	2258	1 M Na_2SO_4	167	23.17	7
CNS-800	4.9/−	1122	KOH/PVA	190	−	8
N/S-HPCM	5.13/− at.%	927	1 M Na_2SO_4	127	17.6	9
CBC3	6.2/10.4 at.%	3534	6 M KOH	297	18	10

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