

# Supplementary Materials

## Nitrogen-Doped Hierarchical Porous Carbon Derived from Coal for High-Performance Supercapacitor

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**Table S1.** Pore structures of all samples.

Sample	BET SSA (m <sup>2</sup> g <sup>-1</sup> )	Pore Volume (cm <sup>3</sup> g <sup>-1</sup> )	Mesopore Volume (cm <sup>3</sup> g <sup>-1</sup> )	Micropore Volume (cm <sup>3</sup> g <sup>-1</sup> )	V <sub>micro</sub> / (V <sub>micro</sub> + V <sub>meso</sub> )
Mi-CPC	1268	0.56	0.12	0.44	78.6%
h-CPC	1735	1.27	0.76	0.51	40%
Me-CPC	320	0.17	0.07	0.10	59%

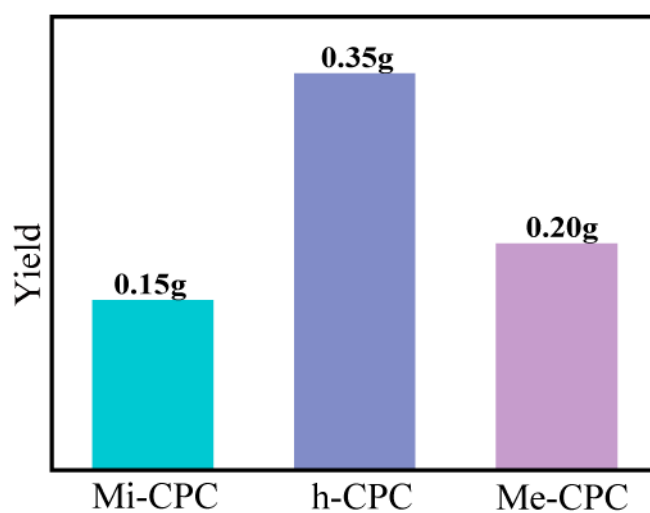
Notes: The pore size distribution is calculated from the corresponding adsorption branch of N<sub>2</sub> isotherm by the nonlocal density functional theory (NLDFT) method for micropores and Barrett-Joyner-Halenda method for mesopores. The total pore volume here is equal to the sum of mesopore volume and micropore volume.

**Table S2.** elemental analysis of the raw coal, OC and prepared samples.

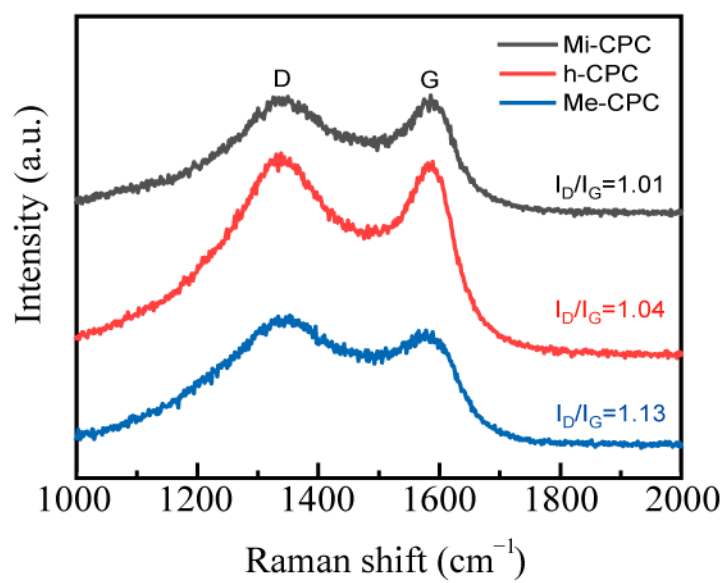
Sample	C (wt.%)	H (wt.%)	N (wt.%)	O (wt.%)
Coal	77.29	4.13	0.93	17.65
OC	48.11	1.83	4.2	45.86
Mi-CPC	70.4	0.55	1.71	28.34
h-CPC	75.98	0.55	2.87	20.6
Me-CPC	65.99	0.3	10.93	22.78

**Table S3.** Elements content obtained from the XPS data of all samples.

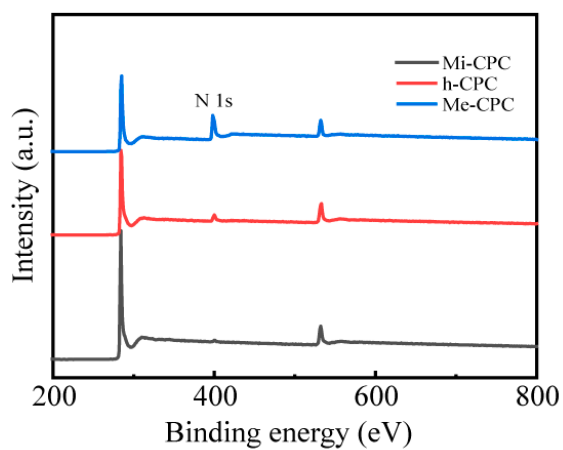
Samples	C (at. %)	N (at. %)	O (at. %)
Mi-CPC	90.91	1.40	7.69
h-CPC	85.03	5.34	9.63
Me-CPC	74.76	18.31	6.93



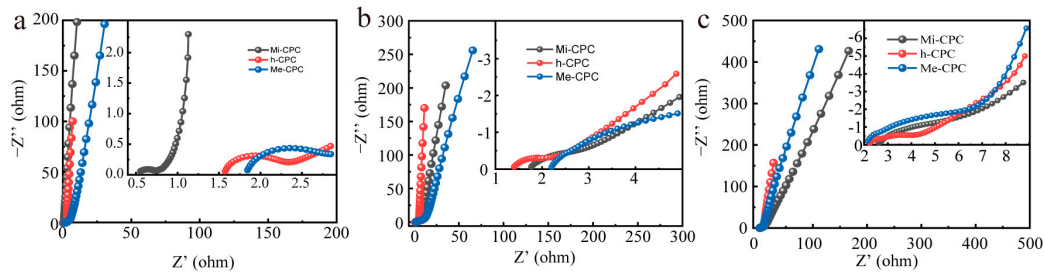
**Figure S1.** The yield data of all samples.



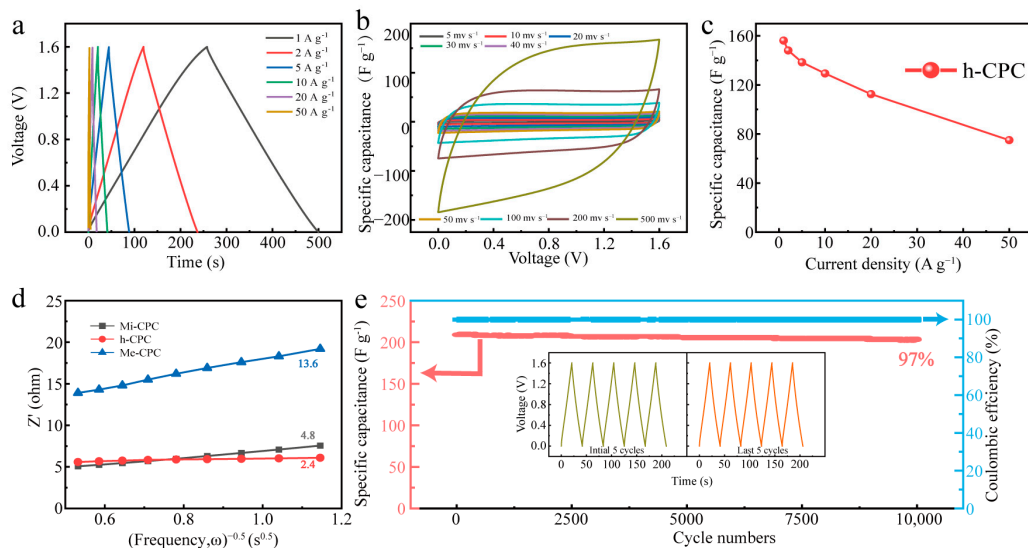
**Figure S2.** The Raman spectra of all samples.



**Figure S3.** XPS survey spectra of Mi-CPC, h-CPC and Me-CPC.



**Figure S4.** Nyquist plots of all resultant samples electrodes: (a) in two-electrode system with 6 M KOH electrolyte, (b) in two-electrode system with 1 M Na<sub>2</sub>SO<sub>4</sub> electrolyte, (c) in two-electrode system with EMIM BF<sub>4</sub> electrolyte.



**Figure S5.** Electrochemical performance of h-CPC in a 1 M Na<sub>2</sub>SO<sub>4</sub> electrolyte for a two-electrode system: (a) GCD curves, (b) CV curves, (c) specific capacitance at different current densities. (d)  $Z'$  versus  $\omega^{-1/2}$  plots for Mi-CPC, h-CPC and Me-CPC. and (e) cycling performance of h-CPC.

**Table S4.** Comparisons of the capacitive performances for the h-CPC electrode in this work and reported carbon materials from literatures.

Sample	Energy Density/ Power Density (Wh kg <sup>-1</sup> /W kg <sup>-1</sup> )	Electrolyte	Ref.
N, S self-doped porous carbon nanosheets	7.4/486.7	6M KOH	1
Porous carbon nanospheres	6.5/80 3.7/4000	6M KOH	2
N,O-codoped egg-box-like carbons	8.09/257	6M KOH	3
Rice husk-based hierarchical porous carbon	7.7/241	6M KOH	4
Hollow N-doped carbon frameworks	4.36/249	6M KOH	5
N-doped porous carbon nanosheets	7.15/50.4	6M KOH	6
Hierarchical porous carbon spheres	7.8/31.2 5.1/6200	6M KOH	7
Heteroatom incorporated porous carbon	9/227	6M KOH	8
Hierarchical porous carbon nanorods	6.77/100 3.6/10000	6M KOH	9
Hierarchical coal-based porous carbon materials	8.3/250	6M KOH	This work
Honeycomblike mesoporous carbons	31.7/620 18/10600	1 M TEABF <sub>4</sub> /AN	10
N-doped graphene	34.5/679.4 12.8/251400	BMIMBF <sub>4</sub>	11
Natural shiitake mushroom	41/875 31/6750	1 M (TEABF <sub>4</sub> /AN)	12
Hair derived micro/mesoporous carbon	45.33/75 29/2243	1 M LiPF <sub>6</sub> EC/DEC	13
Graphitic carbon nanosheets	40/750 19/20000	BMPY TFSI	14
Hierarchical coal-based porous carbon materials	48.3/759	BMIMBF <sub>4</sub>	This work

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