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N-doped 3D Hierarchical Carbon from Resorcinol–formaldehyde–melamine Resin for High-Performance Supercapacitors

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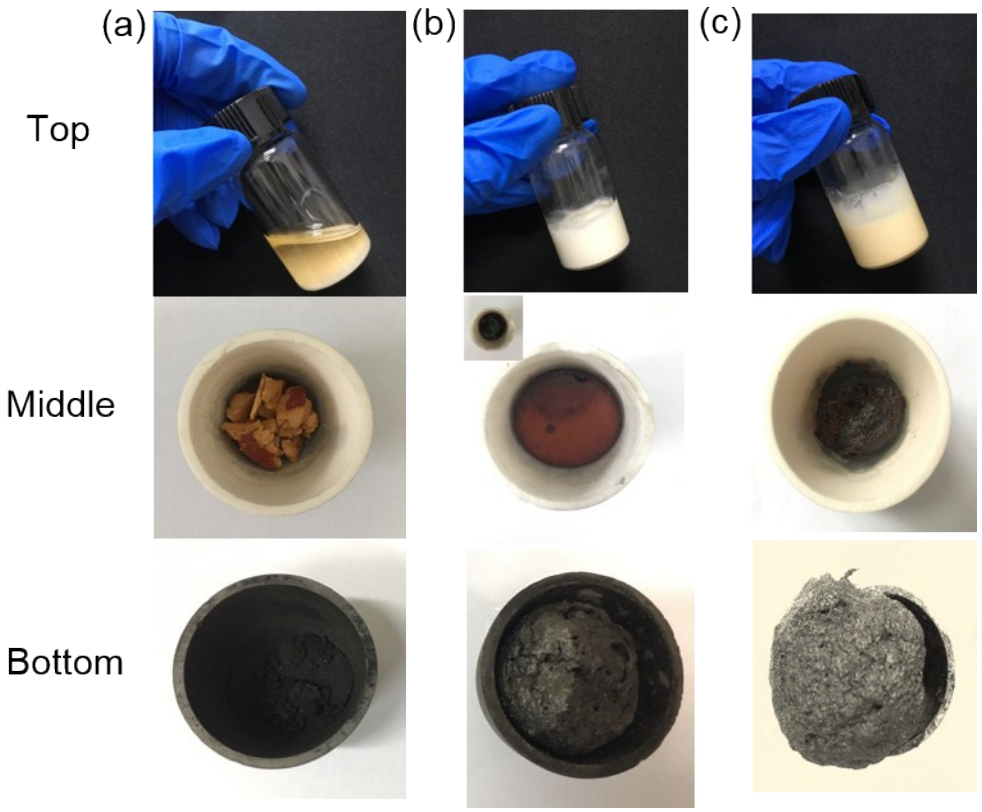

Fig. S1 (a) Photographs of solution without $ZnCl_2$ (top), N-PM-0 (middle) and N-HPC-0 (bottom); (b) Photographs of the sol with 3 g $ZnCl_2$ (top), N-PM-3 (middle) and N-HPC-3 (bottom); (c) Photographs of the sol with 9 g $ZnCl_2$ (top), N-PM-9 (middle) and N-HPC-9 (bottom);

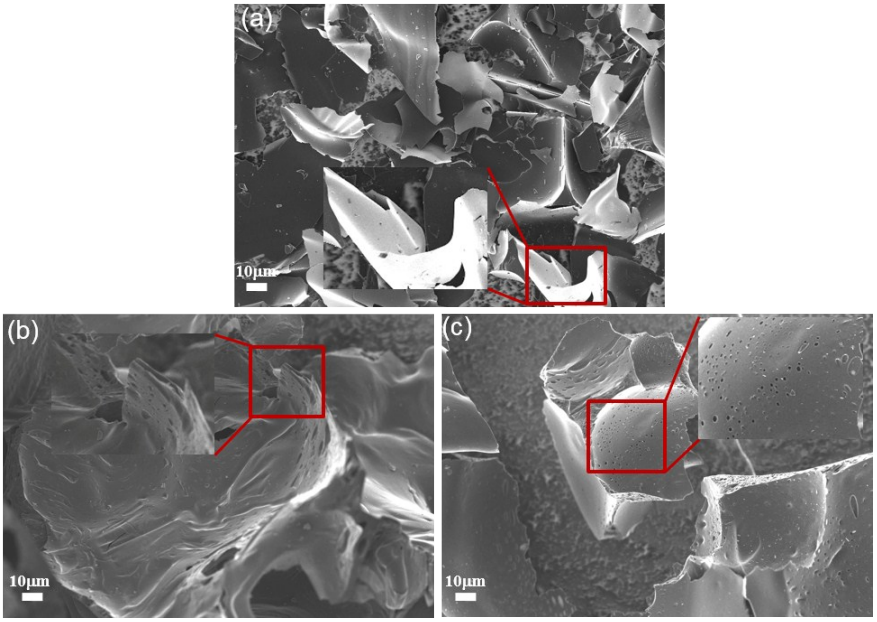

Fig. S2 FESEM images of (a) N-HPC-3, (b) N-HPC-6 and (c) N-HPC-9.

The specific capacitance from the CV curves (C_{CV}) was calculated using equation S1[1]:

$$C_{CV} = \frac{\int i\mathrm{d}V}{2v\Delta V} \tag{S1}$$

where i (A/g) is the current density, ΔV (V) is the applied potential window, v (mV/s) is the scan rate. Herein, the C_{cv} values of N-HPC-*x*s are calculated to be about 19, 276, 348 and 113 F/g at 50 mV/s for N-HPC-0, N-HPC-3, N-HPC-6 and N-HPC-9, respectively.

Table S1 Comparison of different carbon for supercapacitor electrode materials

samples	Publish year	S_{BET} (m^2g^{-1})	Capacitance (Fg^{-1})	Measurements condition ($A\ g^{-1}$)	electrolyte	Ref.
Nitrogen-doped porous carbon	2015	1052	192	10	2M KOH	2
N-doped porous carbons	2018	1478	292	1	6M KOH	3
Nitrogen-doped porous carbon foam	2016	1357.6	210.6	0.5	6M KOH	4
N-doped porous carbon nanosheets	2018	1403	362	2	6M KOH	5
N-doped activated carbons	2016	2859	185	0.4	organic	6
N-doped porous carbon	2017	617	360	0.5	6M KOH	7
Sulfur-doped hierarchically porous carbon	2016	735	252	4	1M H_2SO_4	8
Schiff based-derived carbon powder (synthetic material)	2015	1377	377	0.2	6M KOH	9
Nitrogen-doped porous carbon	-	822	423	1	1M H_2SO_4	This work

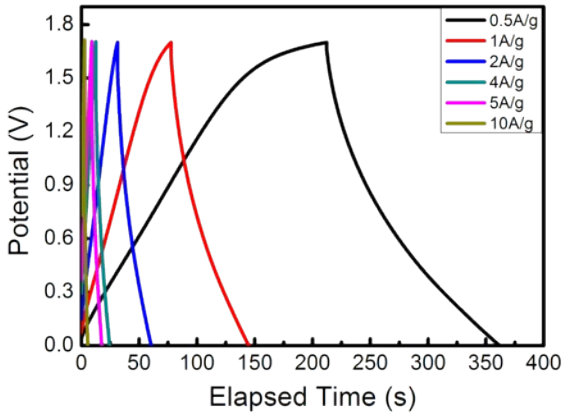

Fig. S3 GCD curves of N-HPC-6// N-HPC-6 at various current densities.

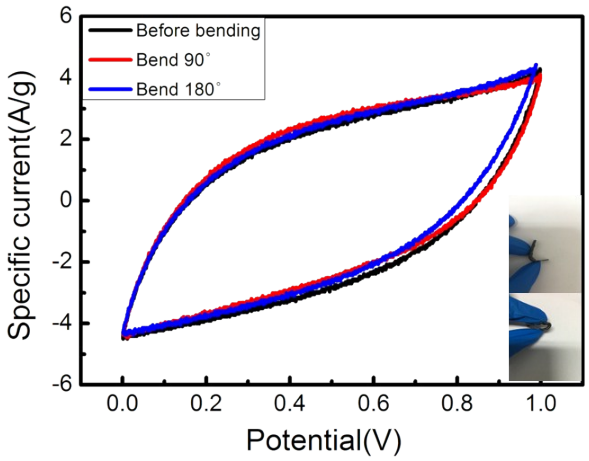

Fig. S4 CV curves of solid-state supercapacitor based on N-HPC-6 at sweep rate of 50 mV/s bended by different angles, 0°, 90°and 180°, the inset is digital images of 90°and 180°.

References

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