# Supporting information

## Design and preparation of highly structure-controllable mesoporous carbons at the molecular level and application as electrode materials for supercapacitors

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This supporting information includes:

Table S1, Table S2, Table S3, Figure S1, Figure S2, Figure S3, and Figure S4

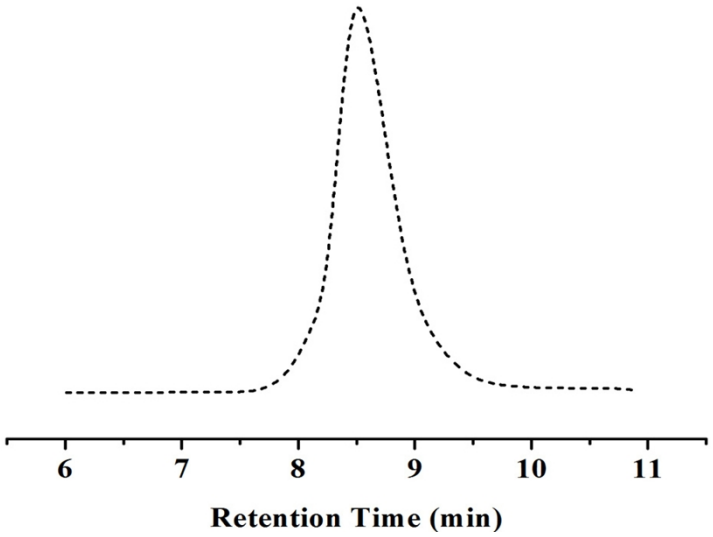


**Figure S1** GPC curve of PAN macroinitiator.

The GPC results: $M_{n\,(GPC)}$ = 22 153 g mol$^{-1}$ and PDI = $M_w/M_n$ = 1.04

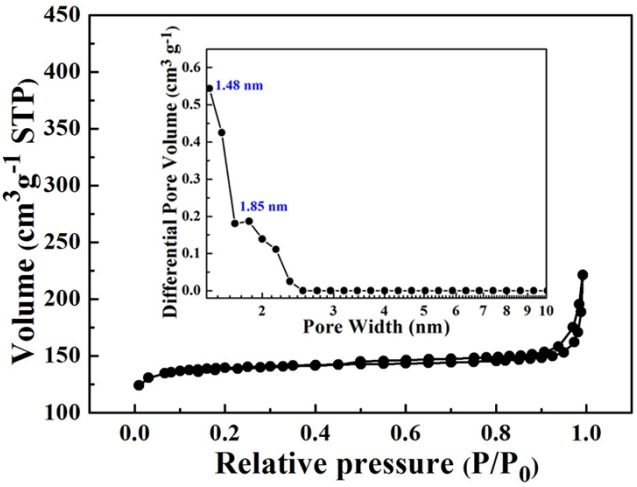


**Figure S2** The nitrogen adsorption-desorption isotherm at -196 ºC of PAC via PAN macroinitiator pyrolysis; And the corresponding pore size distribution (inset) calculated from the adsorption branch of the isotherms using the density function method (DFT) model.

**Table S1**

| Sample | $S_{BET}$ [a] ($m^2\ g^{-1}$) | $S_{meso}$ [b] ($m^2\ g^{-1}$) | $S_{micr}$ [c] ($m^2\ g^{-1}$) | $P$ [d] (nm) | $V_{tota}$ [e] ($cm^3\ g^{-1}$) | $V_{meso}$ [f] ($cm^3\ g^{-1}$) | $V_{micr}$ [g] ($cm^3\ g^{-1}$) |
|---|---|---|---|---|---|---|---|
| PAC | 461.3 | 63.8 | 397.5 | 1.48 | 0.243 | 0.054 | 0.189 |

[a] The specific surface areas were calculated using the BET method. [b] Mesopore surface area. [c] Micropore surface area. [d] The pore diameters were calculated from the adsorption branch of the isotherms by using the DFT model. [e] Total pore volume measured at $P/P_0$ = 0.99. [f] Mesopore volume. [g] Micropore volume.

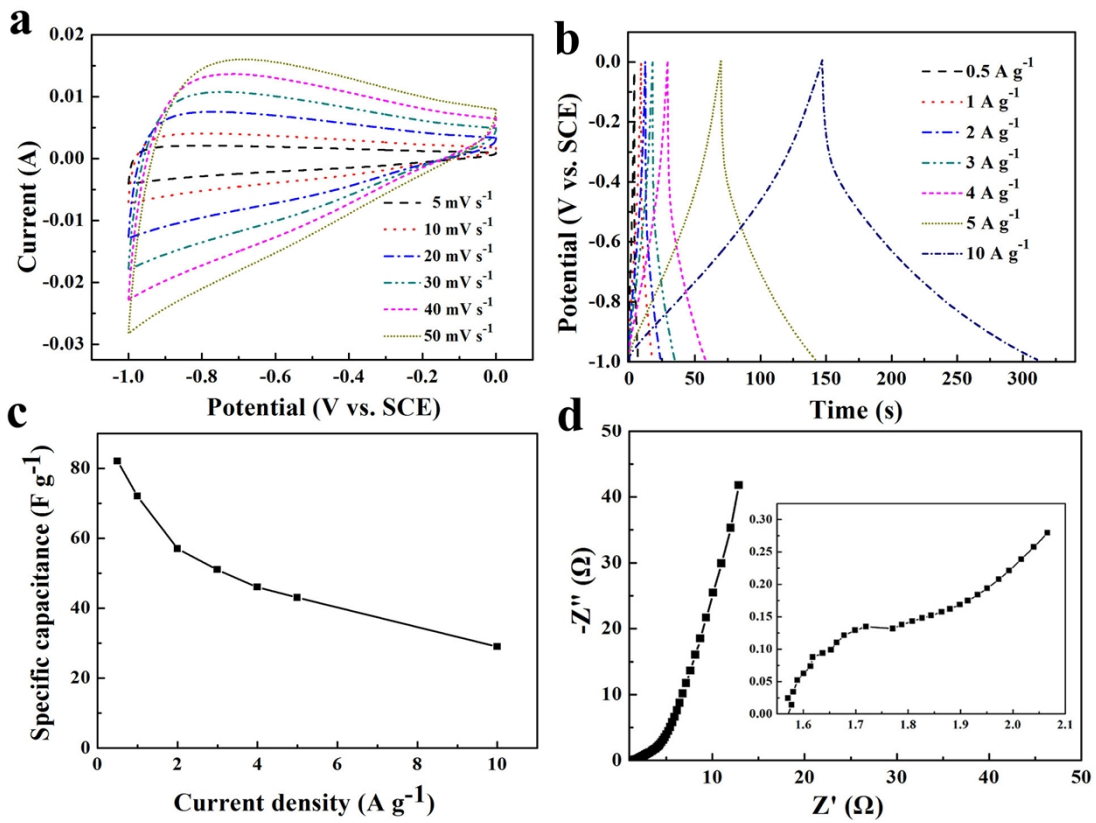


**Figure S3** Electrochemical characterization of HSCMC-5 electrode in 2 mol $L^{-1}$ KOH aqueous electrolyte: (a) CV curves at different scan rates of 5 mV $s^{-1}$ to 100 mV $s^{-1}$ with a potential window from -1V to 0 V; (b) Galvanostatic charge-discharge curves at different current densities of 0.5 A $g^{-1}$ to 10 A $g^{-1}$; (c) Specific capacitance at different current density ranging from 0.5 A $g^{-1}$ to 10 A $g^{-1}$; (d) EIS curve measured in the frequency range from $10^5$ Hz to $10^{-2}$ Hz at the open circuit voltage with an alternate current amplitude of 5 mV.

**Table S2.** Raman peak parameter of HSCMC-5. To obtain the intensity (area) of D and G bands, Loretzian fitting was conducted in origin pragram. The crystallite size of the nanographitic structure domain ($L_a$) was calculated by using $L_a = (2.4 \times 10^{-10}) \times \lambda^4 \times (I_D/I_G)^{-1}$, where $\lambda$ is the laser wave length (nm).

| Sample | Peak | Area% | $I_D/I_G$ | $L_a$（nm） |
|---|---|---|---|---|
| HSCMC-5 | D | 65.75 | 1.92 | 9.13953 |
| | G | 34.25 | | |

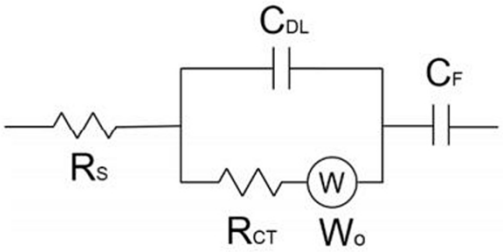


**Figure S4**. An equilibrium circuit used to fit the Nyquist plot using the software Zsimpwin. ($R_S$:

Cell internal resistance, $R_{CT}$: Charge transfer resistance, $C_{DL}$: Double layer capacitance, $W_O$: Warbug diffusion element, $C_F$: Faradic capacitance.)

**Table S3**. Equivalent circuit parameters obtained by using fitting program.

| Samples | $R_S$ (Ω) | $C_{DL}$ (μF) | $R_{CT}$ (Ω) | $W_O$ (Ω.$^{-1/2}$) | $C_F$ (F) |
|---|---|---|---|---|---|
| PAC | 1.691 | 927.5 | 0.3944 | 1.1925 | 0.5056 |
| HSCMC-1 | 1.205 | 881.4 | 0.1315 | 0.5619 | 0.4115 |
| HSCMC-2 | 1.131 | 1 166 | 0.1515 | 0.4146 | 0.5422 |
| HSCMC-3 | 1.124 | 1 815 | 0.1922 | 0.3754 | 0.5985 |
| HSCMC-4 | 1.094 | 666.2 | 0.1218 | 0.5201 | 0.3213 |
| HSCMC-5 | 1.080 | 333.2 | 0.0804 | 0.0757 | 0.5356 |
| HSCMC-6 | 1.404 | 972.3 | 0.0921 | 0.7781 | 0.5352 |
| HSCMC-7 | 1.413 | 559.8 | 0.2365 | 0.5591 | 0.4393 |