

Supporting Information

One-step and template-free preparation of hierarchical porous carbons with high capacitive performance

Jin Zhou*, Zhongshen Zhang, Zhaohui Li, Tingting Zhu, and Shuping Zhuo*

School of Chemical Engineering, Shandong University of Technology, Zibo 255049,

P. R. China. Tel. /fax: +86 533 2781664

Table of Contents

Fig. S1 Photographic pictures of the hydrogel and xerogel

Fig. S2 SEM images (a, b) HPC-6, (c) HPC-7, (d) HPC-8, (e, f, g) HPC-9 and (h) HPC-10

Fig. S3 TEM images (a) HPC-6, (b) HPC-7, (c) HPC-8, (d) HPC-9 and (e, f) HPC-10

Fig. S4 Porosity analysis of HPC-x (a) nitrogen sorption isotherms, (b, c) NLDFT pore size distribution calculated from N₂ adsorption isotherms, (d) NLDFT micropore size distribution calculated from CO₂ adsorption isotherms

Fig. S5 (a) N₂ sorption isotherms and (b) pore size distribution of direct-dried xerogels

Fig. S6 (a) N₂ sorption isotherms and (b) pore size distributions of HPC carbon prepared at 900°C

Fig. S7 (a) Galvanostatic charge/discharge curves at different current density, (b) volumetric capacitance of HPC-9d and CMK-3 in KOH and organic electrolytes

Fig. S8 Specific capacitances of HPC carbon prepared at 900 °C in KOH electrolyte

Fig. S9 normalized imaginary capacitance vs. alternative current frequency

Fig. S10 (a) CV curves of HPC-9d at different scan rate and (b) galvanostatic charge/discharge curves of HPC-9d at different current density in TEABF₄/AN electrolyte

Table S1 Texture properties of samples

Table S2 Values of I_D/I_G for the prepared carbon materials in this work

Table S3 Specific capacitance at 0.20 A g⁻¹ and the time constant in KOH electrolyte

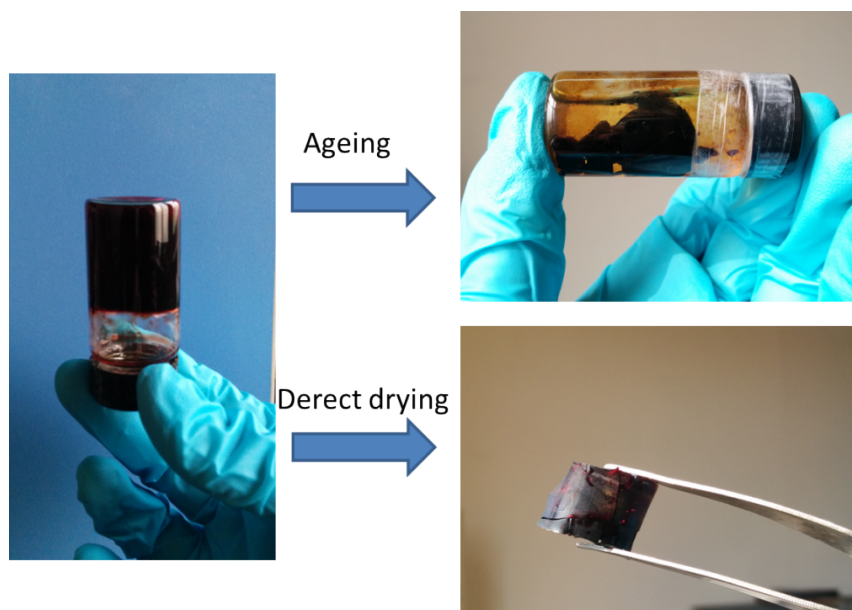


Fig. S1 Photographic pictures of the hydrogel and xerogel

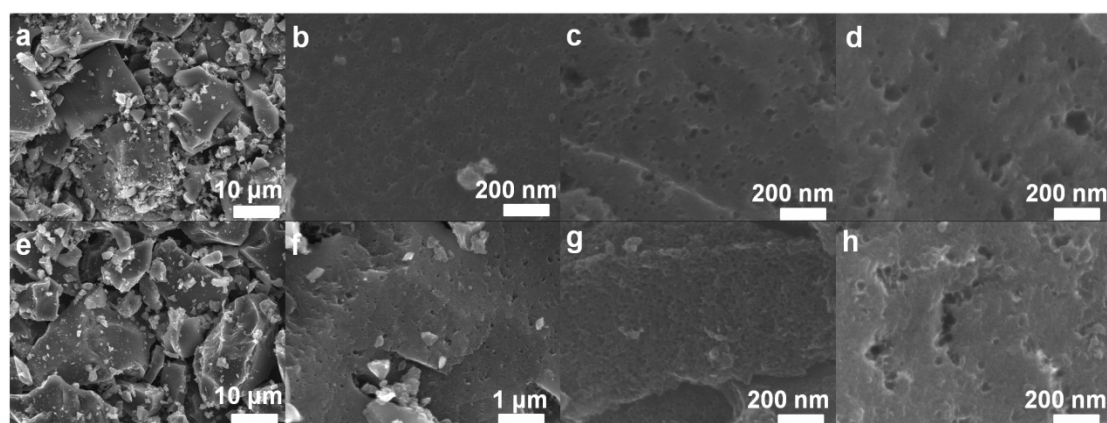


Fig. S2 SEM images (a, b) HPC-6, (c) HPC-7, (d) HPC-8, (e, f, g) HPC-9 and (h) HPC-10

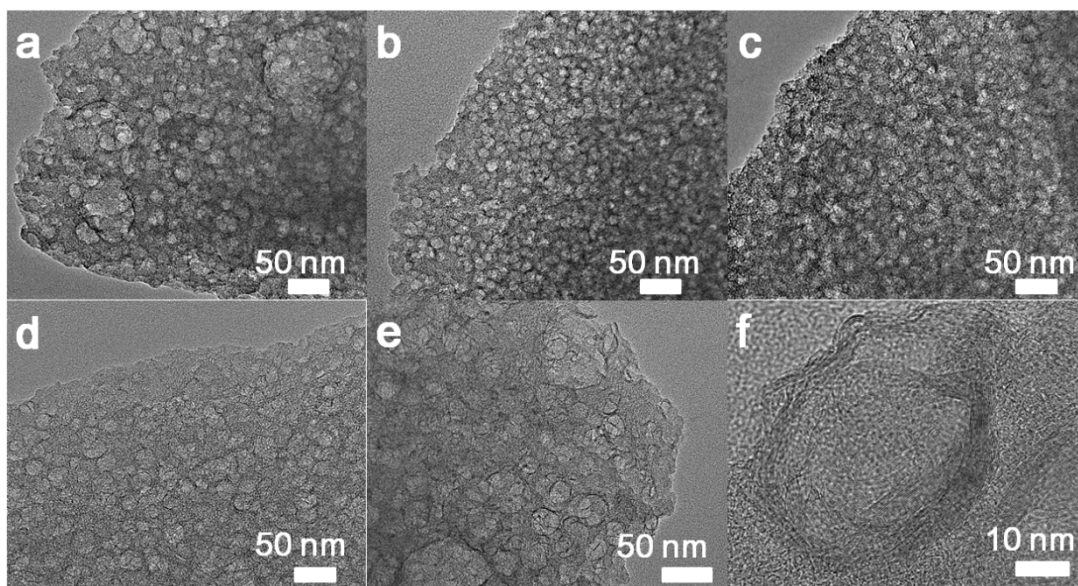


Fig. S3 TEM images (a) HPC-6, (b) HPC-7, (c) HPC-8, (d) HPC-9 and (e, f) HPC-10

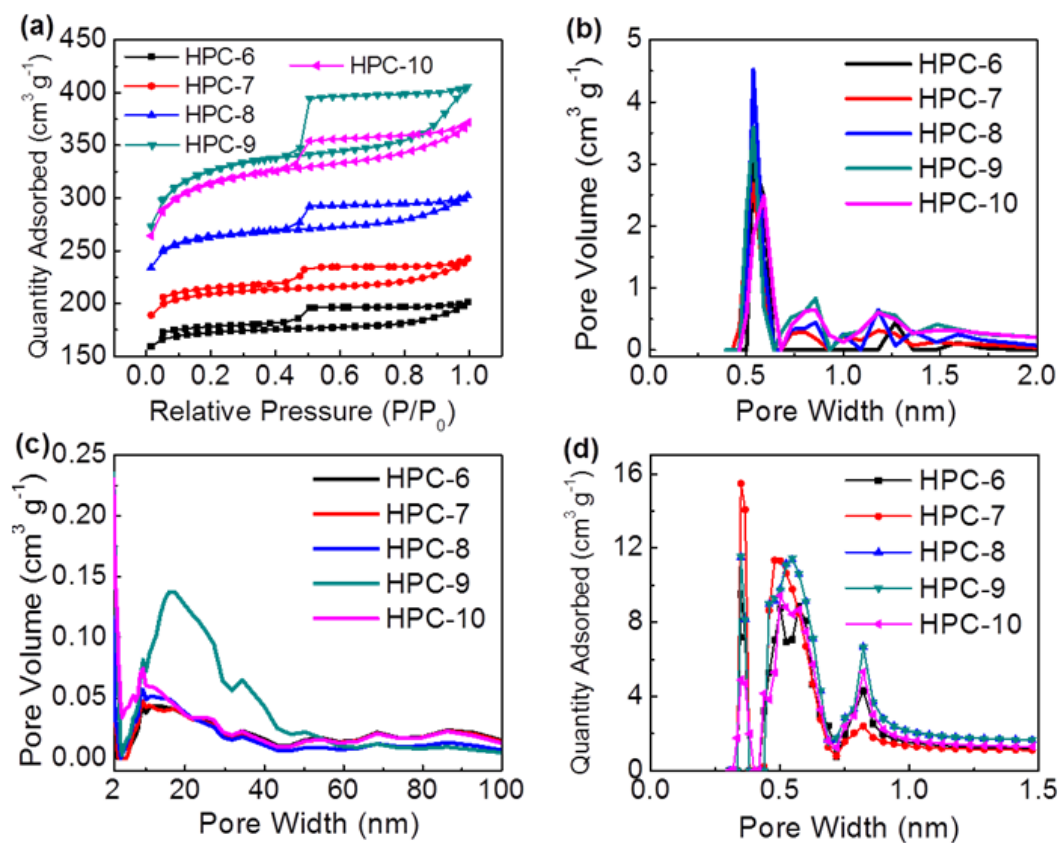


Fig. S4 Porosity analysis of HPC-*x* (a) nitrogen sorption isotherms, (b, c) NLDFT pore size distribution calculated from N_2 adsorption isotherms, (d) NLDFT micropore size distribution calculated from CO_2 adsorption isotherms

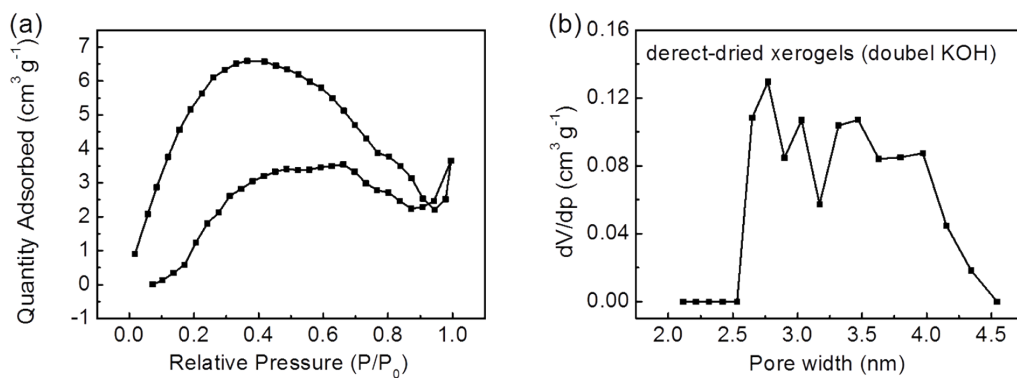


Fig. S5 (a) N_2 sorption isotherms and (b) pore size distribution of direct-dried xerogels

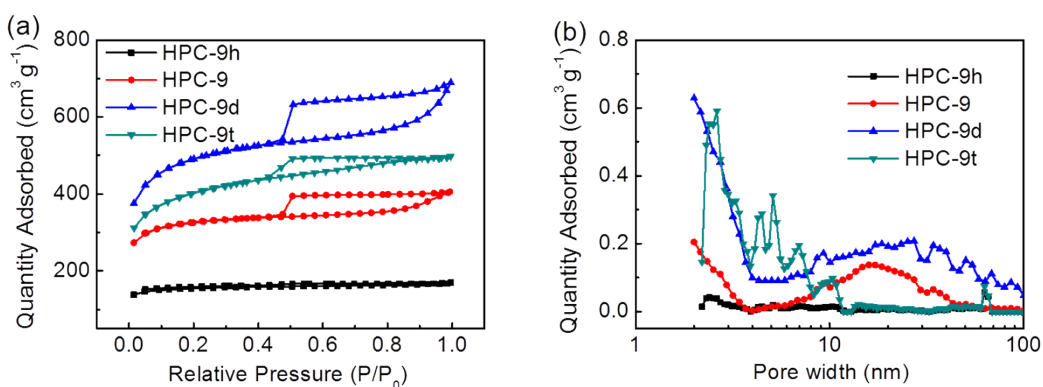


Fig. S6 (a) N_2 sorption isotherms and (b) pore size distributions of HPC carbon prepared at 900°C

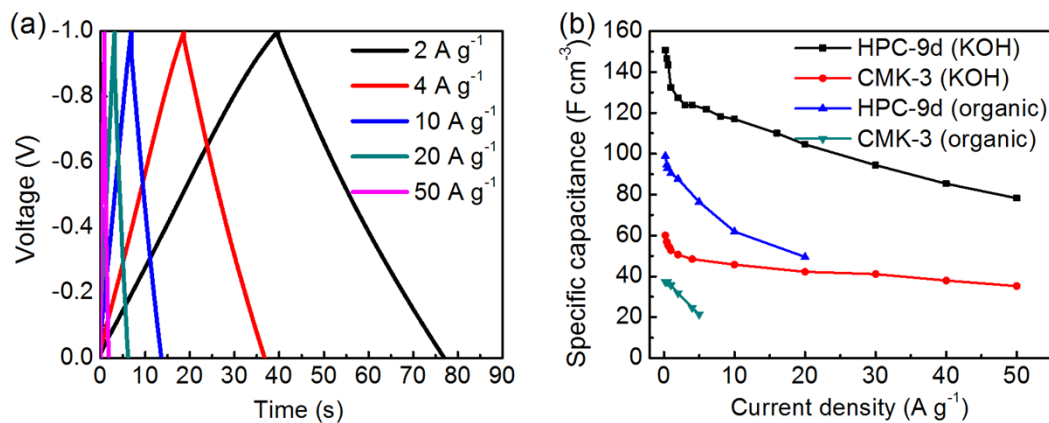


Fig. S7 (a) Galvanostatic charge/discharge curves at different current density, (b) volumetric capacitance of HPC-9d and CMK-3 in KOH and organic electrolytes

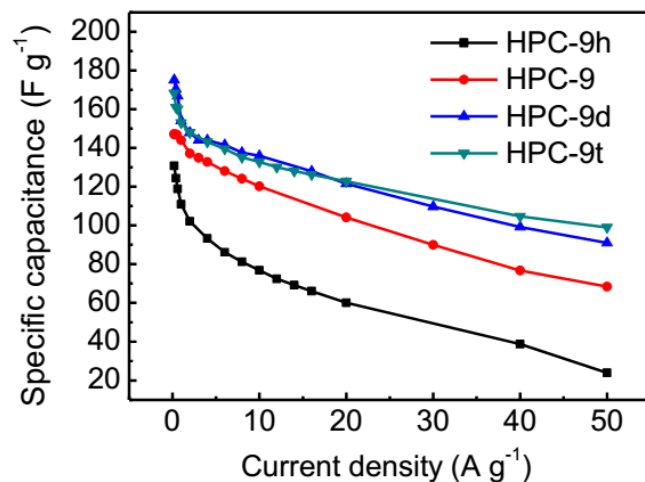


Fig. S8 Specific capacitances of HPC carbon prepared at 900 °C in KOH electrolyte

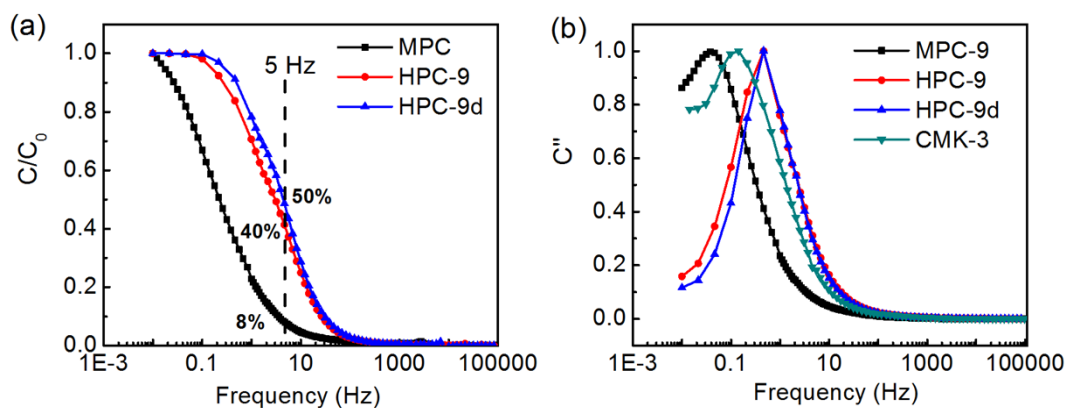


Fig. S9 normalized imaginary capacitance vs. alternative current frequency

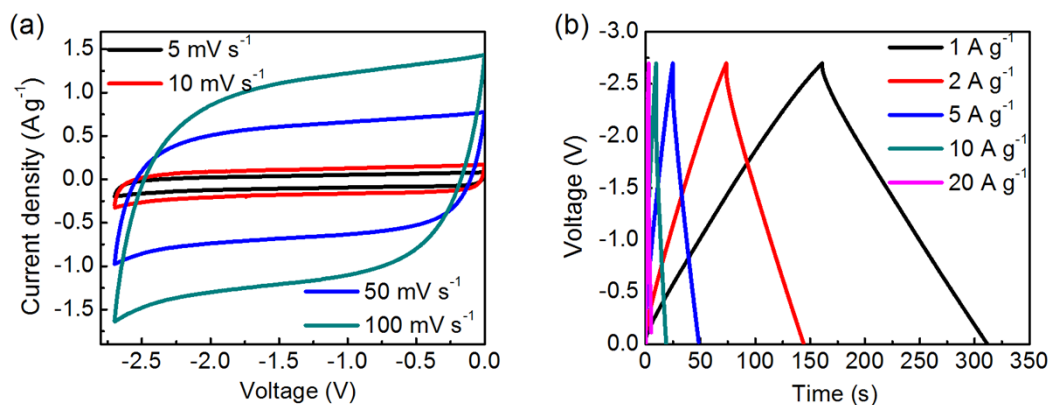


Fig. S10 (a) CV curves of HPC-9d at different scan rate and (b) galvanostatic charge/discharge curves of HPC-9d at different current density in TEABF₄/AN electrolyte

Table S1 Texture properties of samples

Sample	S_{BET} ($\text{m}^2 \text{g}^{-1}$)	V_{T} ($\text{cm}^3 \text{g}^{-1}$)	V_{meso} ($\text{cm}^3 \text{g}^{-1}$)	V_{micro} ($\text{cm}^3 \text{g}^{-1}$)
HPC-9h	473	0.26	0.04	0.22
HPC-9	1007	0.62	0.16	0.46
HPC-9d	1549	0.81	0.17	0.61
HPC-9t	1387	0.77	0.29	0.48

Table S2 Values of $I_{\text{D}}/I_{\text{G}}$ for the prepared carbon materials in this work

Sample	HPC-6	HPC-7	HPC-8	HPC-9	HPC-10	HPC-9d	MPC-9
$I_{\text{D}}/I_{\text{G}}$	0.80	0.82	0.84	0.85	0.85	0.86	0.83

Table S3 Specific capacitance at 0.20 A g^{-1} and the time constant in KOH electrolyte

Samples	C_{KOH} (F g^{-1})	C_{Organic} (F g^{-1})	τ
MPC-9	174.4	1.9	3.95
HPC-9	147.2	38.0	0.36
HPC-9d	175.2	115.0	0.33
CMK-3	126.6	78.6	1.17