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Electronic Supplementary Information

Solution-processable hypercrosslinked polymers by low cost strategies: a promising platform for gas storage and separation

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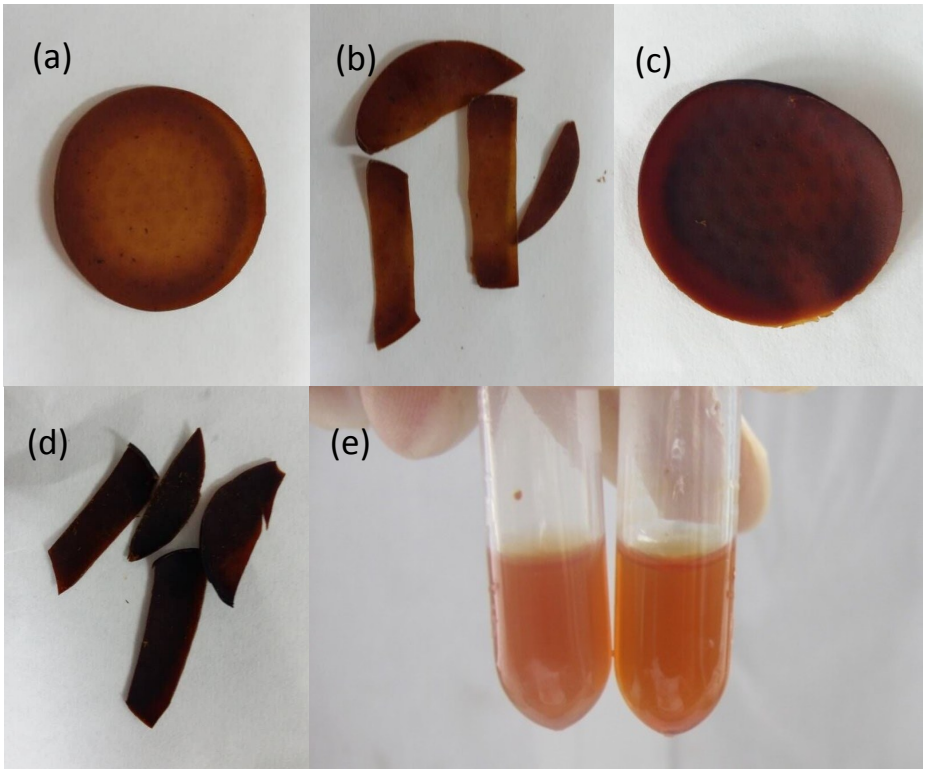

Figure S1 Photographs of insoluble HCP-1 (a) and HCP-2 (c) after filtrating, and small pieces of HCP-1 (b) and HCP-2 (d). Both materials swell in THF (e).

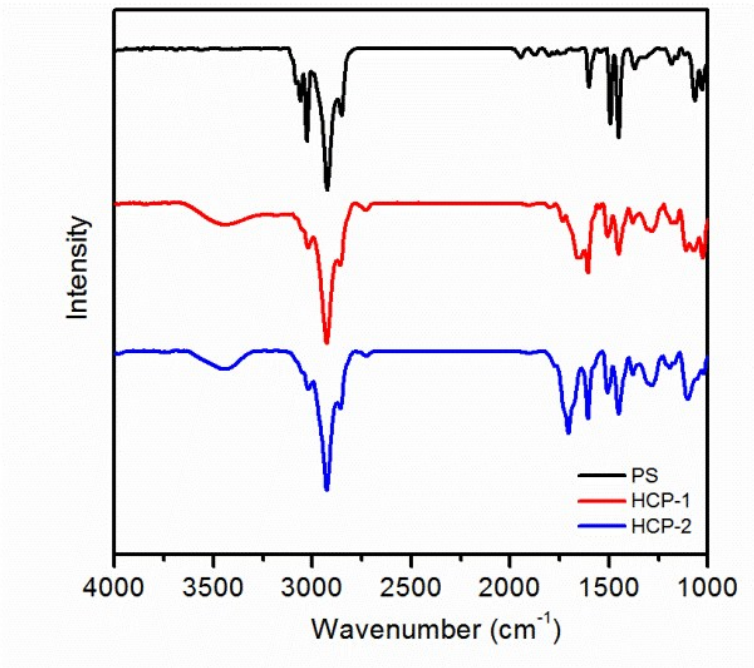

Figure S2 FTIR spectra of PS, HCP-1 and HCP-2.

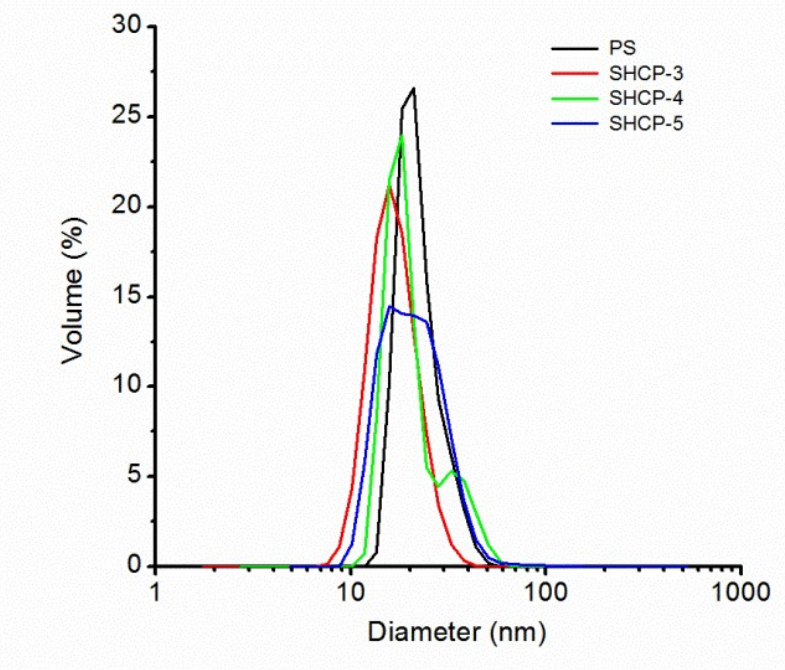

Figure S3 DLS curves of PS and SHCPs. Solvent: tetrahydrofuran.

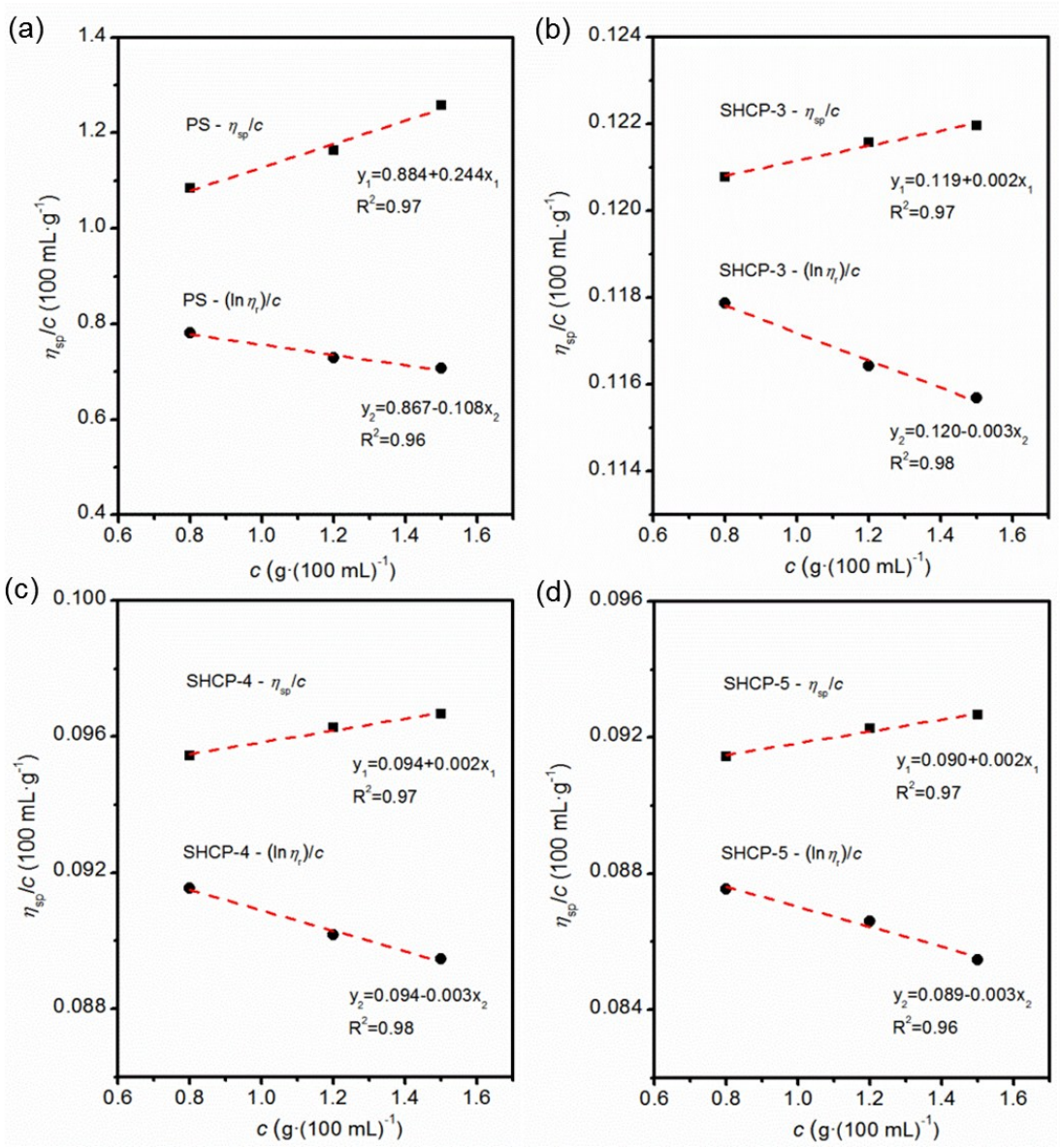

Figure S4 The intrinsic viscosity of PS and SHCPs. Solvent: tetrahydrofuran.

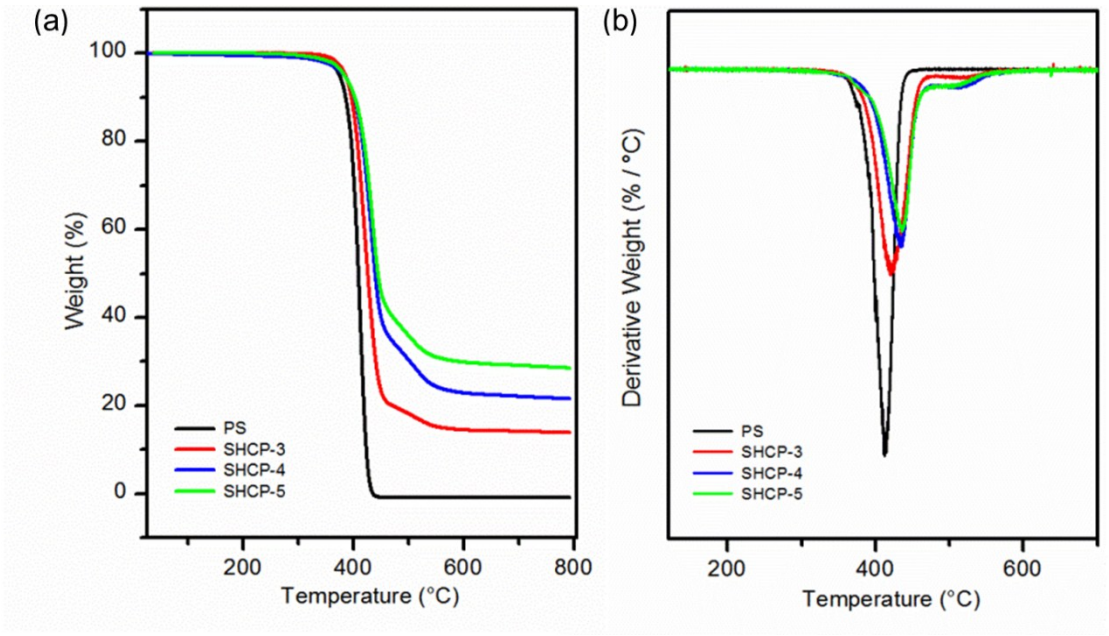

Figure S5 TG (a) and DTA (b) curves of PS and SHCPs at a heating rate of 10 ºC/min under nitrogen atmosphere.

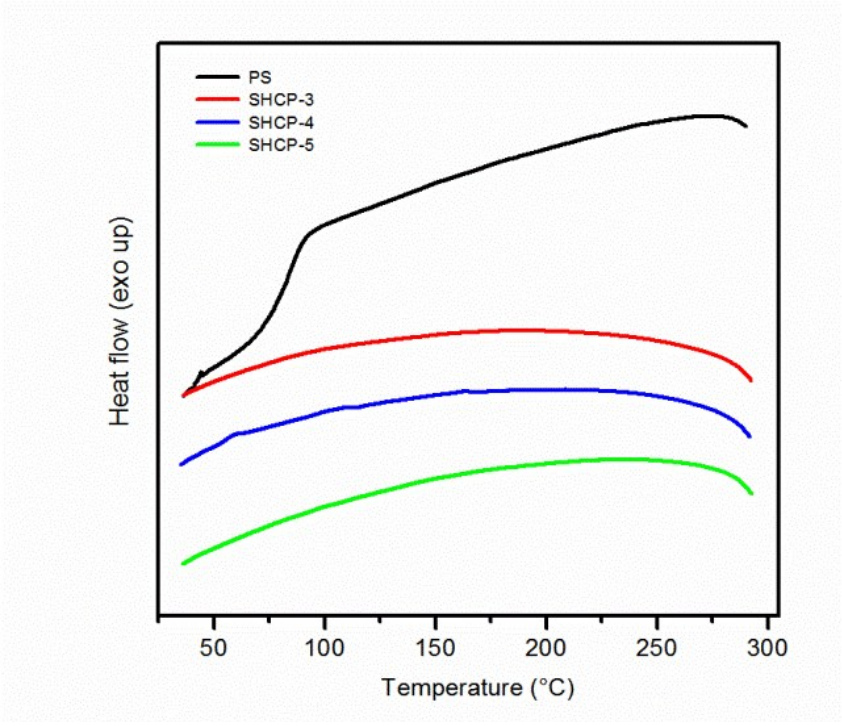

Figure S6 DSC curves of PS and SHCPs at a heating rate of 10 ºC/min under nitrogen atmosphere.

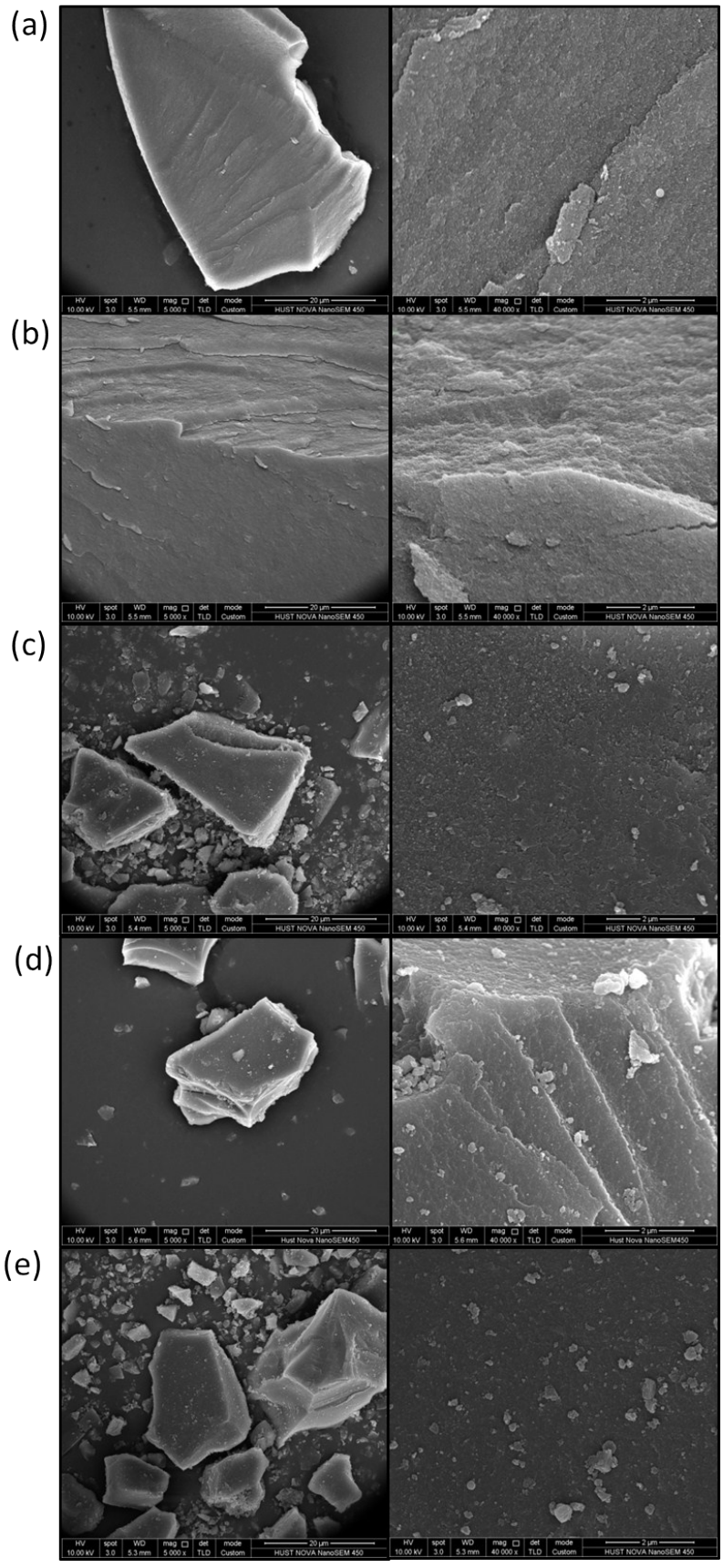

Figure S7 SEM image of the HCP-1 (a), HCP-2 (b), SHCP-3 (c), SHCP-4 (d) and SHCP-5 (e), scale bar: 20 μm (left), 2 μm (right).

Table S1 Reaction conditions for HCPs and SHCPs. The total volume of solvent was 450 mL in each reaction, for samples 3, 4 and 5 the cross-linker (FDA) was slowly added in a 50 mL solution.

Sample	PS (g)	FDA (μL)	$FeCl_3$ (g)	S_{BET}[a)] (m^2g^{-1})
HCP-1	0.10	270	1.22	981
HCP-2	0.22	580	1.08	1125
SHCP-3	0.05	270	0.60	187
SHCP-4	0.52	270	0.60	480
SHCP-5	0.52	500	0.60	724

[a)]surface area for the complete sample, the surface area for the soluble component is shown in table S2.

Table S2 The weight of sedimentations of SHCPs.

Sample	M_1[a)] (g)	M_2[b)] (g)	f[c)] (%)	S_{BET}[d)] (m^2 g^{-1})
SHCP-3	0	0.0500	100	158
SHCP-4	0.0110	0.0390	78	355
SHCP-5	0.0353	0.0147	29	530

[a)]The weight of sedimentations; [b)]The weight which dissolved in chloroform; [c)]$M_2/(M_1+M_2)$ *100%, weight fractions of soluble part; [d)]Apparent surface area of soluble fractions calculated from nitrogen adsorption isotherms at 77.3 K using BET equation.

Table S3 Molecular weight and polydispersity index of SHCPs.

Sample	S_{BET} (m^2 g^{-1})	M_w	M_n	PDI
PS	0	167700	65600	2.56
SHCP-3	187	145000	65600	2.21
SHCP-4	480	177500	98000	1.81
SHCP-5	724	173300	106500	1.63