

Electronic Supplementary Information

Straightforward synthesis of a triazine-based porous carbon with high gas-uptake capacities

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Table S1. Elemental analysis of TPC-1.

Sample	C	N	F	H	C/N
Monomer ^a (wt%)	48.02	14.00	37.98	0	3.43
TPC-1 (wt%)	60.54	20.87	0 ^b	2.23	2.90

^a Theoretical value of the monomer; ^b deduced by XPS, EDX and ¹⁹F NMR analysis.

Table S2. Porosity properties of TPC-1.

Material	S_{BET} (m ² g ⁻¹) ^a	S_{micro} (m ² g ⁻¹) ^b	$S_{\text{micro}}/$ S_{BET}	V_{total} (cm ³ g ⁻¹) ^c	V_{micro} (cm ³ g ⁻¹) ^d	$V_{\text{micro}}/$ V_{total}	D_{pore} (nm) ^e
TPC-1	1940	800	0.41	1.23	0.36	0.29	0.63

^a Specific surface area calculated from the nitrogen adsorption isotherm using the BET method at the relative pressure ranging from 0.05 to 0.2. ^b Micropore surface area calculated from the nitrogen adsorption isotherm using the *t*-plot method. ^c Total pore volume at $P/P_0 = 0.97$. ^d Micropore volume calculated from the nitrogen adsorption isotherm using the *t*-plot method. ^e Dominant pore size determined by the nonlocal density functional theory (NLDFT) method.

Table S3. Summary of CO₂/N₂ adsorption selectivity for various nitrogen-containing adsorbents.

Porous materials		CO ₂ /N ₂ selectivity ^a	References
Porous carbon materials	TPC-1	38	This work
	NC-800	21.6	S1
	NPC-650	23.4	S2
	HCM-DAH-1	28 ^b	S3
	PIF6	58.9 ^b	S4
Porous organic polymers	PCTF-7	22	S5
	PI-1	27 ^b	S6
	ALP-3	43	S7
	PECONF-1	109	S8
	BILP-2	113	S9
Porous coordination polymers	rht-type MOF (1) cobalt-imidazolate framework (2')	34.3	S10
		59	S11
	Bio-MOF-11	81	S12
	CAU-1	101	S13

^a These data are estimated from the ratio of initial slopes of CO₂ and N₂ adsorption isotherms at 273 K unless stated otherwise; ^b data obtained at 298 K.

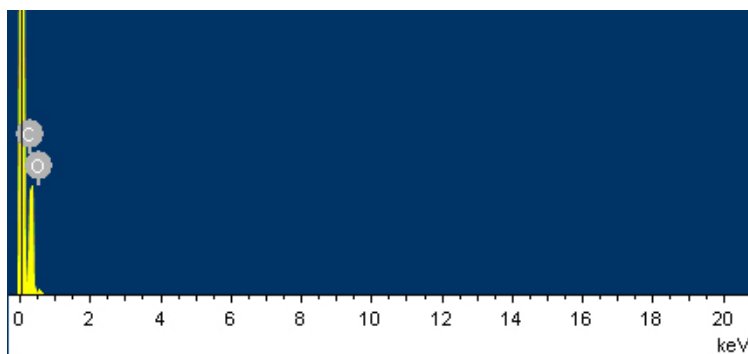


Figure S1. EDX spectrum of TPC-1: Zn (around 1.0 keV) or Cl (around 2.6 and 8.6 keV) signal from ZnCl_2 is not observed.^{S14}

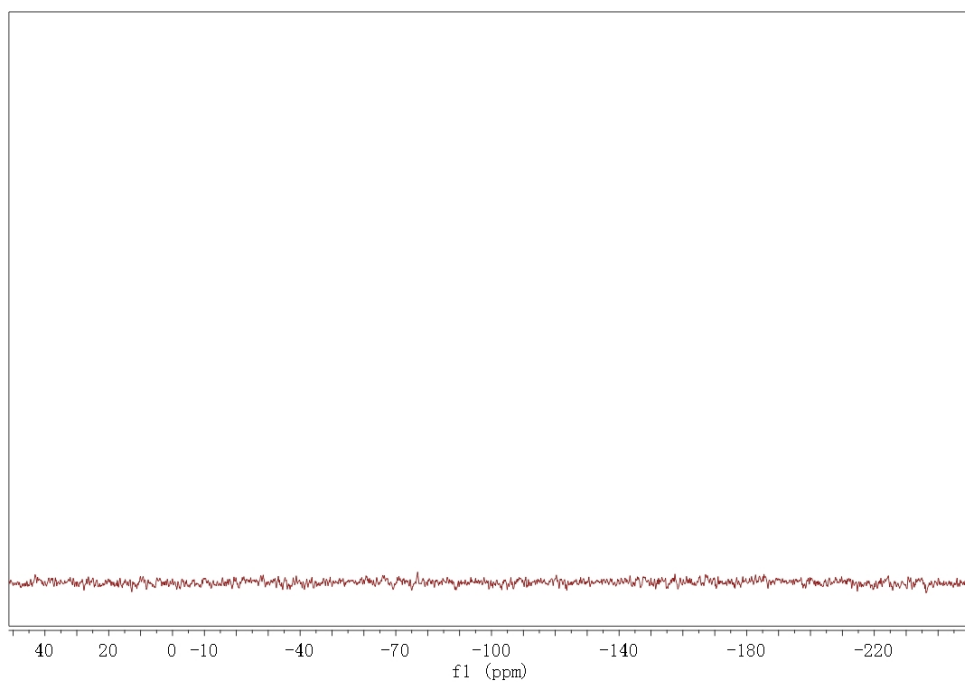


Figure S2. Solid state CP/MAS ^{19}F NMR spectrum of TPC-1. Original F signal (around -147 ppm) is not observed.^{S15}

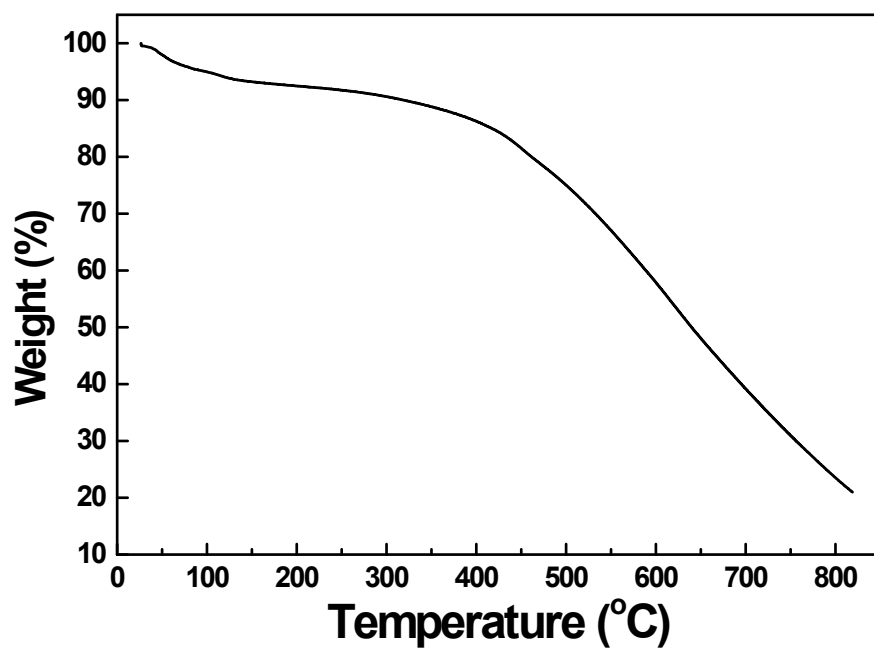


Figure S3. TGA curve of TPC-1.

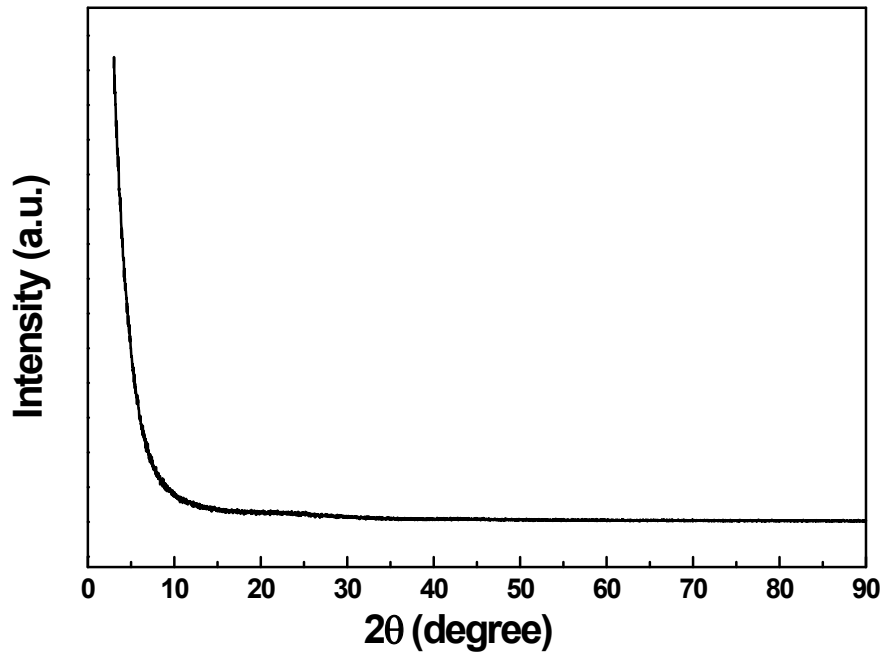


Figure S4. XRD pattern of TPC-1.

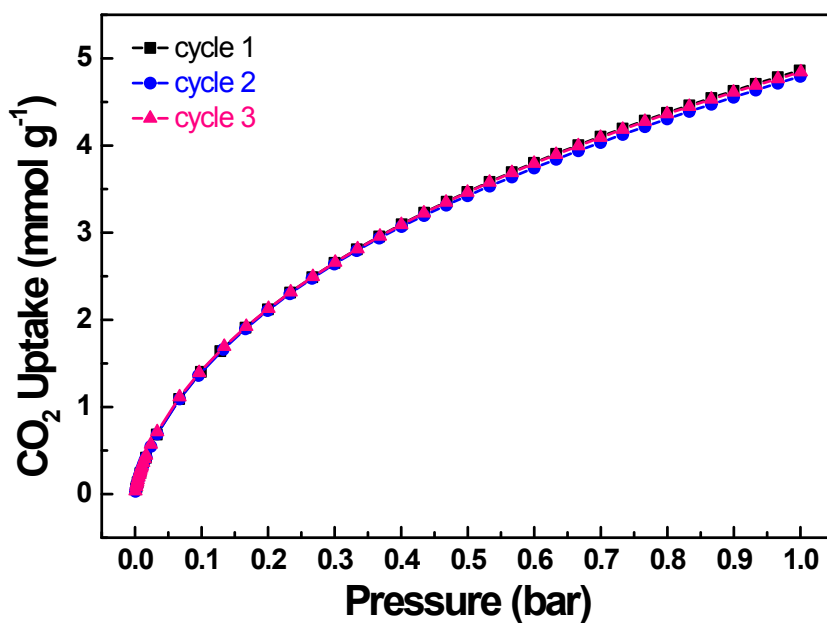


Figure S5. Cycles of CO₂ adsorption for TPC-1 at 273 K.

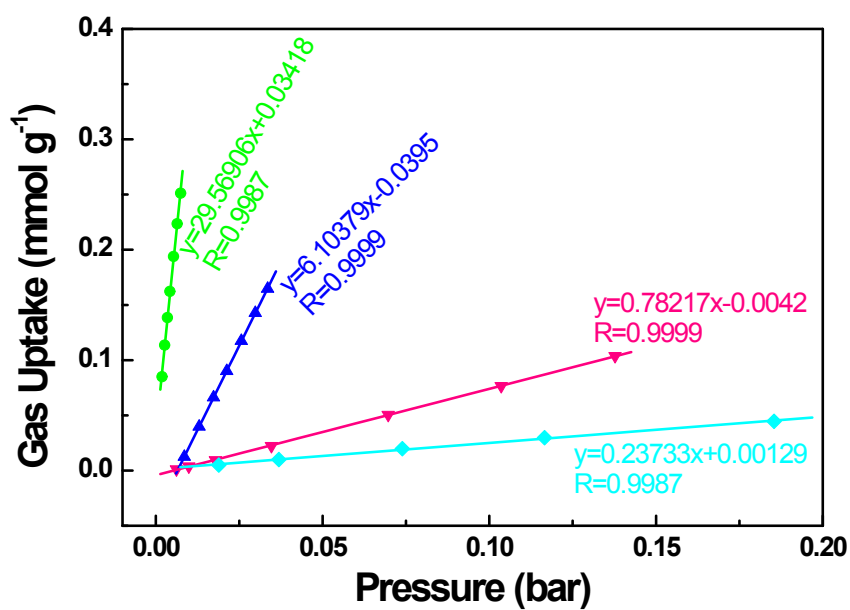


Figure S6. Initial slopes from CO₂ (green circle), CH₄ (blue up-triangle), N₂ (pink down-triangle), and H₂ (cyan diamond) adsorption isotherms at 273 K and low pressure region for TPC-1.

References

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