Supplementary Materials

Rational fabrication of benzene-linked porous polymers for selective CO_2 capture

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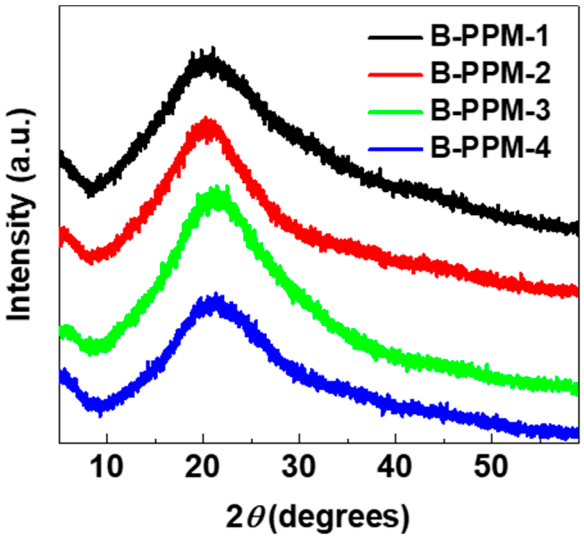


Figurer S1. XRD pattern of the B-PPMs.

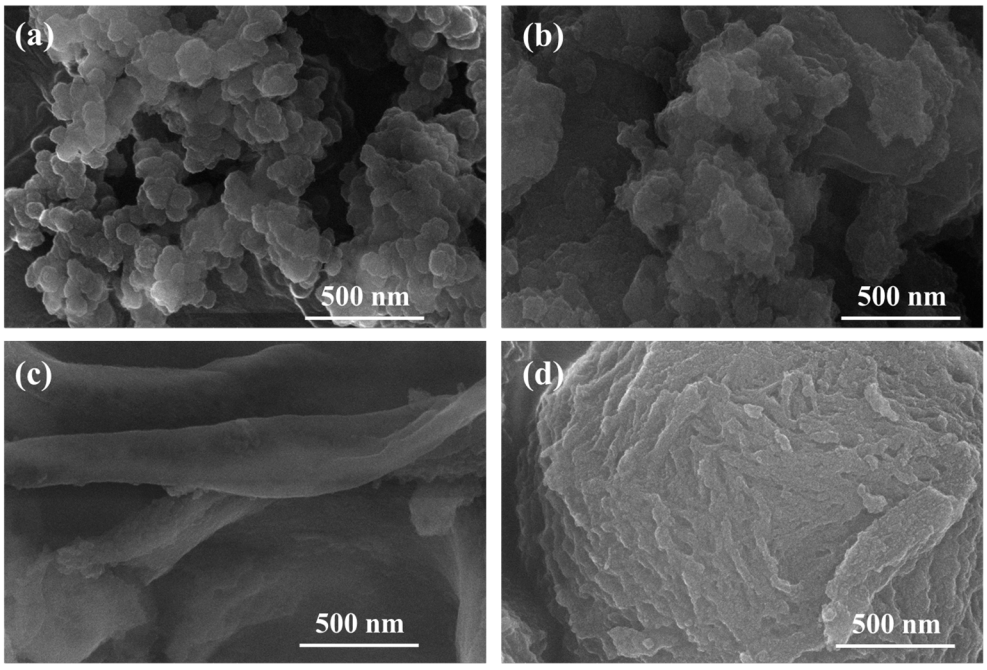


Figure S2. SEM images of the (a) B-PPM-1, (b) B-PPM-2, (c) B-PPM-3 and (d) B-PPM-4.

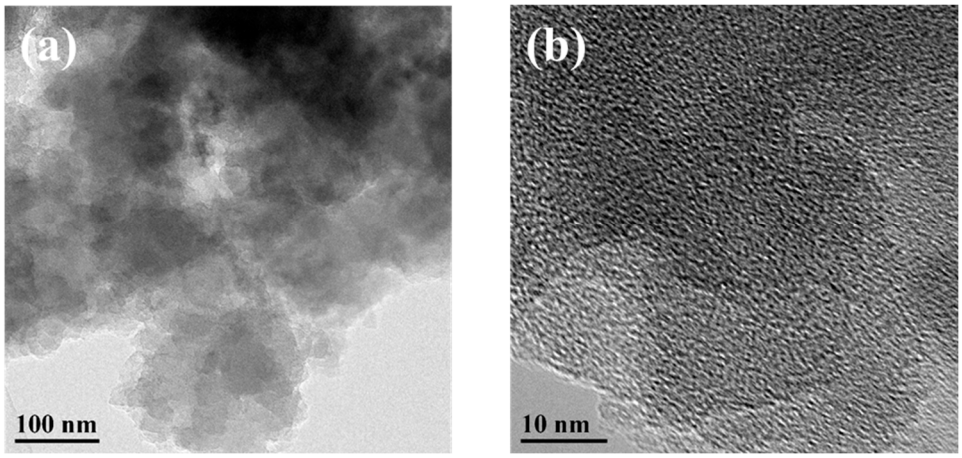


Figure S3. TEM images (a) 100 nm and (b) 10 nm of the B-PPM-2.

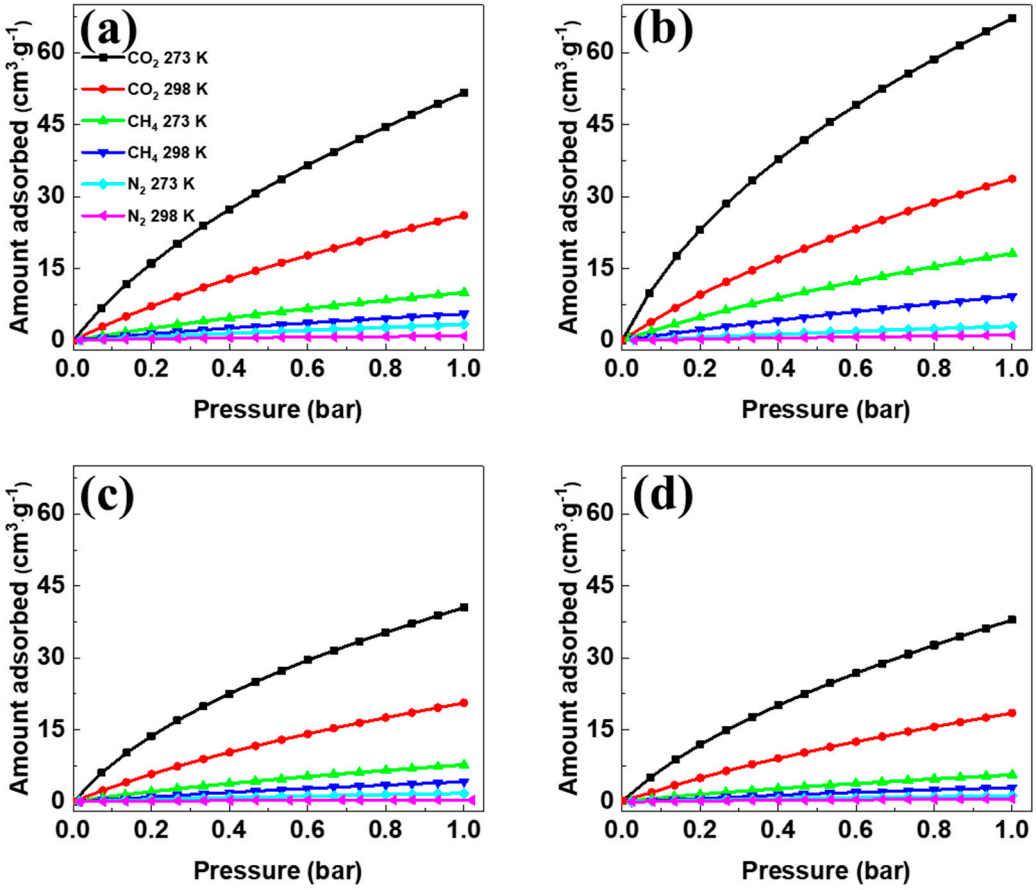


Figure S4. CO_2, N_2 and CH_4 adsorption isotherms of the sample (a) B-PPM-1, (b) B-PPM-2, (c) B-PPM-3, and (d) B-PPM-4 at 273 K and 298 K and 1 bar.

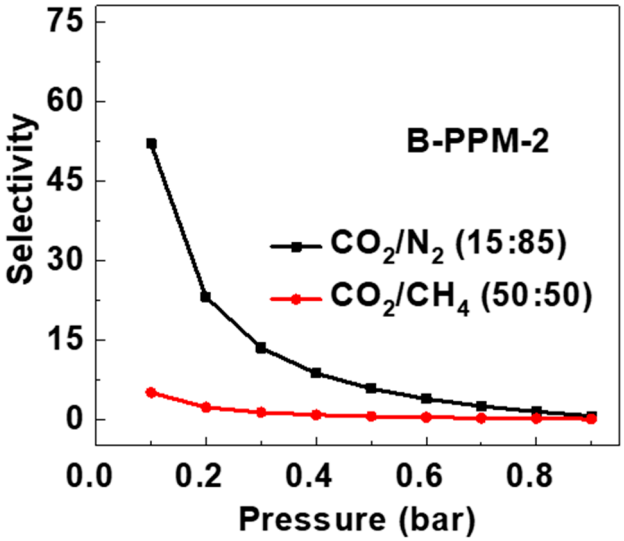
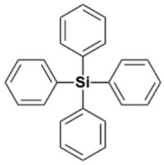
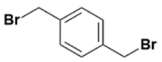
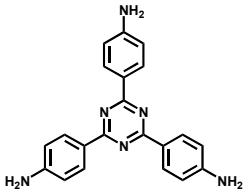
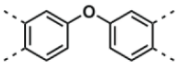
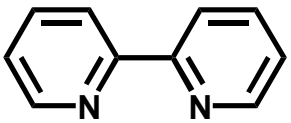
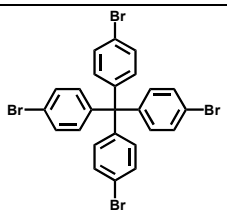
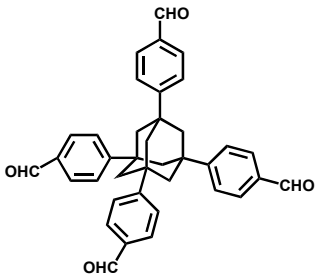
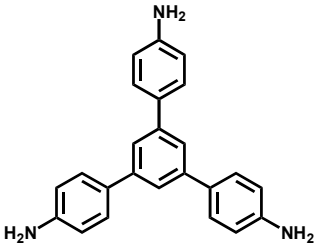
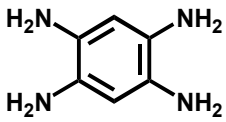
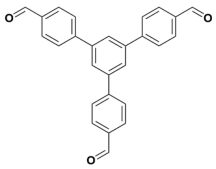


Figure S5. IAST selectivity of CO_2/N_2 (15:85) and CO_2/CH_4 (50:50) on the B-PPM-2 at 298 K.

Table S1. Comparison of the cost of adsorbents based on the price of monomers and catalysts

Sample	Monomer 1 (Price)	Monomer 2 (Price)	Catalyst (Price)	Price /100g	Ref.
B-PPM-2	 tetraphenylsilane ($743/100mL)	 α, α'-Dibromo-p-xylene ($82/100g)	–	$792	This work
TPI-5	 4,4',4'-(1,3,5-Triazine-2,4,6-Triyl) Trianiline ($1006/100g)	 4,4'-Oxybis(1,2-dimethylbenzene) *synthesized from* precursor ($832/100g)	$Pd(dba)_2$ ($230/2g)	$964	[1]
PAF-1	 2,2'-Bipyridine ($464/100g)	 Tetrakis(4-bromophenyl) methane ($3528/100g)	$[Ni(cod)_2]$ ($159/2g)	$4136	[2]

PSN-TAPB	 1,3,5,7-Tetrakis(4-formylphenyl)adamantane ($1094 /1g)	 1,3,5-Tris(4-aminophenyl) benzene ($2093/100g)	–	~$2800/ 1g	[3]
CPCs	 1,2,4,5-benzenetetramine tetrahydrochloride ($210/1g)	 1,3,5-(4-formylphenyl)-benzene ($1714/100g)	–	$2259	[4]

The price of chemicals is obtained from Sigma-Aldrich. The price is mostly based on 100 g (or 100 mL) of chemicals, and other units will be used if chemicals with 100 g (or 100 mL) is not available.

1. Liebl, M.R.; Senker, J. Microporous functionalized triazine-based polyimides with high CO_2 capture capacity. *Chem. Mater.* **2013**, *25*, 970-980, doi:10.1021/cm4000894.
2. Ben, T.; Ren, H.; Ma, S.; Cao, D.; Lan, J.; Jing, X.; Wang, W.; Xu, J.; Deng, F.; Simmons, J.M.; et al. Targeted synthesis of a porous aromatic framework with high stability and exceptionally high surface area. *Angew. Chem. Int. Ed.* **2009**, *48*, 9457-9460, doi:10.1002/anie.200904637.
3. Li, G.; Zhang, B.; Yan, J.; Wang, Z. Micro- and mesoporous poly(Schiff-base)s constructed from different building blocks and their adsorption behaviors towards organic vapors and CO_2 gas. *J. Mater. Chem. A* **2014**, *2*, 18881-18888, doi:10.1039/c4ta04429k.
4. Ashourirad, B.; Sekizkardes, A.K.; Altarawneh, S.; El-Kaderi, H.M. Exceptional gas adsorption properties by nitrogen-doped porous carbons derived from benzimidazole-linked polymers. *Chem. Mater.* **2015**, *27*, 1349-1358, doi:10.1021/cm504435m.