

Electronic Supplementary Information

Functional Microporous Polyimides Based on Sulfonated Binaphthalene Dianhydride for Carbon Dioxide and Vapor Uptake

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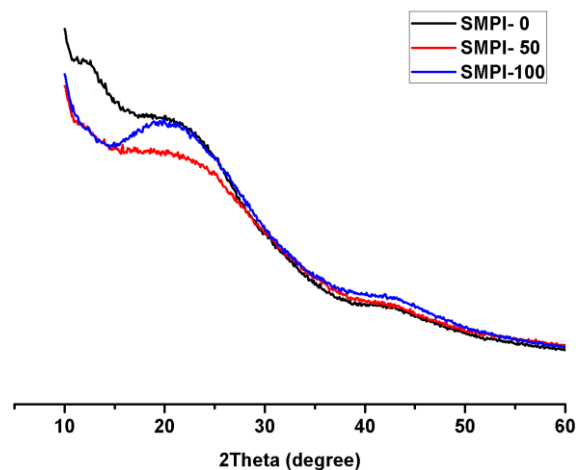


Fig. S1 PXR D-pattern for the SMPI-x.

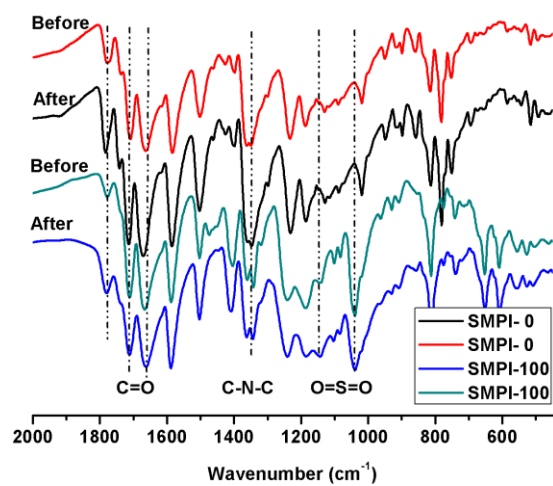


Fig. S2 FT-IR spectra of the SMPIs-0 and SMPIs-100 before and after boiled in water 100 for 48 h.

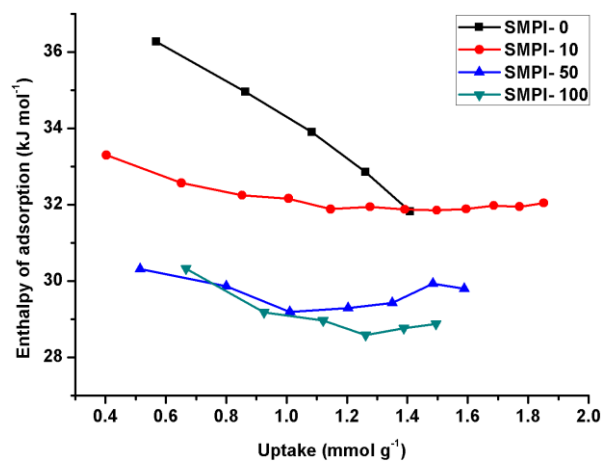


Fig. S3 Isosteric heats of sorption for CO₂ on the SMPIs.

Table S1 The amount of chemicals used for synthesis of SMPIs.

Sample	TAPM	BTDA	SBTDA	Benzoic acid	Triethyamine	m-cresol
	g (mmol)	g (mmol)	g (mmol)	g (mmol)	mL	mL
SMPI-0	0.4566 (1.2)	0.9464 (2.4)	--	1.1724 (9.6)	--	30
SMPI-10	0.4566 (1.2)	0.8518 (2.16)	0.1331 (0.24)	1.1724 (9.6)	0.12	40
SMPI-50	0.4566 (1.2)	0.4732 (1.2)	0.6654 (1.2)	1.1724 (9.6)	0.6	55
SMPI-100	0.4566 (1.2)	--	1.3307 (2.4)	1.1724 (9.6)	1.4	70

Table S2 Elemental analysis of SMPIs.

Sample	Observed Values			Theoretical Values		
	C [%]	N [%]	S [%]	C [%]	N [%]	S [%]
SMPI-0	73.3	4.57	0.123	79.9	5.10	0
SMPI-10	71.3	4.66	0.91	77.6	4.96	1.14
SMPI-50	63.9	5.57	4.70	69.7	4.46	5.09
SMPI-100	58.3	3.92	8.51	62.9	3.95	9.05

Table S3 Initial slopes of CO₂ and N₂ isotherms at 273 K.

Sample	Initial slopes of isotherms at 273 K	
	CO ₂ adsorption isotherm	N ₂ adsorption isotherm
SMPI-0	$y = 85.63x + 9.4729$	$y = 2.9113x + 0.004$
SMPI-10	$y = 105.36x + 11.292$	$y = 3.2799x + 0.049$
SMPI-50	$y = 99.711x + 10.041$	$y = 2.0754x - 0.0873$
SMPI-100	$y = 90.098x + 11.634$	$y = 1.5641x + 0.0597$

Table S4 Initial slopes of vapor isotherms at 298 K.

Sample	Initial slopes of isotherms at 298 K		
	CH ₄ O adsorption isotherm	c-C ₆ H ₁₂ adsorption isotherm	C ₆ H ₆ adsorption isotherm
SMPI-0	$y = 314.53x + 22.296$	$y = 67.687x + 5.8149$	$y = 381.63x + 22.111$
SMPI-10	$y = 550.33x + 33.080$	$y = 101.12x + 20.057$	$y = 314.51x + 36.751$
SMPI-50	$y = 507.21x + 39.496$	$y = 5.4351x - 0.1354$	$y = 9.1065x + 0.0314$
SMPI-100	$y = 534.13x + 49.516$	$y = 4.0654x - 0.0422$	$y = 2.8089x - 0.1806$