Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A

Supporting Information

Synthesis of microporous organic polymers with high CO_2-over-N_2 selectivity and CO_2 adsorption

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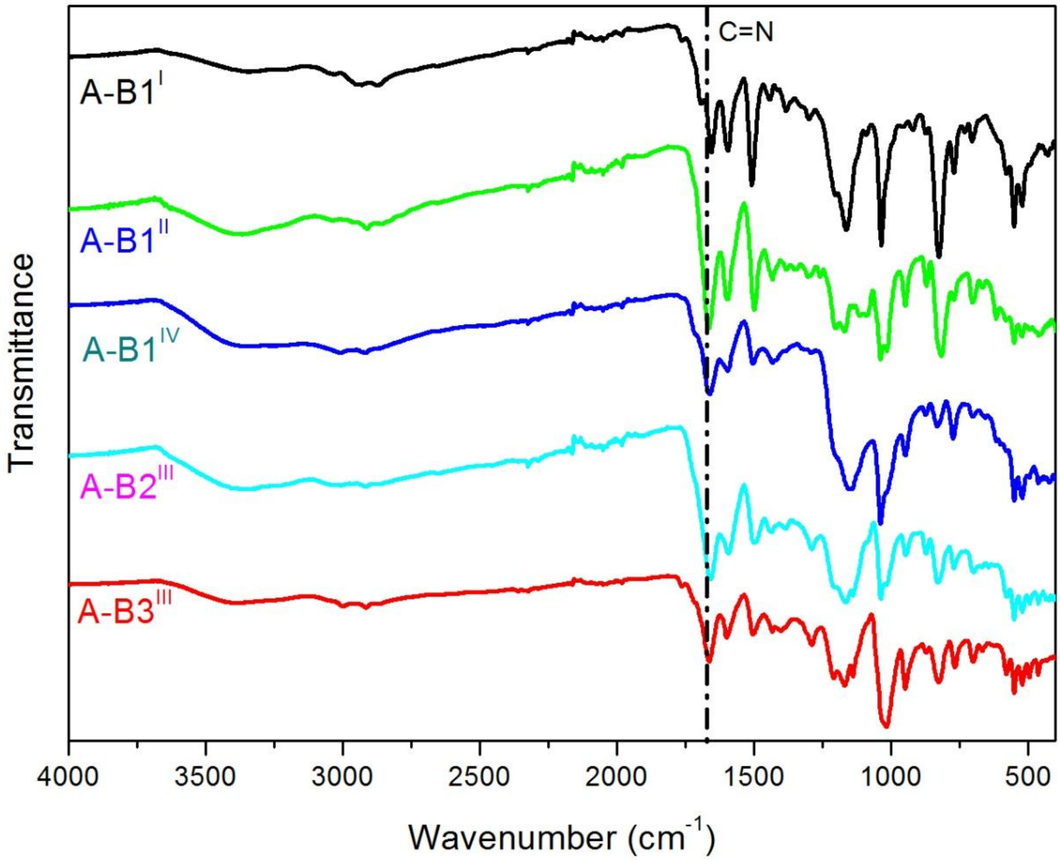

Fig. 1S Fourier transform infrared (FT-IR) spectra of as-synthesized MOPs.

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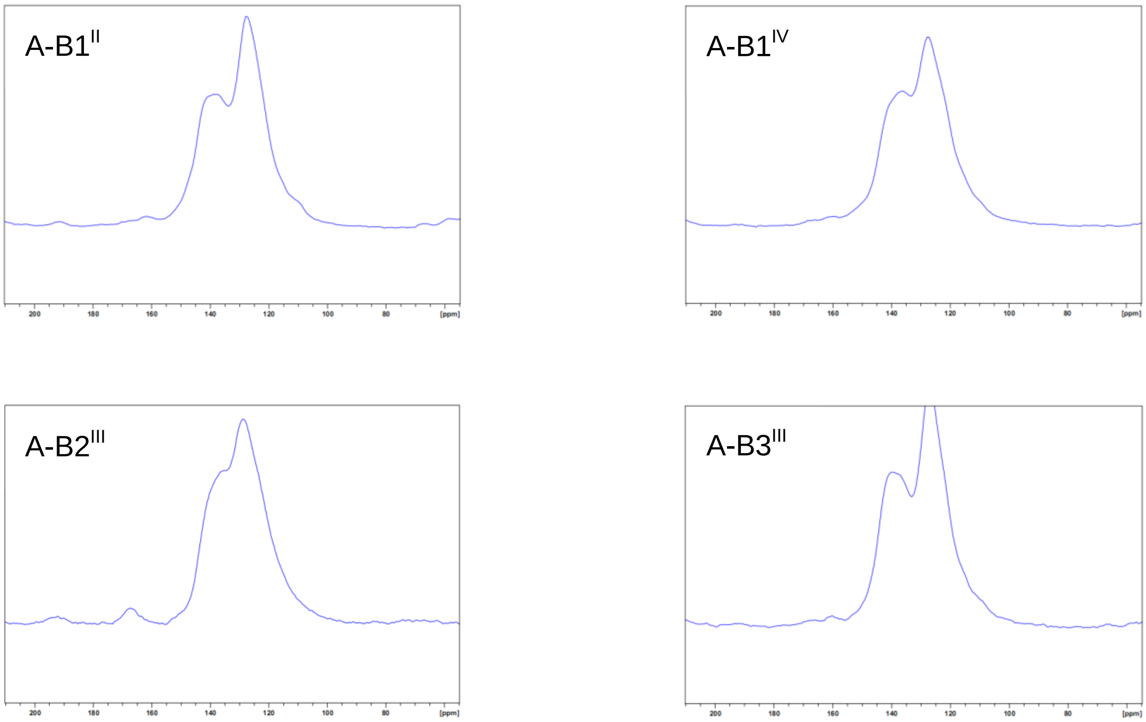


Fig. 2S Solid state ^{13}CP/MAS NMR spectrum of MOPs after heated at 300°C

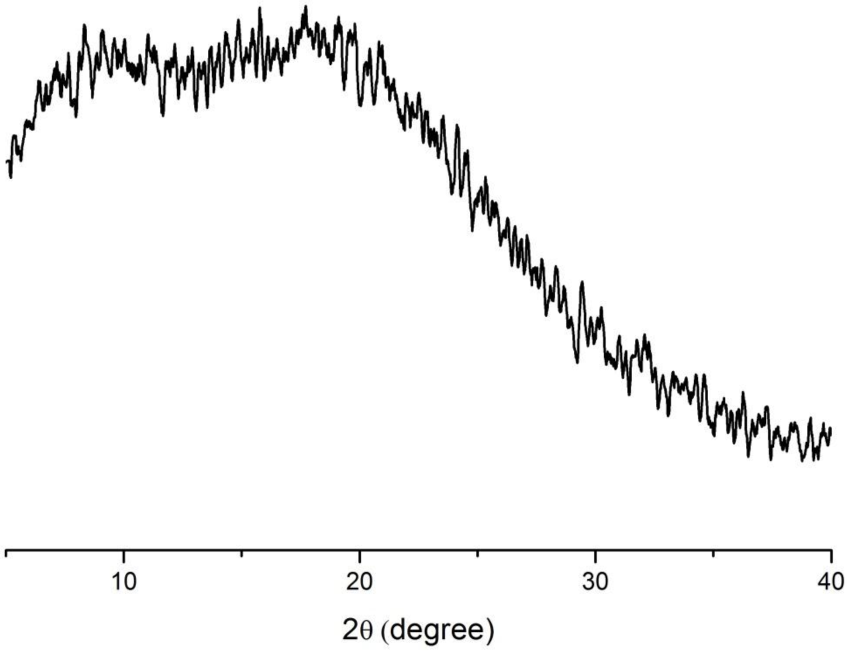
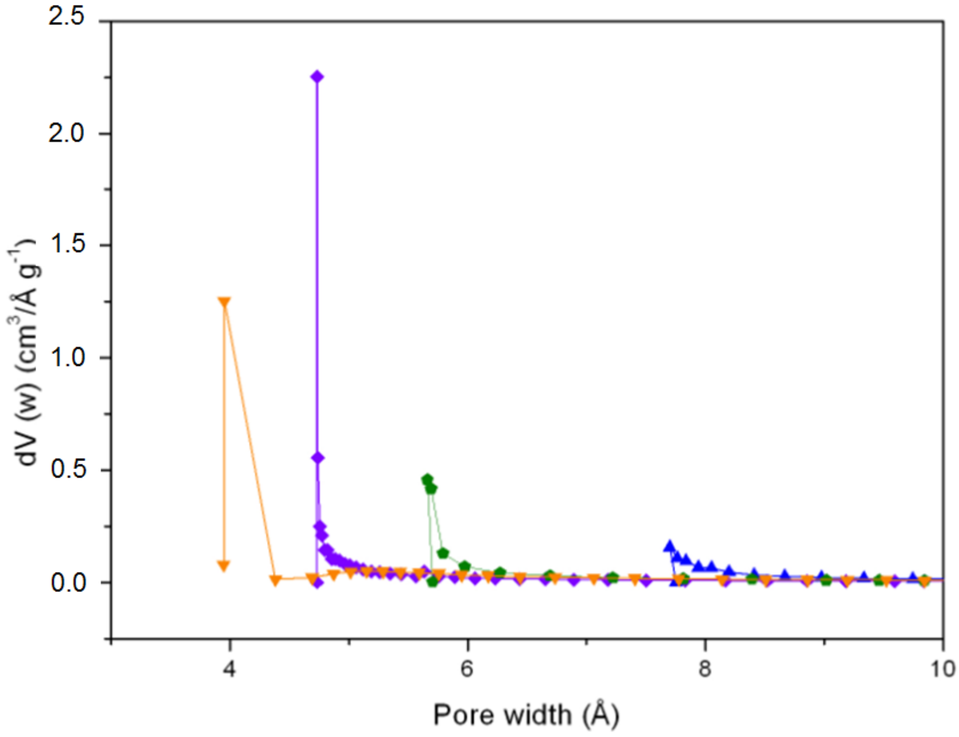


Fig. 3S Powder X-ray diffraction (PXRD) pattern of **A-B2^{III}**.



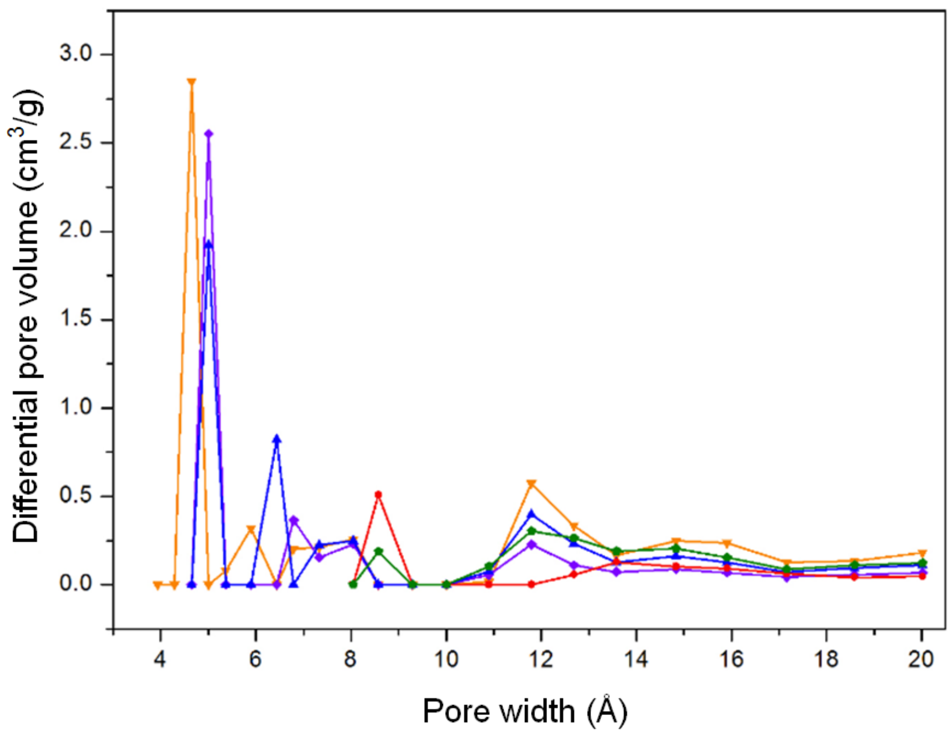


Fig. 4S Pore size distributions of microporous organic polymers by using N_2 adsorption isotherms at 77 K with Horvath-Kawazoe (top) and Density Functional Theory (bottom) method. **A-B1^{II}**, red line with circle; **A-B1^{III}**, violet line with diamond; **A-B1^{IV}**, blue line with triangle; **A-B2^{III}**, olive line with pentagon; **A-B3^{III}**, orange line with reverse triangle.

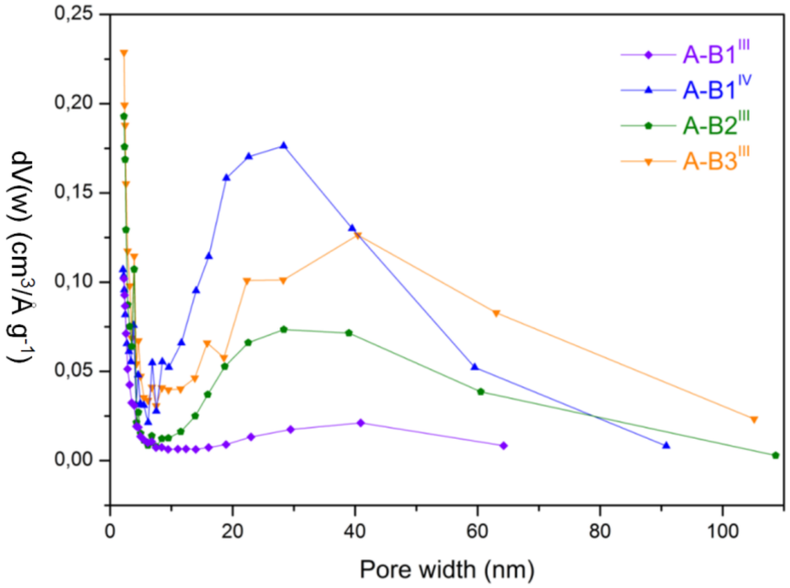


Fig. 5S Pore size distribution of microporous organic polymers (MOPs) by using N_2 desorption isotherms with Barrett–Joyner–Halenda (BJH) method.

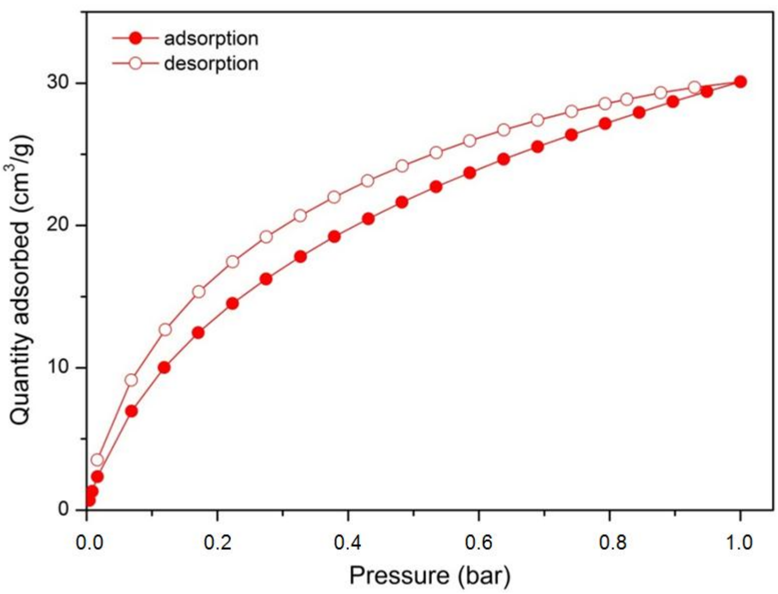


Fig. 6S CO_2 adsorption and desorption isotherm of **A-B1^{I}** at 273 K

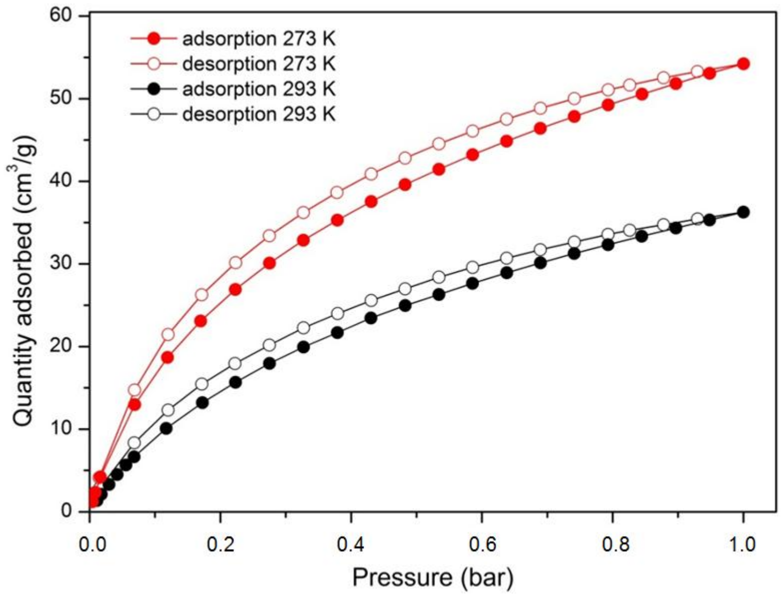


Fig. 7S CO_2 adsorption and desorption isotherm of **A-B1**$^{\mathbf{II}}$ at 273 K and 273 K.

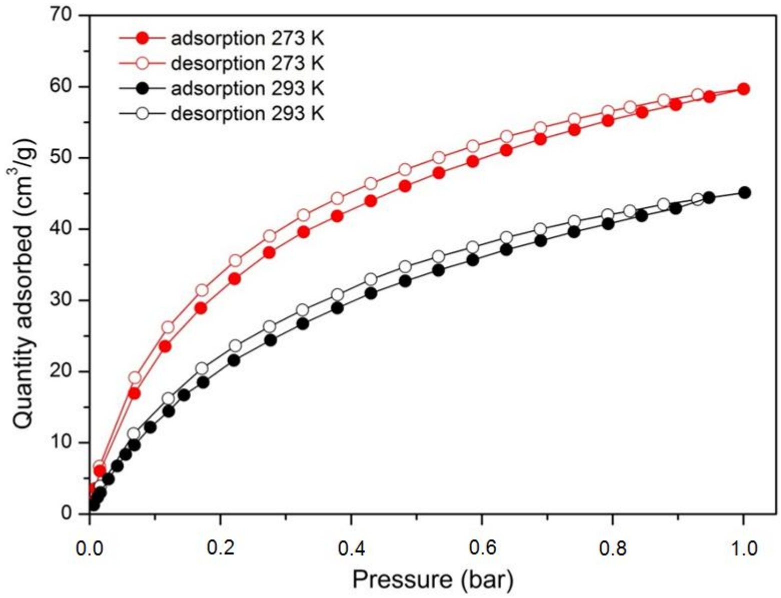


Fig. 8S CO_2 adsorption and desorption isotherm of **A-B1**$^{\mathbf{III}}$ at 273 K and 293 K.

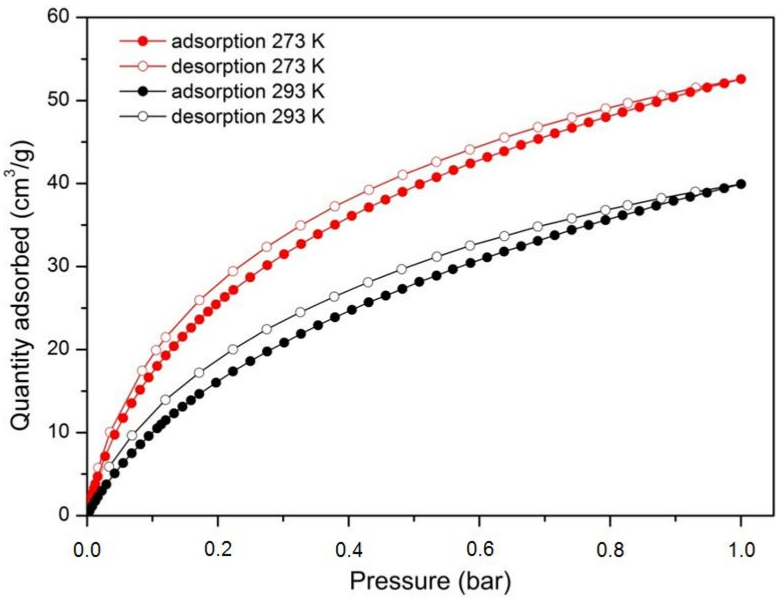


Fig. 9S CO_2 adsorption and desorption isotherm of **A-B1^{IV}** at 273 K and 293 K.

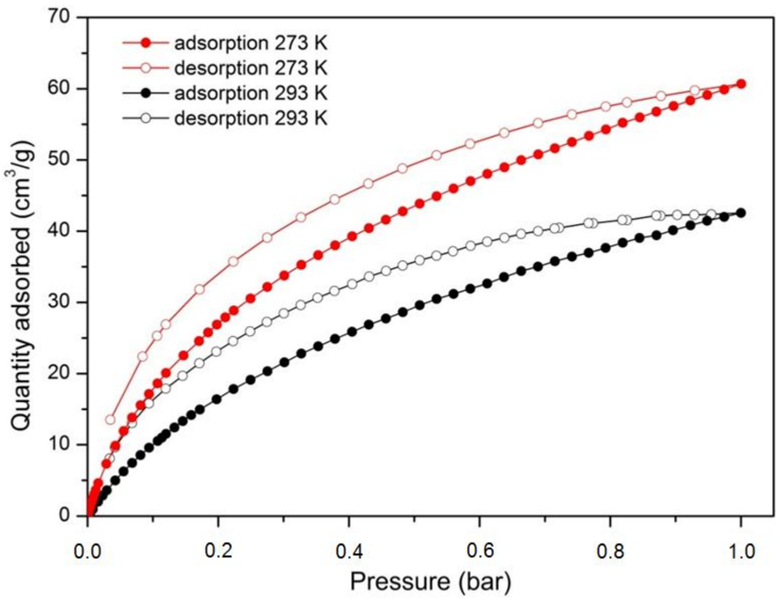


Fig. 10S CO_2 adsorption and desorption isotherm of **A-B2^{III}** at 273 K and 293 K.

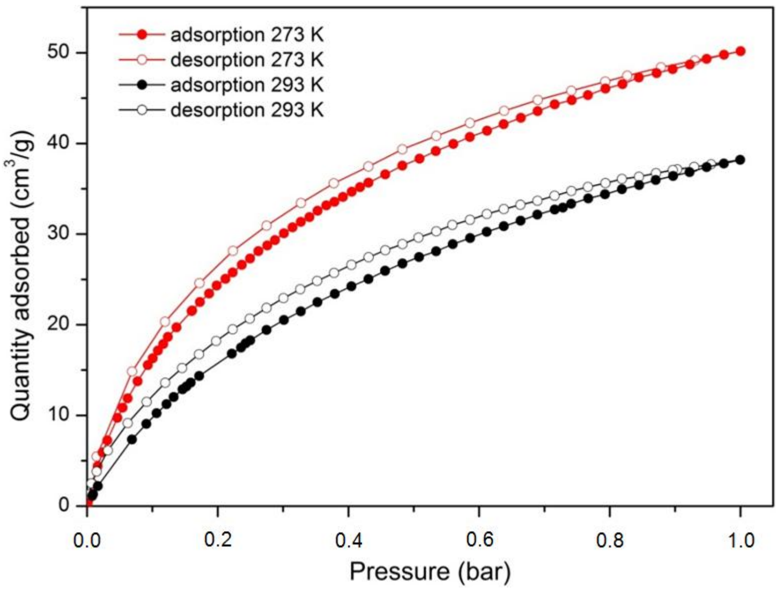


Fig. 11S CO_2 adsorption and desorption isotherm of **A-B3^{III}** at 273 K and 293 K.

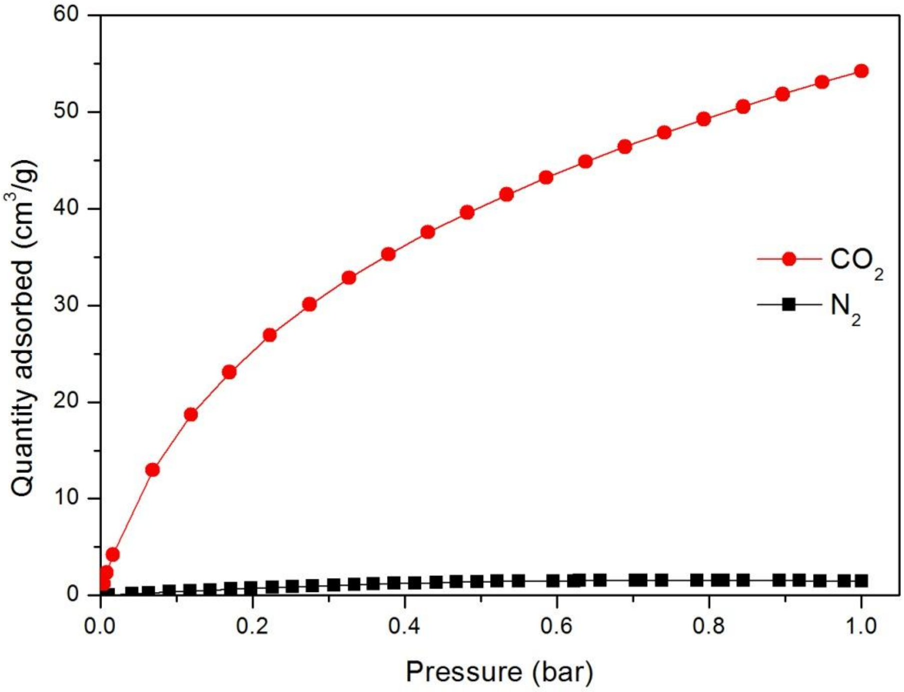


Fig. 12S CO_2 and N_2 adsorption capacity for **A-B1^{II}** at 273 K.

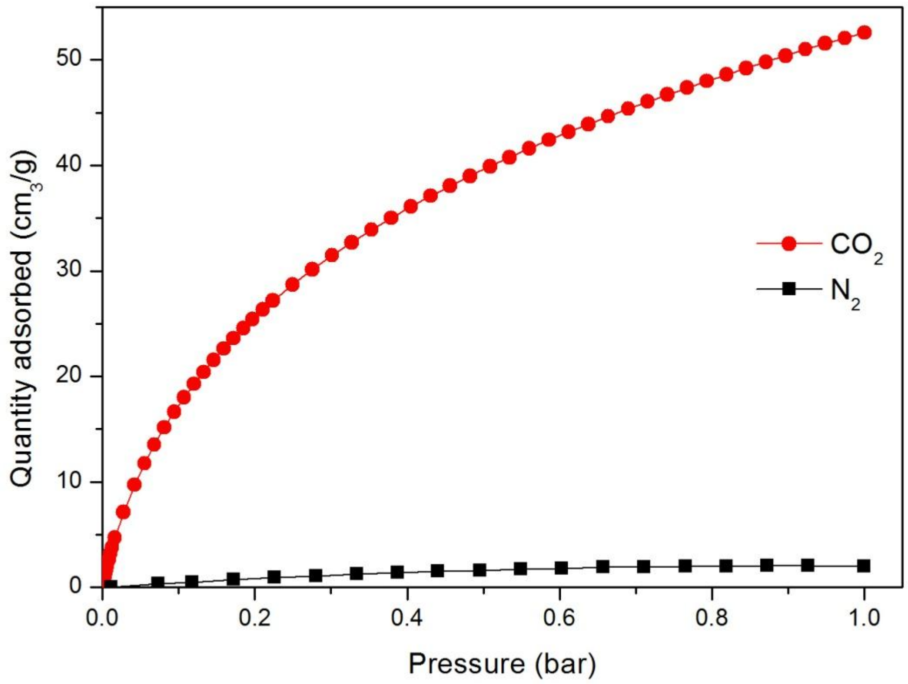


Fig. 13S CO_2 and N_2 adsorption capacity for **A-B1^{IV}** at 273 K.

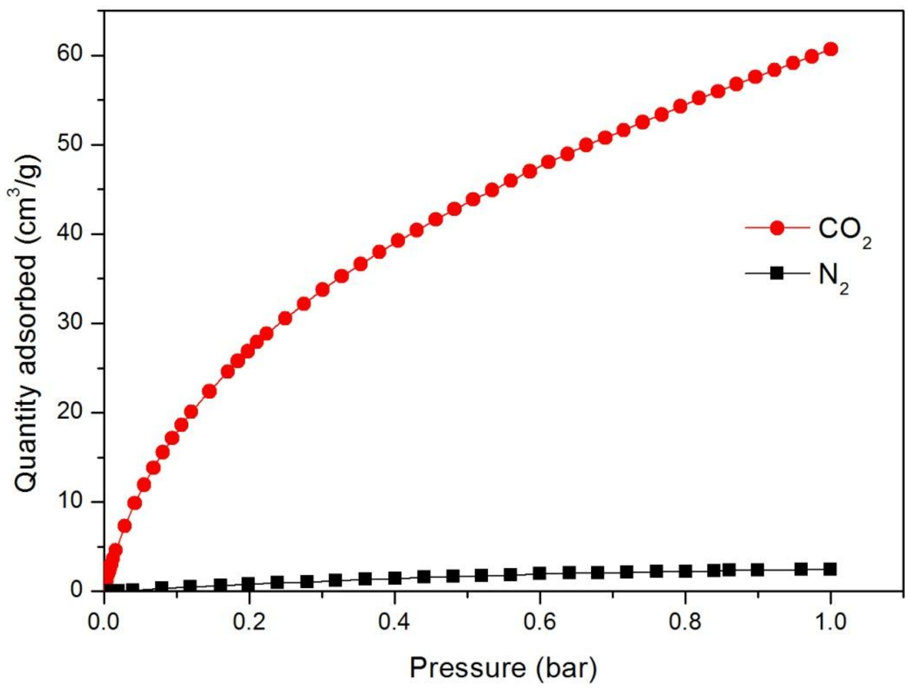


Fig. 14S CO_2 and N_2 adsorption capacity for **A-B2^{III}** at 273 K.

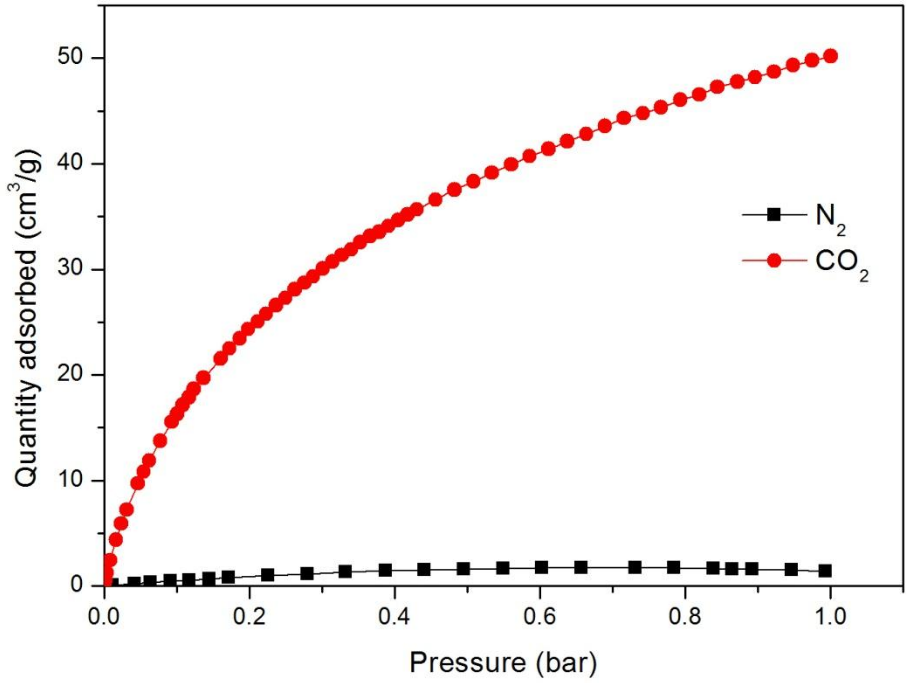


Fig. 15S CO_2 and N_2 adsorption capacity for **A-B3**^{III} at 273 K.

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Table 1S. Summary of S_{BET} and CO_2 uptake for nitrogen containing microporous organic polymers/cages.

		CO_2 uptake at			
Material	S_{BET} (m^2/g)	0.15 bar	1.0 bar	T (K)	Ref
A-B1^{I}	68	0.51	1.34	273	*a*
A-B1^{II}	124	0.95	2.42	273	*a*
		0.53	1.62	293	
A-B1^{III}	377	1.20	2.67	273	*a*
		0.76	2.01	293	
A-B1^{IV}	452	0.98	2.35	273	*a*
		0.60	1.78	293	
A-B2	614	1.02	2.71	273	*a*
		0.59	1.90	293	
A-B3	592	0.93	2.24	273	*a*
		0.58	1.71	293	
POF A1-B4	129	0.83	1.96	273	50
POF A1-B5	63	0.65	1.65	273	50
POF A1-B6	50	0.54	1.36	273	50
CMP-1-NH_2	710	0.60	1.64	273	46
		0.22	0.95	298	
PI-1	506	0.87	2.10	273	51
		0.47	1.41	298	
PI-2	568	0.45	1.60	273	51
		0.24	1.00	298	
TBI-1	609	1.08	3.17	273	35
TBI-2	582	1.02	2.68	273	35
BILP-1	1172	1.63	4.27	273	62
		0.91	2.98	298	
BILP-2	708	1.45	3.39	273	52
		0.78	2.36	298	

		CO_2 uptake at			
Material	S_{BET} (m^2/g)	0.15 bar	1.0 bar	T (K)	Ref
BILP-3	1306	1.67	5.11	273	60
		0.82	3.30	298	
BILP-4	1135	1.99	5.34	273	52
		1.01	3.59	298	
BILP-5	599	1.12	2.90	273	52
		0.57	1.98	298	
BILP-6	1261	1.81	4.80	273	60
		0.98	2.75	298	
BILP-7	1122	1.47	4.39	273	52
		0.73	2.77	298	
PPN-6-CH_2-DETA	555	3.04	4.30	295	59
PPN-6-CH_2-TAEA	663	2.35	3.54	295	59
PPN-6-CH_2-TETA	634	2.04	3.25	295	59
PPN-6-CH_2-EDA	1014	1.82	3.26	295	59
CC1	23	0.56	1.27	275	65
		0.40	1.03	289	
CC2	533	1.02	3.00	275	65
		0.72	2.21	289	
CC3	624	0.90	2.47	275	65
		0.61	1.94	289	
CC4	930	0.59	1.90	275	66
CC5	1333	0.91	3.07	275	67
CC6	99	0.20	0.90	273	68
Cage3	1377	0.45	2.10	273	69
Cage3a	744	0.52	2.70	298	70

a this work.