

SUPPORTING INFORMATION

A COMPARATIVE STUDY OF ADSORPTION EQUILIBRIUM OF CO₂ ON MICROPOROUS COMMERCIAL MATERIALS AT LOW PRESSURES

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Table S1. Freundlich, Langmuir and Toth parameters for carbon dioxide adsorption on the microporous materials at several temperatures.

	Freundlinch				Langmuir				Toth				
	k_F	m_F	R	χ^2	C_0	k_L	R	χ^2	C_0	k_T	m_T	R	χ^2
	((mmol kPa ^m)/g)				(mmol/g)	(1/kPa)			(mmol /g)				
5A													
263 K	2.15	6.00	0.96	14.57	4.17	3.37	0.992	3.32	4.51	9.90	0.53	0.998	0.59
273 K	1.93	5.43	0.96	14.16	4.10	1.72	0.993	2.65	4.46	4.00	0.57	0.9990	0.55
283 K	1.77	5.07	0.96	11.19	4.02	0.87	0.994	1.82	4.42	2.10	0.58	0.9993	0.18
293 K	1.63	4.77	0.96	8.66	3.99	0.49	0.995	1.22	4.41	1.14	0.60	0.9995	0.10
13A													
263 K	1.95	4.82	0.98	8.59	4.57	0.88	0.98	8.69	6.21	11.18	0.34	0.9998	0.062
273 K	1.72	4.49	0.98	6.55	4.42	0.47	0.98	6.29	6.20	5.81	0.34	0.9998	0.044
283 K	1.52	4.19	0.98	4.49	4.30	0.29	0.98	4.49	6.43	3.67	0.33	0.9998	0.048
293 K	1.27	3.82	0.98	2.78	4.19	0.17	0.98	2.33	6.45	1.29	0.36	0.9997	0.052
13X													
263 K	2.22	4.66	0.98	15.17	5.20	1.29	0.98	13.8	7.08	12.6	0.343	0.9995	0.43

273 K	1.85	4.17	0.98	11.37	4.92	0.72	0.98	9.90	6.85	4.85	0.36	0.9997	0.18
283 K	1.67	3.95	0.98	8.27	4.80	0.48	0.98	9.50	7.29	4.28	0.34	0.9997	0.16
293 K	1.42	3.63	0.98	5.96	4.65	0.28	0.98	6.80	7.41	2.32	0.34	0.9997	0.10
BasA100													
263 K	0.30	1.56	0.993	3.11	10.80	0.011	0.9994	0.28	7.94	0.013	1.53	0.99990	0.050
273 K	0.16	1.37	0.997	0.74	11.57	0.006	0.9997	0.07	8.77	0.008	1.31	0.9998	0.041
283 K	0.09	1.26	0.9993	0.12	11.92	0.004	0.9998	0.02	16.01	0.003	0.83	0.99990	0.019
293 K	0.06	1.21	0.9998	0.017	11.20	0.003	0.9998	0.02	121.05	0.0004	0.42	0.99996	0.0041
BasZ1200													
263 K	0.01	0.87	0.9998	0.012	199.97	0.0001	0.995	0.39	111.18	0.0002	2.96	0.995	0.34
273 K	0.01	0.91	0.99994	0.002	74.91	0.0002	0.997	0.11	95.91	0.0002	2.37	0.997	0.09
283 K	0.008	0.92	0.99998	0.0005	74.92	0.0002	0.998	0.04	95.91	0.0001	2.37	0.998	0.03
293 K	0.006	0.92	0.99997	7.31×10^{-5}	65.84	0.0001	0.998	0.02	99.25	0.0001	16.80	0.998	0.02
AC													
263 K	0.21	1.59	0.9998	0.027	7.20	0.011	0.997	0.61	37.3	0.0051	0.36	0.9997	0.064
273 K	0.15	1.52	0.9998	0.021	6.29	0.009	0.998	0.25	23.5	0.0044	0.43	0.9997	0.038
283 K	0.10	1.43	0.9998	0.013	5.78	0.0075	0.998	0.12	17.3	0.0036	0.51	0.9997	0.024

293 K	0.07	1.36	0.9998	0.009	5.30	0.0063	0.9992	0.04	1.07	0.0037	0.63	0.9998	0.015
Al-PILC													
263 K	0.095	1.86	0.99993	0.0008	1.79	0.016	0.991	0.095	122	0.0082	0.15	0.9996	0.0047
273 K	0.068	1.75	0.99996	0.0004	1.65	0.014	0.993	0.051	40	0.0050	0.21	0.9996	0.0033
283 K	0.048	1.63	0.99997	0.0002	1.52	0.011	0.996	0.026	17	0.0037	0.27	0.9996	0.0022
293 K	0.035	1.54	0.99998	0	1.46	0.009	0.996	0.014	13	0.0028	0.31	0.9997	0.0016
Zr-PILC													
263 K	0.070	1.73	0.9997	0.003	1.73	0.014	0.992	0.084	2165	0.0011	0.11	0.9993	0.0072
273 K	0.050	1.62	0.99990	0.0008	1.60	0.011	0.994	0.042	89	0.0017	0.19	0.9994	0.0050
283 K	0.037	1.57	0.9998	0.0007	1.35	0.010	0.995	0.026	154	0.0008	0.17	0.9994	0.0032
293 K	0.025	1.46	0.9998	0.0005	1.35	0.008	0.996	0.014	153	0.0003	0.19	0.9994	0.0022

Table S2. Parameters used to describe the temperature-dependence of the Freundlich, Langmuir and Toth isotherms.

	Freundlich				Langmuir		Toth			
	k_F ((mmol·kPa ^m)/g)		m_F		k_L (1/kPa)		k_T (1/kPa)		m_T	
	A_F	B_F	a_F	b_F	A_L	B_L	A_T	B_T	a_T	b_T
5A	0.142	- 5930	0.632	- 4902	1.95×10^{-8}	- 41480	1.16×10^{-9}	- 50000	1.735	2576
13A	0.036	- 8718	0.530	- 4839	8.47×10^{-8}	- 35331	2.18×10^{-7}	- 38826	0.508	911
13X	0.032	- 9249	0.420	- 5255	5.81×10^{-7}	- 31943	1.26×10^{-7}	- 40207	0.238	- 856
A100	2.0×10^{-8}	- 36132	0.114	- 5693	2.82×10^{-8}	- 28118	5.21×10^{-11}	- 42299	7.07×10^{-5}	- 21953
Z1200	3.6×10^{-5}	- 12567	1.457	1100	- 0.543	1.92×10^5	0.0022	- 2910	140	- 10268
AC	4.0×10^{-6}	- 23855	0.329	- 3462	4.0×10^{-5}	- 12341	0.00015	- 7688	89.81	12107
Al-PILC	6.6×10^{-6}	- 20935	0.286	- 4098	5.8×10^{-5}	- 12341	8.77×10^{-8}	- 24989	144.5	14890
Zr-PILC	5.0×10^{-6}	- 20919	0.358	- 3447	8.2×10^{-5}	- 11150	8.37×10^{-7}	- 16282	8.09	9014

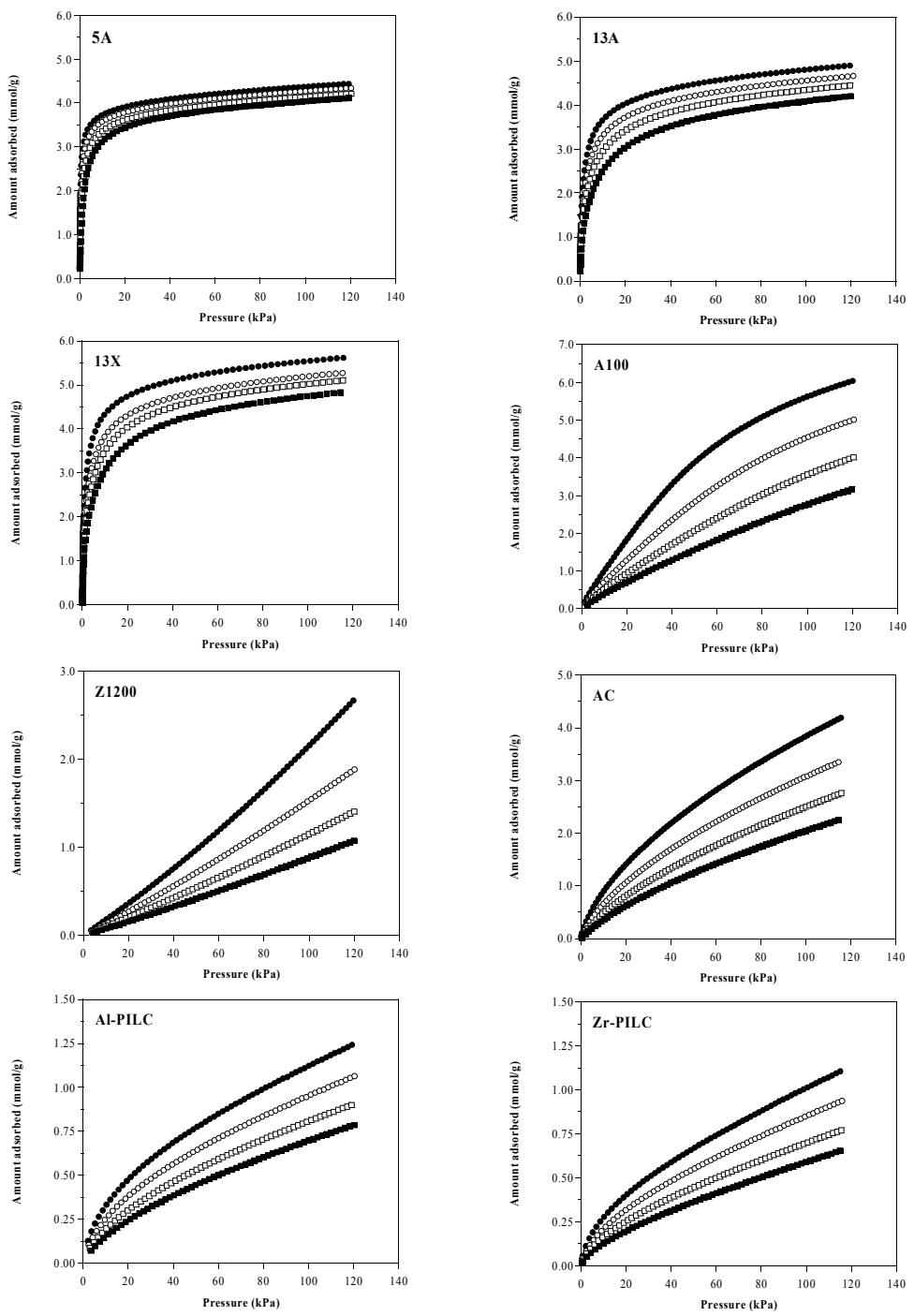


Figure S1. CO₂ adsorption on the microporous materials in the temperature range 263–293 K. (●) 263, (○) 273, (□) 283 and (■) 293 K.

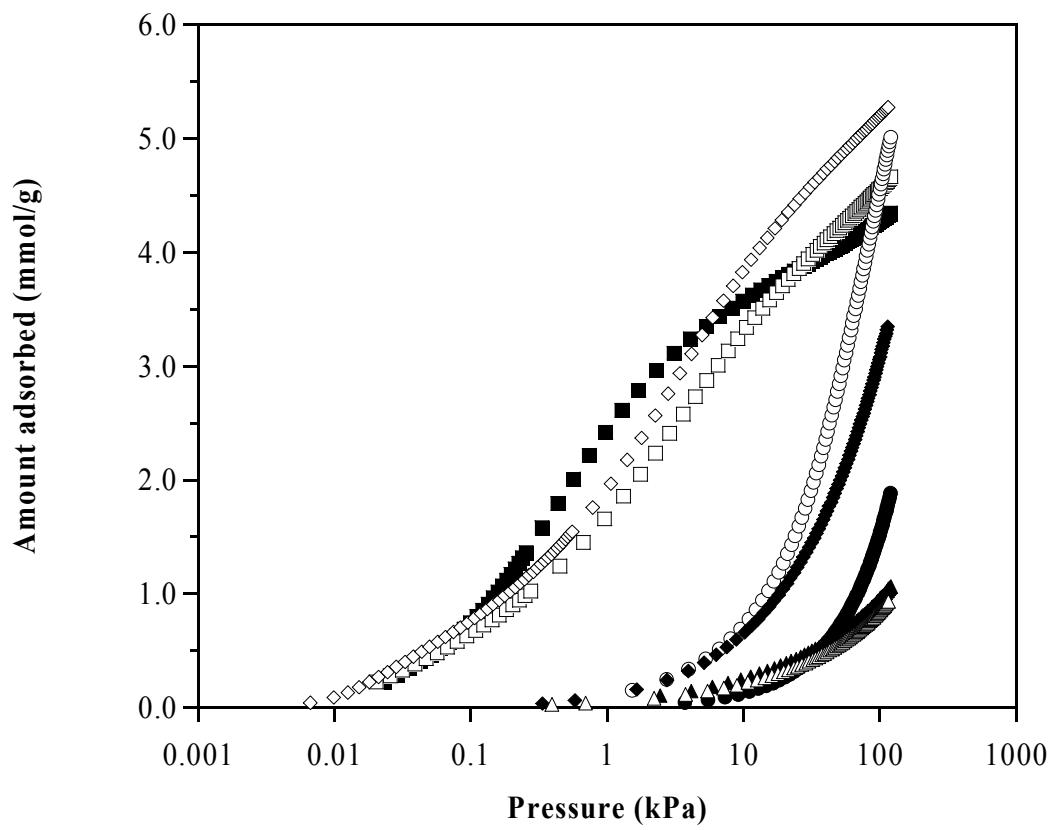


Figure S2. Semi-logarithmic plot of the adsorption isotherm of CO_2 at 273 K on the microporous materials. (■) 5A, (□) 13A, (◊) 13X, (○) A100, (●) Z1200, (♦) AC, (▲) Al-PILC and (Δ) Zr-PILC.

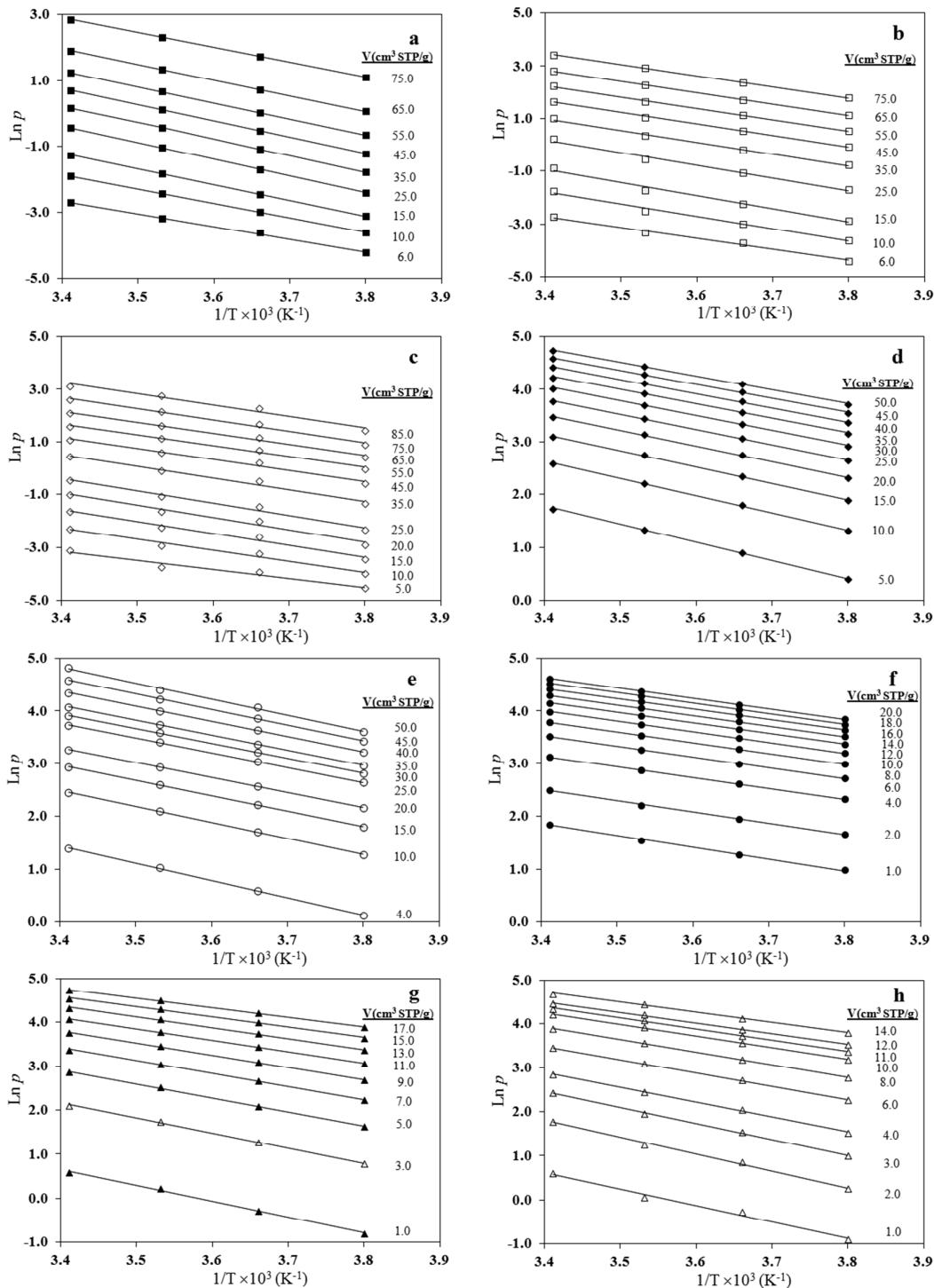


Figure S3. Adsorption isosteres of CO₂ in the temperature range from 263 to 293 K. 5A (a), 13A (b), 13X (c), AC (d), A100 (e), Z1200 (f), Al-PILC (g) and Zr-PILC (h). The points were calculated by numerical interpolation, the lines represent the linear fit. All the isosteres are marked with the corresponding amount adsorbed in cm³ STP/g.