1. Sour mixed-gas transport performance of selected polymeric materials

Table S1. Sour mixed-gas permeability data of selected polymers, measured at 35°C [1].

Material	Pressure (psia)	H_2S permeability (Barrer)	CO_2 permeability (Barrer)	CH_4 permeability (Barrer)	Acid gas (AG) permeability (Barrer)	H_2S/CH_4 selectivity	CO_2/CH_4 selectivity	AG/CH_4 selectivity	References
AO-PIM-1 (Fresh)	1122	4375	796	59.4	5171	74	13	87	[2]
	800	3582	705	47.63	4287	75	15	90	
	400	2625	625	40.4	3250	65	15	80	
PIM-1	1122	13800	4850	531	18650	26	9	35	
	800	17000	4700	586	21700	29	8	37	
	400	19800	4612	660	24412	30	7	37	
AO-PIM-1 (Rejuvenated)	1122	4050	796	67.5	4846	60	12	72	
	800	3150	625	52.5	3775	60	12	72	
	400	1875	500	40.76	2375	46	12	58	
Crosslinked PI: DEGMC	900	43	55	2.45	98	18	22	40	[3]
	700	38	51	1.9	89	20	27	47	
	400	26	52	1.7	78	15	31	46	
TEGMC	900	43	50	1.75	93	25	29	53	
	700	36	48	1.5	84	24	32	56	
	400	26	49	1.4	75	19	35	54	
TetraMC	900	30	42	1.45	72	21	29	50	
	700	25	41	1.3	66	19	32	51	
	300	24	48	1.2	72	20	40	60	
6FDA-DAM:DABA(3:2)	800	101	87	4.39	188	23	20	43	
	100	25	66	1.43	91	17	46	64	
Pure CA	500	8.71	8.66	0.295	17	30	29	59	[4]
	700	39.7	27.5	2.07	67	19	13	32	
GCV-modified CA	500	204	129.4	9.35	333	22	14	36	
	700	190	136	9.5	326	20	14	34	
6FDA-DAM	100	1076	737	27.87	1813	39	26	65	[5]
	500	612	411	15.81	1023	39	26	65	
	100	332	582.9	22.4	915	15	26	41	
	100	246.5	435.9	16.4	682	15	27	42	
6FDA-DAM_aged	100	206.9	375.2	12.46	582	17	30	47	
	800	495.1	301.1	15.87	796	31	19	50	
6FDA-DAM/DABA (3:2)_200C	100	87.4	91	1.78	178	49	51	100	
	100	27.1	76.9	1.44	104	19	53	72	
	100	22.8	58.4	1.145	81	20	51	71	
PIM-6FDA-OH	500	36	55	1.97	91	18	28	46	[6]
	700	63	53	2.10	116	30	25	55	

6F-PAI-1	900	4	8.1	0.25	12	17	32	49	[7]
	600	4	11.4	0.33	15	12	35	47	
	400	4	11.5	0.34	15	11	34	44	
6F-PAI-2	800	4	7.5	0.62	12	7	12	19	
	600	4	7.4	0.53	11	7	14	21	
	400	3	7.4	0.45	11	7	16	24	
6FDA/ODPA-DAM	100	130	149.4	4.42	279	29	34	63	[8]
	195	131	114.2	3.64	246	36	31	67	
	400	176	108.6	4.03	284	44	27	70	
	616	291	147.4	6.55	438	44	23	67	
	800	550	232.7	12.41	783	44	19	63	
Polynorbornenes									[9]
P0	800	4186	2741	644	6927	6.5	4.3	11	
P1	800	3170	1413	387	4583	8.2	3.4	12	
P2	800	1852	626	164	2478	11.3	3.8	15	
P3	800	2683	818	160	3501	16.8	5.08	22	
P3a	800	1850	645	103	2495	17.9	6.2	24	
P3b	800	1446	634	101	2080	14.3	6.2	21	
P4	800	3556	1288	133	4844	26.8	9.2	37	
P5	800	2000	750	61	2750	32.6	12.9	45	
P6	800	1617	592	47	2209	34.7	13.8	47	
P7	800	3130	750	65	3880	47.8	11.6	59	
P0	800	6785	5382	712	12167	9.53	4.4	17	
P1	800	6495	4902	722	11397	9.00	3.48	16	
P2	800	5863	4204	493	10067	11.90	3.68	20	
P3	800	6372	4356	377	10728	16.90	4.53	28	
P3a	800	5856	4075	329	9931	17.80	5.14	30	
P3b	800	5700	4182	370	9882	15.40	5.14	27	
P4	800	7000	4742	254	11742	27.60	7.14	46	
P5	800	6181	4258	206	10439	30.00	8.88	51	
P6	800	6181	4333	196	10514	31.60	9.5	54	
P7	800	6910	4371	182	11281	37.90	7.95	62	
Polyurethanes									[10]
PU1	147	239	78	11	317	21	7	28	
	147	183	56	8	239	23	7	29	
PU2	147	613	197	33	810	19	6	25	
	147	618	195	35	813	18	6	23	
PU3	147	271	59	5	330	58	13	70	
	147	280	62	5	342	55	12	67	
PU4	147	199	45	3	244	74	17	90	
	147	223	51	3	274	66	15	81	
PU4	60	95	21	1	116	106	23	129	
	147	101	22	1	123	101	22	123	
	200	115	25	1	140	105	23	127	

	60	104	22	1	126	95	20	115	
	147	123	25	1	148	95	20	114	
	200	130	27	1	157	93	19	112	
Pebax MX series	147	695	155	14	850	50	11	62	
	147	553	122	10	675	54	12	66	
	147	248	69	5	317	51	14	65	
	147	175	40	4	215	49	11	60	
Pebax SA00	147	312	84	13	396	24	6	30	
	147	888	243	43	1131	21	6	27	
	147	38	7	2	45	20	4	24	
	147	8	4	1	12	15	8	23	
Crosslinked PEO									
MW 200	800	0.07	0.07	0.001	0.14	66	73	139	
MW 300	800	0.24	0.11	0.003	0.35	37	79	116	
MW 400	800	0.50	0.20	0.01	0.7	41	100	141	[11]
MW 600	800	9.27	2.29	0.09	11.55	26	104	130	
MW 1000	800	25.94	5.20	0.24	31.14	22	110	133	
MW 2050	800	2.95	0.69	0.03	3.64	28	118	146	
Polyphosphazene 1	30 (pure-gas)	14.1	7.5	0.5	21.6	15.0	28.2	43.2	
2		588.0	152.3	9.4	740.3	16.2	62.6	78.8	[12]
3		1130.0	250.0	14.0	1380.0	17.9	80.7	98.6	
PA12-PEO-50	200	1030	152.7	10.5	1182.7	14.5	98.1	112.6	
	500	1929	285.5	21.3	2214.4	13.4	90.6	104.0	
	800	2775	417.7	34.7	3192.3	12.0	80.0	92.0	
PA6-PEO-60	200	651	98.0	5.7	748.9	17.1	114.2	131.4	
	500	1380	209.2	14.9	1588.9	14.1	92.6	106.6	
	800	2083	331.9	25.9	2414.6	12.8	80.4	93.2	
PA12-PTMEO-80	200	2180	487.9	65.6	2667.5	7.5	33.2	40.7	
	500	3567	852.6	132.6	4419.4	6.4	26.9	33.3	[13]
	800	4713	1263.8	305.4	5976.9	4.8	15.4	19.6	
PA12-PEO-a-50	200	481	94.2	8.9	575.3	10.6	54.1	64.6	
	500	920	173.5	17.5	1093.6	9.9	52.6	62.5	
	800	1444	270.8	28.3	1714.8	9.6	51.0	60.6	
PA6-PTMEO-33	200	145	29.0	3.3	173.7	8.7	43.8	52.6	
	500	322	61.7	7.4	383.3	8.3	43.5	51.8	
	800	576	111.0	13.3	687.0	8.4	43.3	51.7	

2. Publications discussing polymeric membranes for H_2S removal from natural gas

Figure S1 shows the increase in the number of publications discussing polymeric membranes for sour gas purification over the past two decades.

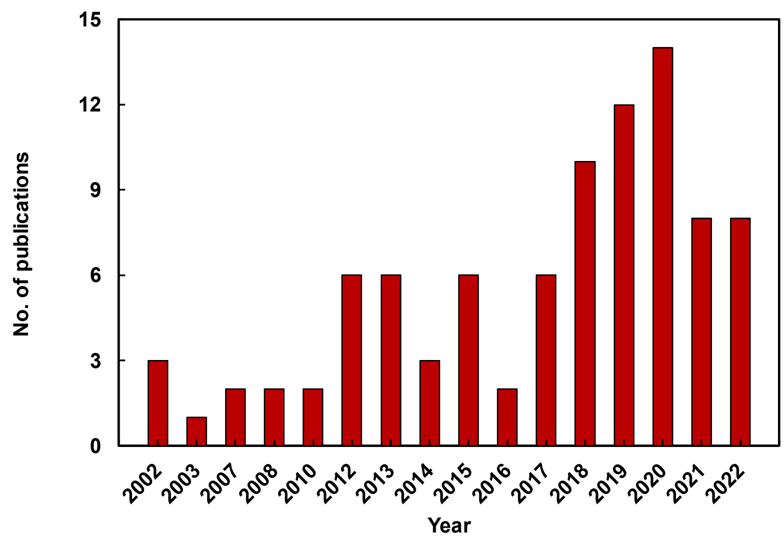

Figure S1. Number of publications on polymeric membranes for sour gas purifications over the past two decades. (Data extracted from Web of Science™).

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