Supporting information:

The effect of fabrication and operation conditions on CO_2 separation performance of PEO-PA block copolymer membranes

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Table i Comparison of the gas separation property (tested at room temperature) with membranes of different thickness.

Membranes	Thickness (μm)	Permeability (Barrer)		Permselectivity
		N_2	CO_2	CO_2/N_2
Pebax®1657, 3% solution, room dry	66	0.18	20	113
	22	0.20	21	104
Pebax®1074 1% solution, room dry	64	0.61	62	102
	17	0.61	70	114

Table ii CO_2 permeability and CO_2/N_2 permselectivity of Pebax®1657 and 1074 membranes cast with different polymer concentration solutions (gas permeation tests at 200 psi and 35°C). The density of the membrane was also included for comparison.

Membrane	Polymer concentration	Film thickness (μm)	Density of membrane (g/cm^3)	Permeability (Barrer)		Permselectivity CO_2/N_2
				N_2	CO_2	
Pebax®1657 (dry at room temperature)	1%	41	1.07 ± 0.013	0.60	55	92
	3%	28	1.05 ± 0.019	0.82	75	91
	5%	60	1.12 ± 0.009	1.30	118	91
	6%	50	1.18 ± 0.012	1.60	125	78
Pebax®1074 (dry at 35°C)	1%	53	0.95 ± 0.009	3.07	168	55
	3%	19	0.92 ± 0.024	2.76	169	61
	5%	77	0.96 ± 0.006	4.00	263	66

Table iii CO_2 *permeability and* CO_2/N_2 *permselectivity of Pebax®1657 and 1074 dense membranes cast with different solvent evaporation rate (200 psi and 35°C)*

Membrane	Solvent evaporation condition	Film thickness (μm)	Density of membrane (g/cm^3)	Permeability (Barrer) N_2	Permeability (Barrer) CO_2	Permselectivity CO_2/N_2
Pebax®1657 (1%)	Room dry	41	1.07 ± 0.013	0.60	55	92
	35°C oven	34	1.09 ± 0.016	0.98	84	85
Pebax®1657 (3%)	Room dry	28	1.05 ±0.019	0.82	75	91
	35°C oven	30	1.02 ± 0.015	1.12	94	84
Pebax®1657 (6%)	Room dry	50	1.08 ± 0.012	1.60	125	78
	35°C oven	98	1.03 ± 0.005	1.66	147	89
Pebax®1074 (1%)	Room dry	33	0.93 ± 0.014	2.39	128	53
	35°C oven	53	0.95 ± 0.009	3.07	168	55

Table iv CO_2 *solubility and diffusivity coefficient of Pebax®1657 and 1074 membrane and comparison with the literature*

Membrane	CO_2 diffusivity coefficient ($10^8 cm^2/s$)	CO_2 solubility coefficient ($cm^3STP/cm^3 \cdot cmHg$)	Conditions (pressure/ temperature)	Measurement method	Reference
Pebax®1657	46	0.0158	0.6 bar/30°C	Time-lag diffusion	41
	49	0.0160	0.3 bar/ 30°C	Time-lag diffusion	48
	79	0.0115	4 bar/ 35°C	Gravimetric sorption	36
	55	**0.0137**	**4 bar/35°C**	**Gravimetric sorption**	**This work**
Pebax®1074	100	0.0120	10 bar/35°C	Barometric sorption method	24
	80	0.0118	1 bar/30°C	Time-lag diffusion	27
	67	**0.0129**	**4 bar/35°C**	**Gravimetric sorption**	**This work**

Table v Permeation activation energy of Pebax®1074 and Pebax®1657 membrane in the literature

Membrane	E_p (Kj/mol) N_2	E_p (Kj/mol) CO_2	Reference
Pebax®1074	36.2	13.5	This work
Pebax®1657	26.2	10.9	25
Pebax®1657 (composite membrane)	40.1	22.2	49