Online Resource 1 (ESM_1)

Can pure-gas permeability data design a mixed-gas module? A correctability map for dual-mode CO_2/N_2 transport in Matrimid 5218 hollow fibres

Brazilian Journal of Chemical Engineering

Miracle Victory Ajoku, Modade Sola-Ojo, George Chukwuebuka Duru

Corresponding author: Miracle Victory Ajoku, Department of Chemical Engineering, Federal University of Technology Owerri, Owerri, Imo State, Nigeria. E-mail: miracleajoku96@gmail.com

Table S1 Numerical checks at the reference condition

Check	Setting	Rec_B (%)	ΔRec (pp)	Mass-balance error (%)
Thickness invariance	l = 50 µm	44.830	2.5322	0.0007
	l = 5 µm, F_{in} × 10	44.830	2.5322	0.0007
	l = 0.5 µm, F_{in} × 100	44.830	2.5322	0.0007
Grid refinement	N = 25	44.565	2.5043	0.0035
	N = 50	44.830	2.5322	0.0007
	N = 100	44.966	2.5465	0.0014
	N = 200	45.034	2.5538	0.0027
	$N \to \infty$ (first order)	≈ 45.10	≈ 2.561	–

15% CO_2, 10 bar, p_{ref} = 1 bar, $F{\cdot}K$ = 0.191. Thickness cases scale F_{in} with 1/l; N, number of axial cells.

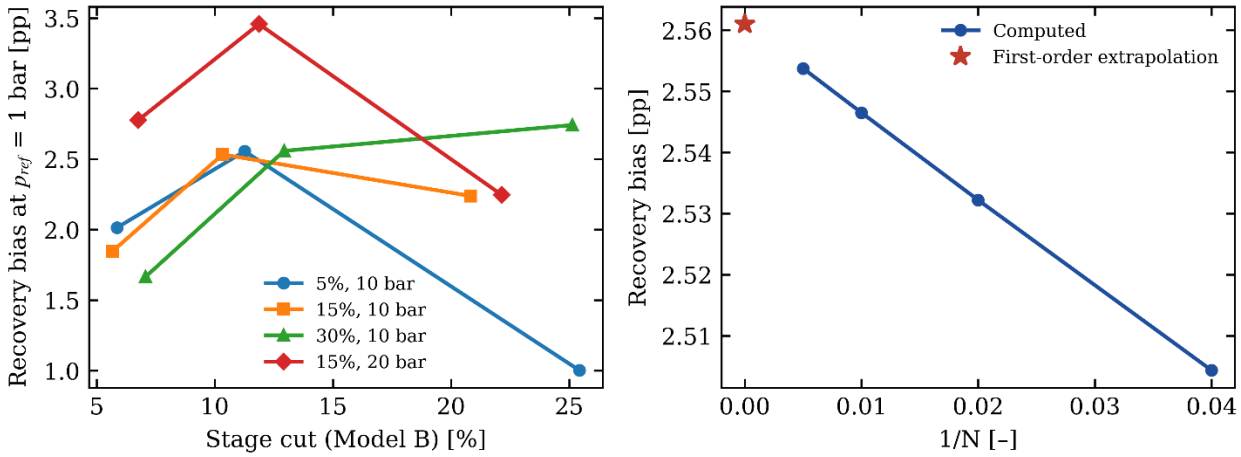


Fig. S1 Stage-cut sensitivity and grid convergence of the recovery bias

(a) Recovery bias at p_{ref} = 1 bar versus Model B stage cut for flow parameters φ = 2, 5 and 10 at four feed conditions. (b) Grid convergence of the recovery bias at the reference condition; the star marks the first-order extrapolation.

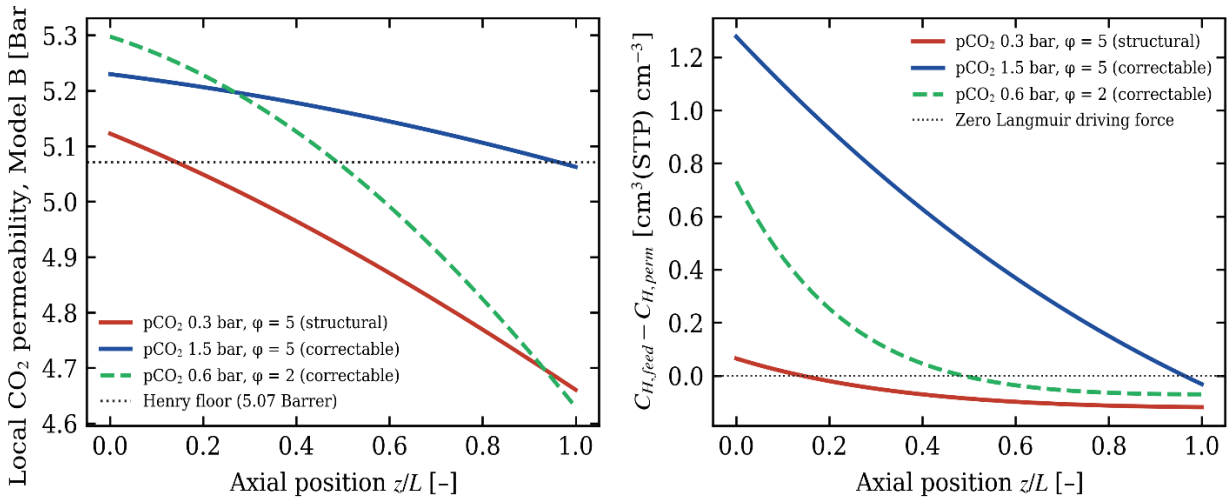


Fig. S2 Axial profiles of local permeability and Langmuir driving force

Converged axial profiles of (a) local Model B CO_2 permeability and (b) Langmuir driving force $C_{H,feed} - C_{H,perm}$, at 10 bar feed, for a structural case (0.3 bar CO_2, φ = 5) and two correctable cases (1.5 bar CO_2, φ = 5; 0.6 bar CO_2, φ = 2). Dotted lines: Henry's-law floor (a) and zero driving force (b).