

Supplementary Material

# An Assessment of Anion Exchange Membranes for CO<sub>2</sub> Capture Processes: A Focus on Fumasep<sup>®</sup> and Sustainion<sup>®</sup>

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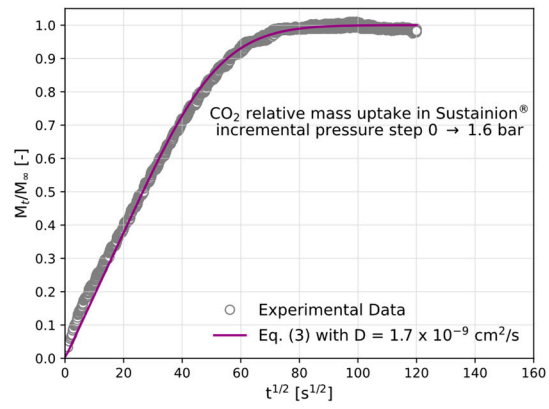
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**Table S1.** CO<sub>2</sub> and CH<sub>4</sub> sorption isotherms and diffusivity coefficients in Fumasep<sup>®</sup> and Sustainion<sup>®</sup>, measured at 30 °C.

Fumasep <sup>®</sup> - CO <sub>2</sub> - 1 <sup>st</sup> isotherm			Fumasep <sup>®</sup> - CO <sub>2</sub> - 2 <sup>nd</sup> isotherm		
$p_{eq}$ bar	$c \times 10^1$ mmol g <sup>-1</sup>	$D_0 \times 10^9$ cm <sup>2</sup> s <sup>-1</sup>	$p_{eq}$ bar	$c \times 10^1$ mmol g <sup>-1</sup>	$D_0 \times 10^9$ cm <sup>2</sup> s <sup>-1</sup>
1.31	1.65 ± 0.13	7.0 ± 0.4	1.02	1.47 ± 0.11	6.5 ± 0.4
3.20	3.07 ± 0.22	11.0 ± 0.6	2.30	2.59 ± 0.17	10.5 ± 0.6
5.07	4.17 ± 0.28	15.0 ± 0.8	3.72	3.62 ± 0.22	14.0 ± 0.8
6.85	5.15 ± 0.34	18.0 ± 1.0	5.08	4.37 ± 0.27	16.0 ± 0.9
8.32	5.96 ± 0.38	22.0 ± 1.2	7.16	5.44 ± 0.34	21.0 ± 1.1
Sustainion <sup>®</sup> - CO <sub>2</sub> - 1 <sup>st</sup> isotherm			Sustainion <sup>®</sup> - CO <sub>2</sub> - 2 <sup>nd</sup> isotherm		
$p_{eq}$ bar	$c \times 10^1$ mmol g <sup>-1</sup>	$D_0 \times 10^9$ cm <sup>2</sup> s <sup>-1</sup>	$p_{eq}$ bar	$c \times 10^1$ mmol g <sup>-1</sup>	$D_0 \times 10^9$ cm <sup>2</sup> s <sup>-1</sup>
1.26	2.04 ± 0.27	1.6 ± 0.1	1.10	1.79 ± 0.26	1.7 ± 0.1
2.97	4.06 ± 0.41	3.0 ± 0.2	2.83	3.18 ± 0.40	2.8 ± 0.1
4.65	5.23 ± 0.54	5.0 ± 0.3	4.61	4.52 ± 0.53	3.5 ± 0.2
6.38	6.64 ± 0.66	6.0 ± 0.3	6.28	5.73 ± 0.66	5.0 ± 0.3
7.95	7.74 ± 0.79	9.0 ± 0.5	7.82	6.60 ± 0.78	9.0 ± 0.5
Fumasep <sup>®</sup> - CH <sub>4</sub> - 1 <sup>st</sup> isotherm			Fumasep <sup>®</sup> - CH <sub>4</sub> - 2 <sup>nd</sup> isotherm		
$p_{eq}$ bar	$c \times 10^1$ mmol g <sup>-1</sup>		$p_{eq}$ bar	$c \times 10^1$ mmol g <sup>-1</sup>	
1.15	0.18 ± 0.11		1.57	0.30 ± 0.11	
2.76	0.45 ± 0.19		3.42	0.86 ± 0.17	
4.68	0.72 ± 0.26		5.21	1.16 ± 0.22	
6.47	1.12 ± 0.31		7.01	1.49 ± 0.27	
7.95	1.42 ± 0.35		8.33	1.69 ± 0.30	
Sustainion <sup>®</sup> - CH <sub>4</sub> - 1 <sup>st</sup> isotherm			Sustainion <sup>®</sup> - CH <sub>4</sub> - 2 <sup>nd</sup> isotherm		
$p_{eq}$ bar	$c \times 10^1$ mmol g <sup>-1</sup>		$p_{eq}$ bar	$c \times 10^1$ mmol g <sup>-1</sup>	
1.61	0.33 ± 0.29		2.61	0.70 ± 0.37	
3.45	0.91 ± 0.43		4.76	1.32 ± 0.53	
5.37	1.54 ± 0.57		6.25	1.96 ± 0.64	
6.78	2.21 ± 0.68		7.57	2.58 ± 0.75	
8.03	2.81 ± 0.79		8.76	3.07 ± 0.85	



**Figure S1.** Sorption kinetics of CO<sub>2</sub> in Sustainion® at 30 °C and fitting of  $D$  with Eq. (3). The step initial pressure was 0 and the final pressure was 1.6 bar.