

Supporting Information

Exploring the effect of fluorinated anions on the CO₂/N₂ separation of supported ionic liquid membranes

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Table S1 Gas diffusivity (D) values of all the SILMs contemplated in this study.^a

SILM sample	Gas Diffusivity ($\times 10^{12}$) ($\text{m}^2 \text{s}^{-1}$)	
	$D \text{ CO}_2$	$D \text{ N}_2$
[C ₂ mim][TFSAM]	258 ± 1.1	291 ± 4.5
[C ₂ mim][FSI]	315 ± 4.4	353 ± 7.5
[C ₂ mim][FAP]	214 ± 1.9	326 ± 0.2
[C ₂ mim][BETI]	167 ± 2.1	216 ± 2.4
[C ₂ mim][C ₄ F ₉ SO ₃]	55 ± 1.2	88 ± 2.0
[C ₂ mim][SCN] ¹	220 ± 6.3	149 ± 2.2
[C ₂ mim][SCN][OTf]	213 ± 1.1	104 ± 3.8
[C ₂ mim][OTf]	182 ± 3.6	226 ± 2.6
[C ₂ mim][N(CN) ₂] ¹	214 ± 7.0	137 ± 7.5
[C ₂ mim][N(CN) ₂][NTf ₂] ¹	213 ± 5.7	206 ± 5.5
[C ₂ mim][NTf ₂] ¹	172 ± 1.7	203 ± 2.5

^a The listed uncertainties represent the standard deviations, based on three experiments.

Table S2 Gas solubility (S) values of all the SILMs contemplated in this study.^a

SILM sample	Gas Solubility ($\times 10^6$) ($\text{m}^3(\text{STP}) \text{ m}^{-3} \text{ Pa}^{-1}$)	
	$S \text{ CO}_2$	$S \text{ N}_2$
[C ₂ mim][TFSAM]	22 ± 0.09	0.44 ± 0.01
[C ₂ mim][FSI]	20 ± 0.29	0.39 ± 0.01
[C ₂ mim][FAP]	22 ± 0.21	0.55 ± 0.01
[C ₂ mim][BETI]	20 ± 0.17	0.61 ± 0.01
[C ₂ mim][C ₄ F ₉ SO ₃]	4 ± 0.07	0.49 ± 0.01
[C ₂ mim][SCN] ¹	9 ± 0.24	0.23 ± 0.01
[C ₂ mim][SCN][OTf]	15 ± 0.09	0.53 ± 0.02
[C ₂ mim][OTf]	20 ± 0.37	0.38 ± 0.01
[C ₂ mim][N(CN) ₂] ¹	17 ± 0.57	0.39 ± 0.02
[C ₂ mim][N(CN) ₂][NTf ₂] ¹	21 ± 0.53	0.51 ± 0.02
[C ₂ mim][NTf ₂] ¹	26 ± 0.28	0.61 ± 0.01

^a The listed uncertainties represent the standard deviations, based on three experiments.

References

1. L. C. Tomé, D. J. S. Patinha, C. S. R. Freire, L. P. N. Rebelo and I. M. Marrucho, *RSC Adv.*, 2013, **3**, 12220-12229.