Supporting Information

Development of Hollow-Fiber Membranes Functionalized with Ionic Liquids for Enhanced CO_2 Separation

Julia A. Piotrowska†, Christian Jordan‡, Michael Harasek,‡ and Katharina Schröder*,†*

†Technische Universität Wien, Institute of Applied Synthetic Chemistry, Getreidemarkt 9/163, 1060 Vienna, Austria

‡Technische Universität Wien, Institute of Chemical, Environmental and Bioscience Engineering, Getreidemarkt 9/E166, 1060 Vienna, Austria

Corresponding Authors

* Katharina Schröder, phone: +43 1 58801 163601, mail: katharina.schroeder@tuwien.ac.at

* Michael Harasek, phone: +43 1 58801 - 166 202, mail: michael.harasek@tuwien.ac.at

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1. Viscosity-density data, FT-IR and ^{1}H NMR of the pure ionic liquids

Table S1 Viscosity and density data of purchased ionic liquids, provided by the company

IL type / Data type	**[C_6mim][NTf_2]**	**[C_6mim][Cl]**
Viscosity [cP]	63.2	3302
Density [g/cm³]	1.37	1.04

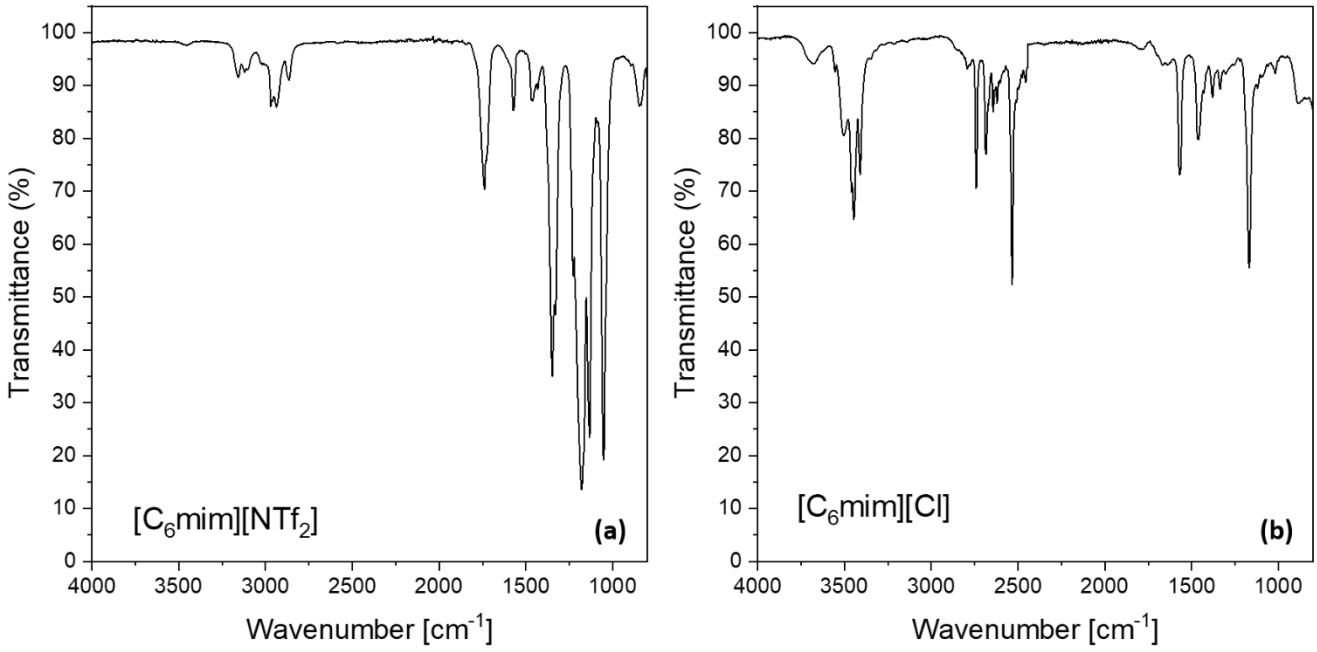

Figure S1. FT-IR spectra of pure [C_6mim][NTf_2] (a) and [C_6mim][Cl] (b)

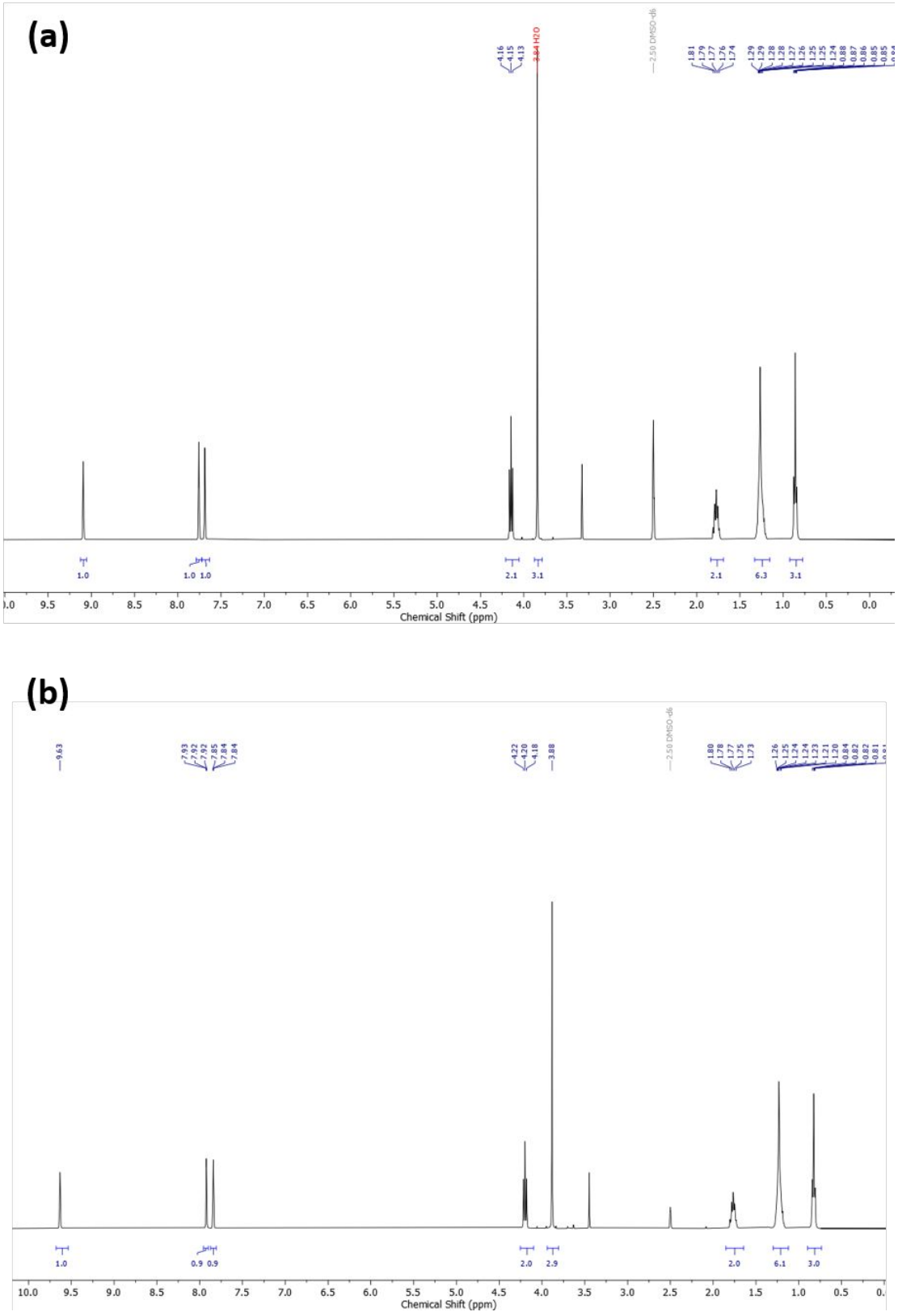

Figure S2. ^{1}H NMR spectra of pure $[C_6mim][NTf_2]$ (a) and $[C_6mim][Cl]$ (b)

2. SEM images of flat sheet membranes coated with [C_6mim][Cl]

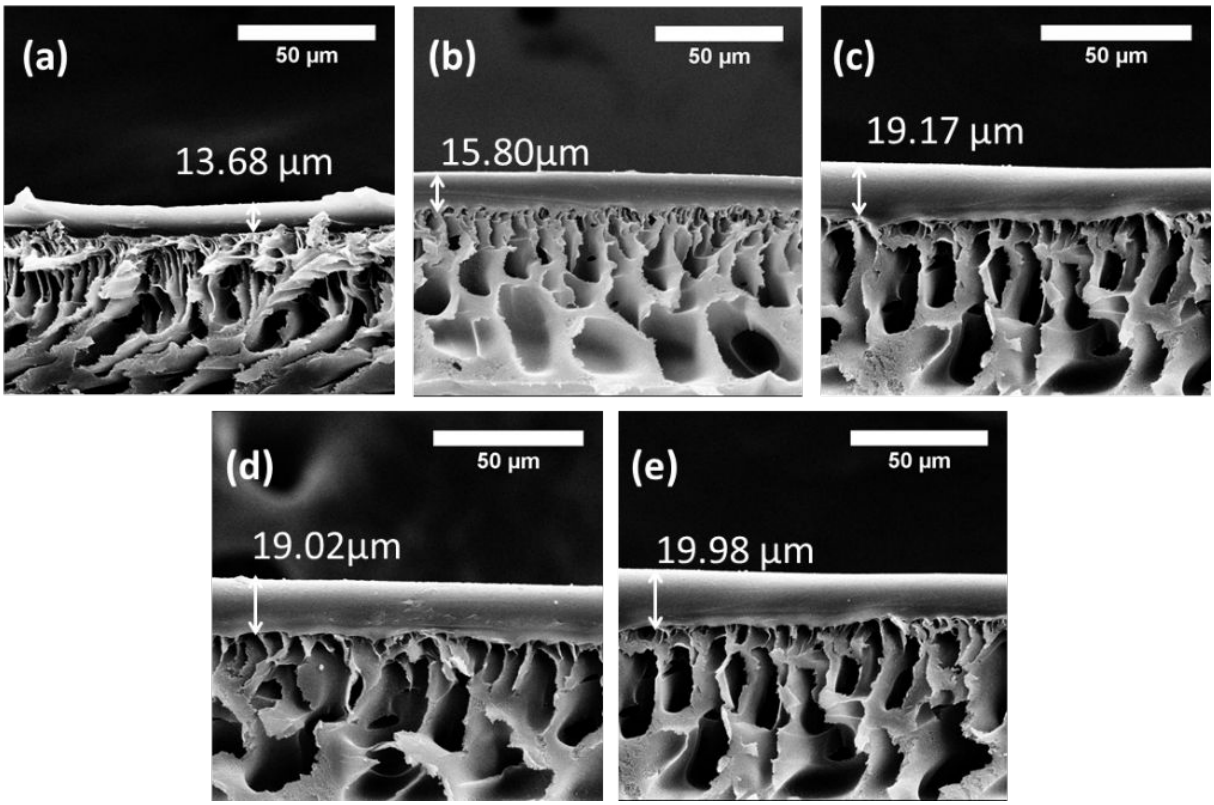

Figure S3. SEM images of flat sheet membranes coated with 10 (a), 20 (b), 40 (c), 60 (d) and 80 wt.% of [C_6mim][Cl] (e)

3. TGA and DSC curves

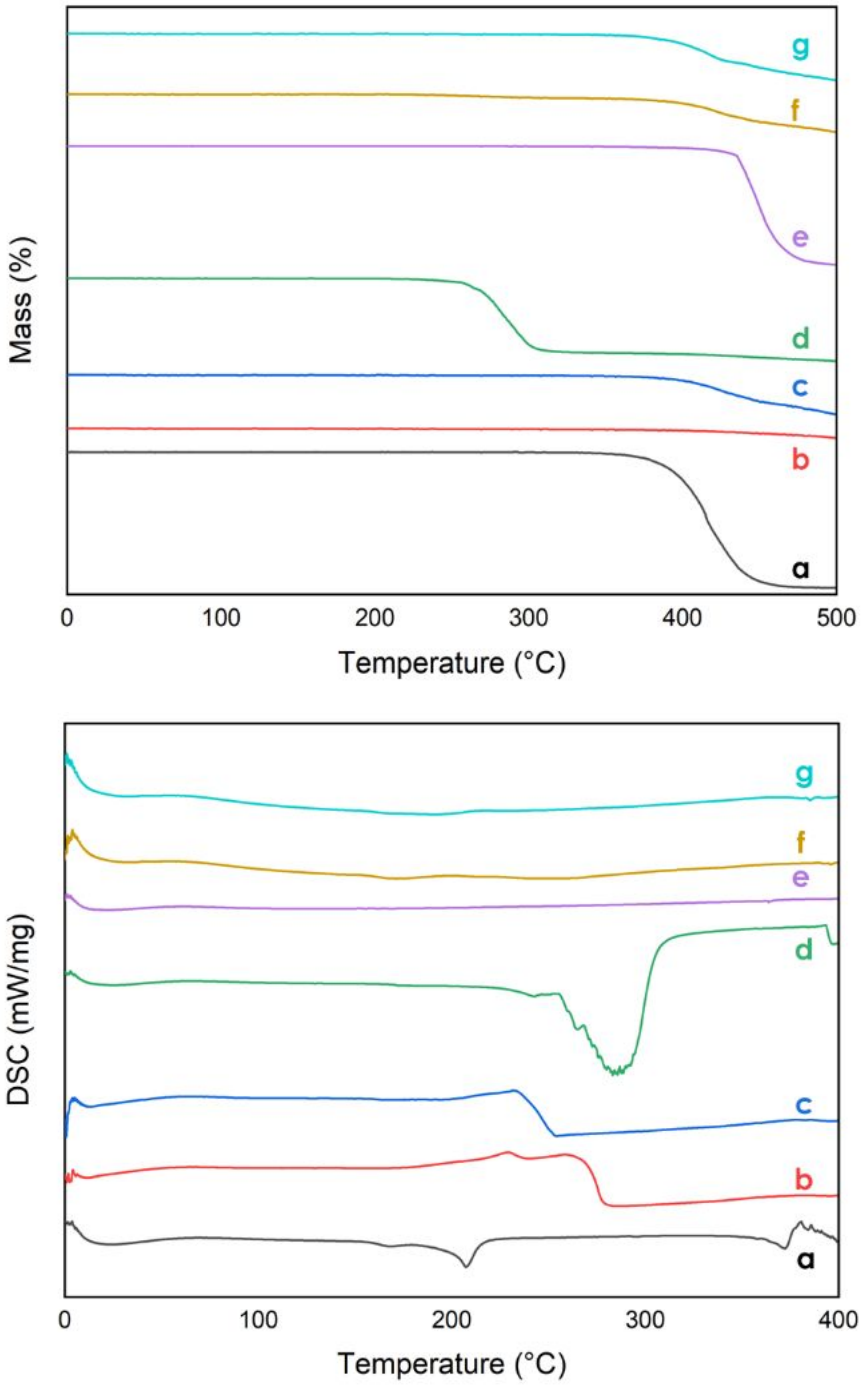

Figure S4. TGA (upper) and DSC (lower) curves of: pure Pebax 1657 (a), PES uncoated membrane (b), membranes coated with: neat Pebax (c), neat $[C_6mim]Cl$ (d), neat $[C_6mim][NTf_2]$ (e), Pebax and 20 wt.% of $[C_6mim][NTf_2]$ (f), Pebax and 20 wt.% of $[C_6mim][Cl]$ (g)

4. XRD spectra of coated membranes

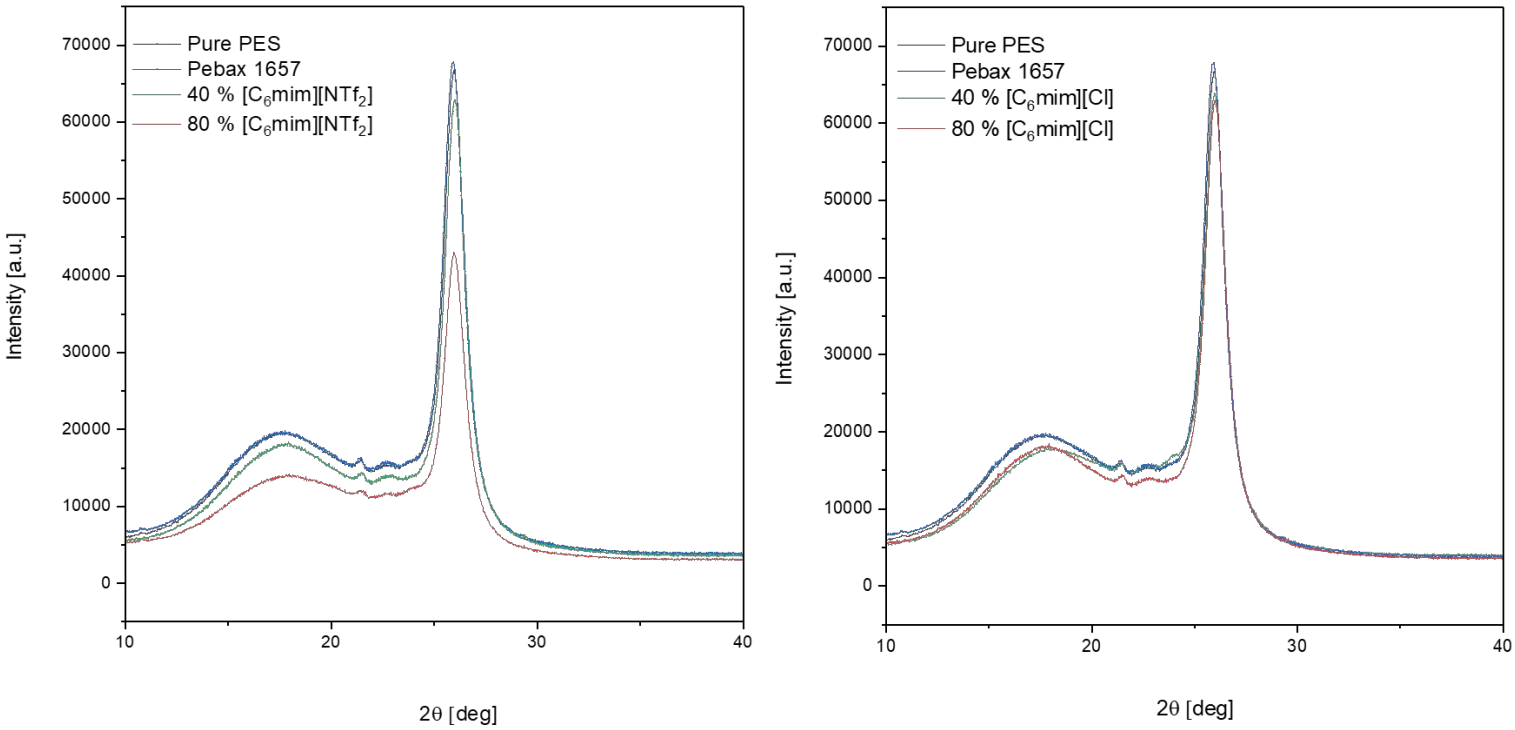

Figure S5. XRD spectra of dense neat Pebax 1657, Pebax1657/IL 40 wt.% and Pebax1657/IL 80 wt.%, for $[C_6mim][NTf_2]$ (a) and $[C_6mim][Cl]$ (b)

5. Comparison of CO_2/N_2- and CO_2/CO-separation properties of membranes with the literature data

Table S2 Literature comparison - performance of membranes coated with Pebax 1657 and / or ILs

				Ideal selectivity [-]				
	Membrane type	**Coating Material**	**CO_2 permeability**	**CO_2/N_2**	**CO_2/CO**	**CO/N_2**	**Test conditions**	**Ref.**
1.	Supported Flat sheet composite	Pebax 1657/ 40% $[C_6mim][NTf_2]$	163 Barrer	44	-	-	25 °C, variable pressure	This paper
2.	Neat polymer flat sheet	Pebax 1657	80 Barrer	70	-	-	21 °C, variable pressure	1
3.	Neat polymer flat sheet	Pebax 1657	20 GPU	28	50	0.5	25 °C, variable pressure	2
4.	Hollow fibers	Pebax 1657	7.6 GPU (69 Barrer)	18	13	1.1	25 °C, 2 bar	This paper
5.	Hollow fibers	Pebax 1657/ 40% $[C_6mim][NTf_2]$	23 GPU (245 Barrer)	8.7	12.3	0.7	25 °C, 2 bar	This paper
6.	Hollow fibers	Pebax 1657	86.4 Barrer	34	-	-	25 °C, 1 bar	3
7.	Hollow fibers	Pebax 1657/ 40% $[emim][BF_4]$	143 Barrer	34	-	-	35 °C, 3 bar	3
8.	Hollow fibers	$[emim][NTf_2]$	2600–3100 Barrer	33	-	-	25 °C, 1 bar	4
9.	Hollow fibers	Pebax 1657/ [emim][BF4]/GO	642 GPU	34	-	-	35 °C, 3 bar	5

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