

Supporting Information

## Green membrane manufacture for peptide separations

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Table 1S. Hansen solubility parameters ( $\delta$ ) for PES, PSU, and different solvents;  $\delta_d$ ,  $\delta_p$  and  $\delta_h$  are van der Waals, polarity, and hydrogen bond contributions to  $\delta$ .

	$\delta_d$	$\delta_p$	$\delta_H$	$\delta$ (MPa <sup>1/2</sup> )
PSU <sup>b</sup>	20	8	8	23
PES <sup>b</sup>	19	11	8	23
[EMIM]DEP <sup>a</sup>	20	13	15	28
[EMIM]OAc <sup>a</sup>	22	16	17	32
NMP <sup>b</sup>	18	12	7	23
DMF <sup>b</sup>	17	14	11	25
DMAc <sup>b</sup>	17	12	10	23
Water <sup>b</sup>	16	16	42	48

<sup>a</sup>Calculated with HSPiP, <sup>b</sup>From a reference. <sup>31</sup>

Table 2S. Rejections of PEG (and PEO) of different molecular weights, measured for PES membranes cast from solutions in [EMIM]DEP with different polymer concentrations and from 16 wt% PES solutions in NMP, DMAc and DMF; MWCO estimated from the measuring data.

Molecular weight (kg mol <sup>-1</sup> )	Solute rejection (%)						
	8 wt% [EMIM]DEP	12 wt% [EMIM]DEP	14 wt% [EMIM]DEP	16 wt% [EMIM]DEP	16 wt% NMP	16 wt% DMAc	16 wt% DMF
600	100	100	100	100	100	100	100
100	100	100	100	100	100	100	100
35	99± 0.2	100	100	100	97	97± 0.1	94± 0.2
10	48± 0.4	100	100	100	46± 0.2	67± 0.3	33± 0.3
6	16± 0.1	100	100	100	25± 0.1	62± 0.1	24± 0.4
1.5	4± 0.5	44± 0.4	100	100	9± 0.4	58± 0.1	13± 0.4
0.3	1± 0.2	16± 0.1	40± 0.1	52.9	5± 0.3	59± 0.3	10± 0.2
MWCO (kg mol <sup>-1</sup> )	30	5	1.3	1.25	31	29	33

Table 3S. Water permeance and MWC0 of PES membranes reported in the literature.

Composition	Membrane type	Water permeance (L m <sup>-2</sup> h <sup>-1</sup> bar <sup>-1</sup> )	MWC0 (kg mol <sup>-1</sup> )	References
8 % PES/[EMIM]DEP	FS	140	30	This study
12 % PES/[EMIM]DEP	FS	65	5	This study
14 % PES/[EMIM]DEP	FS	25	1.3	This study
16 % PES/[EMIM]DEP	FS	20	1.25	This study
18 % PES/f-MWCNT/PVP/DMF	FS	24	35	48
18 % PES/15 % Methanol/67 % NMP	HF	187	10	58
PES/PEG/NMP	HF	28	45	45
32 % PES/DMF	FS	9.4	1.9	46
30 % PES/NMP	FS	22.2	2.1	
NFPES10 (Nadir, Germany)	FS	15.4	1.2	
N30F (Nadir, Germany)	FS	3.8	0.7	
20 % PES/DMF	FS	5	35	47
20 % PEG/PEG/DMF	FS	25	65	
NTR7450 (modified PES, Nitto-Denko)	FS	5.7	0.7	49
15 % PES/DMF	FS	9	2	50
15 % PES/NMP	FS	1.7	35	
17.5 % PES/82.5 % NMP	FS	2.6	> 69	51
17.5 % PES/82.5 % DMSO	FS	5.7	45	
17.5 % PES/82.5 % DMF	FS	3.6	35	
15 % PES/85 % NMP	FS	5.6	45	
15 % PES/85 % DMSO	FS	11.9	20	
15 % PES/85 % DMF	FS	7.7	35	
PES (HFK-131, Koch)	FS	53	10	53 54
16 % PES/2 % PVP/82 % DMAc	FS	74	80.5	52
16 % PES/2 % PVP/10 % AA/72 % DMAc	FS	44	35.9	
16 % PES/2 % PVP/10 % HEMA/72 % DMAc	FS	59	34.1	
18 % PES/NMP	FS	850	600	55
18 % PES/0.03 % ZrO <sub>2</sub> /NMP	FS	1580	600	
PES/PVP (HydraCap 60, LD Hydranautics)	HF	600	150	56
PES/PVP/DMAc	FS	350	120	57
PES/TiO <sub>2</sub> /PVP/DMAc	FS	450	250	

\* FS: flat sheet, HF: hollow fiber

PES/[EMIM]DEP

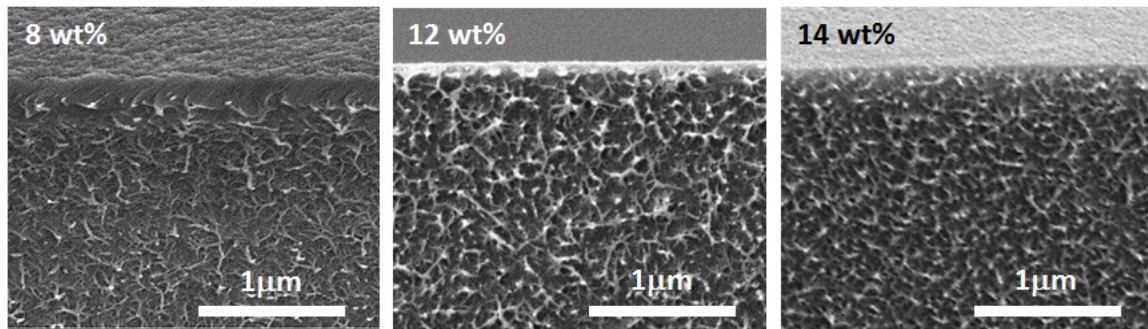


Figure 1S. FESEM images of membranes cross sections, cast from PES/[EMIM]DEP solutions with the following polymer concentrations: 8, 12 and 14 wt%.

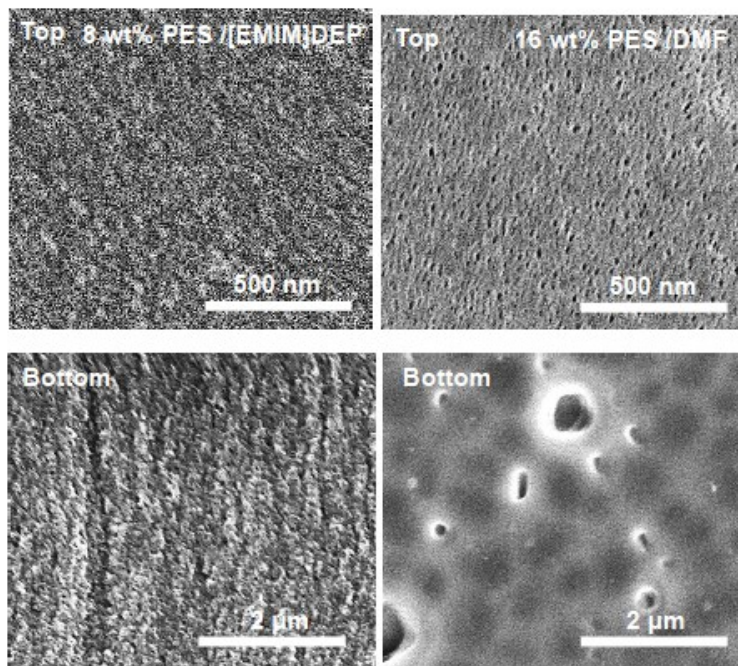


Figure 2S. FESEM images of membranes surfaces (top and bottom), cast from 8 wt% PES/[EMIM]DEP and 16 wt % PES/DMF solutions.