## Supplementary information

## Development of a novel cellulose solvent based on pyrrolidinium hydroxide and reliable solubility analysis

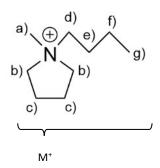
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## Characterization of [C<sub>4</sub>mpyr][OH]

<sup>1</sup>H-NMR (400 MHz, DMSO- $d_6$ ) δ = 3.39-3.52 (m, 4H, c), 3.32-3.28 (m, 2H, e), 2.98 (s, 3H, a), 2.07 (s, 4H, b), 1.63-1.71 (m, 2H, d), 1.31 (td, J = 14.8, 7.5 Hz, 2H, f), 0.90-0.94 (t, J = 7.4 Hz, 3H, g). MS (EI, 70 eV): m/z (%) = 446.3, 305.1, 152.0, 142.1 (M<sup>+</sup>).



**Table S1** Solubility of microcrystalline cellulose in aqueous [C₄mpyr][OH] at 25 °C.

		•		•		
Water	Water / IL	Maximal solubility		Insolubility		Turbidity
/ wt%	(mole ratio)	Cellulose /	Turbidity	Cellulose	Turbidity	increase
		wt%	/ NTU	/ wt%	/ NTU	/ NTU
45.15	7.26	-	-	0.23	205.40	205.40
49.88	8.78	19.98	7.99	21.04	42.30	34.31
55.42	10.97	13.93	15.93	15.06	46.20	30.27
60.16	13.32	10.05	25.28	11.09	56.43	31.15
65.51	16.76	6.97	16.01	8.07	33.13	17.12
70.61	21.20	6.00	15.64	7.00	51.10	35.46
74.40	25.64	0.22	21.83	0.85	91.16	69.33
80.95	37.50	-	-	0.24	432.30	432.30

Maximal solubility = no crystals seen under the microscope Insolubility = crystals were visible under the microscope COMMUNICATION Journal Name



Figure S1 Photograph of a turbidity meter with glass vial (the stirrer bar is fixed with a magnet), silicone oil and a cloth.

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[P14][OH] 45 wt% water	GOVM	[P14][OH] 50 wt% water GO MM	[P14][OH] 55 wt% water SOUTH	[P14][OH] 60 wt% water	00 Wm
O wt% cellulose of disso		20 wt% cellulose	14 wt% cellulose	10 wt% cellulose	
0.2 wt% cellfilose in aque		21 wt% cellutose.	15 wt% cellulose Go wm	11 wt% cellulose	SOW
[P14][OH] 66 wt@water	4 O E A O O	[P14][OH] 71 wt% water GO Em	[P14][OH] 74 wt% water COLUM	[P14][OH] 81 wt% water	00 km
7 wt% cellulose lat different water concentration		6 wt% cellulose	0.2 wt% cellulose	0 wt% cellulose	
8 wt% cellulose s	00 V M	7 wt% cellulose	0.9 wt% cellulose	0.2 wt% cellulose	E 2 0 0
				S	