Supplementary information

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

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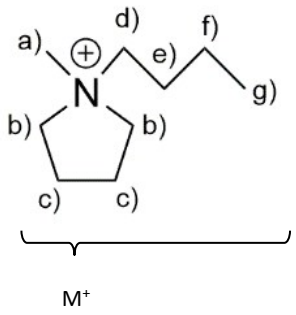
Characterization of [C_4mpyr][OH]

^{1}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^+).



M^+

Table S1 Solubility of microcrystalline cellulose in aqueous [C_4mpyr][OH] at 25 °C.

Water / wt%	Water / IL (mole ratio)	Maximal solubility		Insolubility		Turbidity increase / NTU
		Cellulose / wt%	Turbidity / NTU	Cellulose / wt%	Turbidity / 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

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

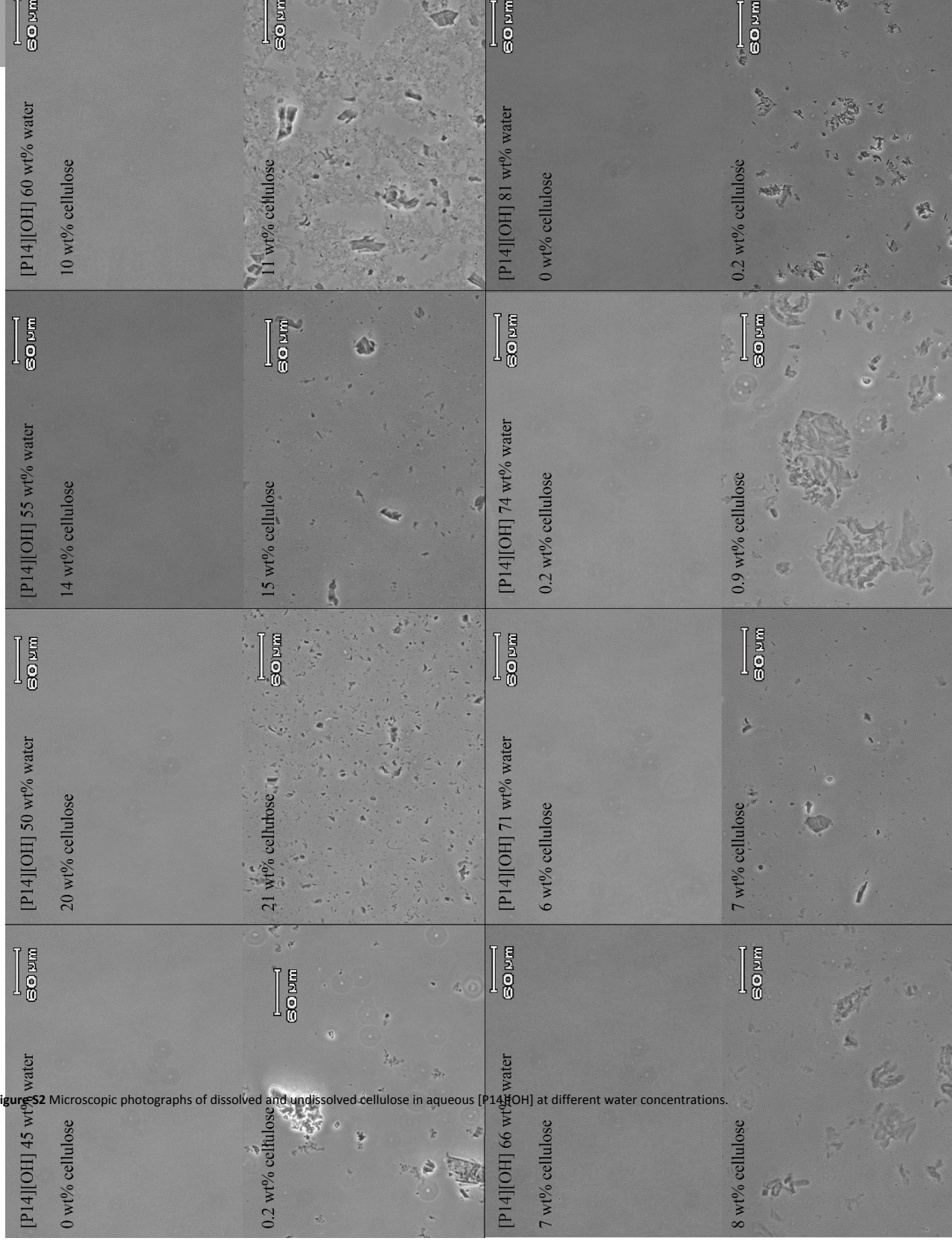


Figure S2 Microscopic photographs of dissolved and undissolved cellulose in aqueous [P14][OH] at different water concentrations.