

Supporting Information

Enhanced dissolution of ibuprofen using ionic liquids as cationic hydrotropes

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Table S1. Calibration curve used to determine the solubility of ibuprofen in water and in the aqueous solutions with variable concentration of IL.

	λ / nm	Calibration curve	Retention time / min	Method
Ibuprofen	230	Peak area = 43033 x C (mg.L ⁻¹) + 397400	16.5	HPLC-DAD

Table S2. Experimental solubility of ibuprofen in aqueous solutions of hydrotropes at (303.1 ± 0.5) K.

Name	Hydrotrope		Solubility of ibuprofen ± σ / mg.L ⁻¹	
	Weight fraction composition / wt %	Molality / mol _{Hyd} ·kg _{water} ⁻¹		
H ₂ O	0.00	0.000	37.54 ± 0.93	
	0.51	0.025	73.25 ± 5.30	
	1.01	0.050	108.66 ± 10.83	
	2.02	0.101	162.22 ± 4.16	
	[C ₄ C ₁ im][N(CN) ₂]	5.00	0.257	625.76 ± 3.36
	10.02	0.542	1385.87 ± 9.64	
	14.97	0.858	2592.06 ± 80.03	
	20.04	1.221	4473.19 ± 31.96	
[C ₄ C ₁ im][SCN]	0.51	0.026	71.67 ± 3.73	
	1.02	0.052	102.03 ± 8.75	
	2.01	0.104	183.47 ± 4.89	
	5.09	0.272	412.86 ± 11.48	
	10.00	0.563	820.53 ± 7.18	
	15.09	0.900	1367.98 ± 8.56	
	20.09	1.274	2287.91 ± 13.61	
[C ₄ C ₁ im][TOS]	5.04	0.171	100.73 ± 2.42	
	10.02	0.359	162.22 ± 3.75	
	14.99	0.568	291.72 ± 8.73	
	20.07	0.809	519.10 ± 3.33	
	30.23	1.396	2011.20 ± 30.81	
[C ₄ C ₁ im]Cl	4.99	0.301	74.88 ± 4.77	
	10.00	0.636	118.31 ± 0.11	
	14.94	1.006	167.16 ± 4.39	

	19.98	1.430	242.47 ± 5.87
	5.02	0.285	57.96 ± 1.38
[C ₄ C ₁ py]Cl	10.01	0.599	100.86 ± 2.55
	15.02	0.952	175.93 ± 6.41
	20.00	1.346	275.61 ± 2.17
	0.53	0.028	38.03 ± 5.34
	1.09	0.057	40.16 ± 3.69
	2.07	0.110	47.47 ± 3.48
[C ₄ C ₁ pip]Cl	5.03	0.276	90.52 ± 2.56
	10.01	0.580	126.67 ± 1.50
	15.00	0.921	173.37 ± 4.48
	19.97	1.301	217.98 ± 4.22
	0.51	0.029	38.43 ± 3.20
	1.00	0.057	43.73 ± 3.71
	2.01	0.115	50.70 ± 2.94
[C ₄ C ₁ pyrr]Cl	5.06	0.300	88.66 ± 1.88
	10.02	0.626	121.84 ± 4.58
	14.99	0.992	144.89 ± 8.52
	20.01	1.407	189.56 ± 7.33
	0.52	0.018	45.49 ± 2.96
	1.02	0.035	45.04 ± 1.12
	2.04	0.070	50.63 ± 0.17
[P _{4,4,4,4}]Cl	4.99	0.178	54.44 ± 1.17
	10.24	0.387	141.83 ± 5.12
	14.98	0.598	321.39 ± 8.34
	20.07	0.851	903.94 ± 26.49
	4.99	0.189	71.78 ± 3.75
	9.92	0.396	117.00 ± 5.62
[N _{4,4,4,4}]Cl	14.99	0.634	224.96 ± 7.49
	20.04	0.902	492.22 ± 26.01
	5.00	0.377	55.18 ± 3.42
	10.00	0.796	62.49 ± 3.06
[N _{1,1,1,2(OH)}]Cl	14.99	1.263	74.24 ± 2.29
	20.00	1.791	79.92 ± 2.78
	1.00	0.113	153.56 ± 7.65
Na[N(CN) ₂]	4.91	0.580	473.67 ± 3.49
	9.52	1.181	784.32 ± 7.88

	15.02	1.986	1027.21 ± 7.94
Na[TOS]	5.00	0.271	169.08 ± 8.30
	10.00	0.572	322.51 ± 11.09
	15.01	0.910	499.11 ± 16.09
	20.05	1.292	737.03 ± 22.24
	0.50	0.062	32.13 ± 1.03
Na[SCN]	1.00	0.125	32.46 ± 2.17
	2.02	0.255	34.97 ± 0.41
	5.02	0.652	33.50 ± 1.00
	10.00	1.370	38.62 ± 3.62
	15.02	2.180	32.25 ± 0.69
	20.05	3.093	25.02 ± 0.39

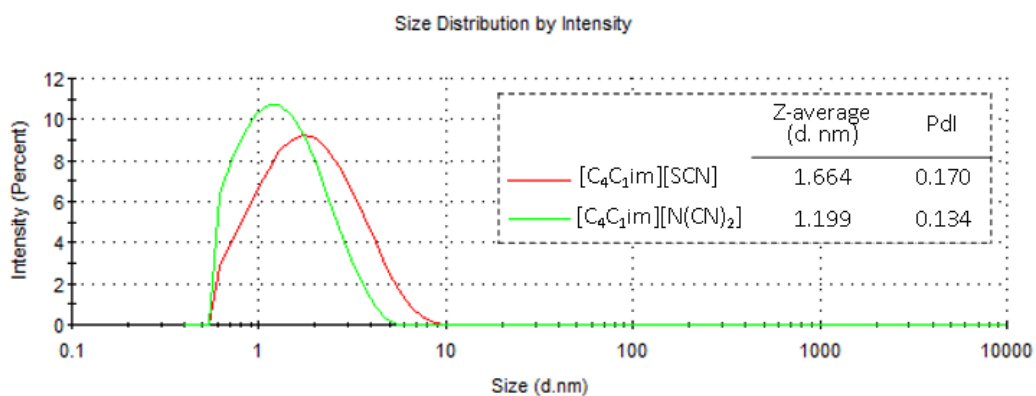


Figure S1. Size distribution analysis by DLS for saturated solutions of ibuprofen in 2.5 mol·kg⁻¹ of [C₄C₁im][SCN] (red line) and [C₄C₁im][N(CN)₂] (green line) at 303 K.

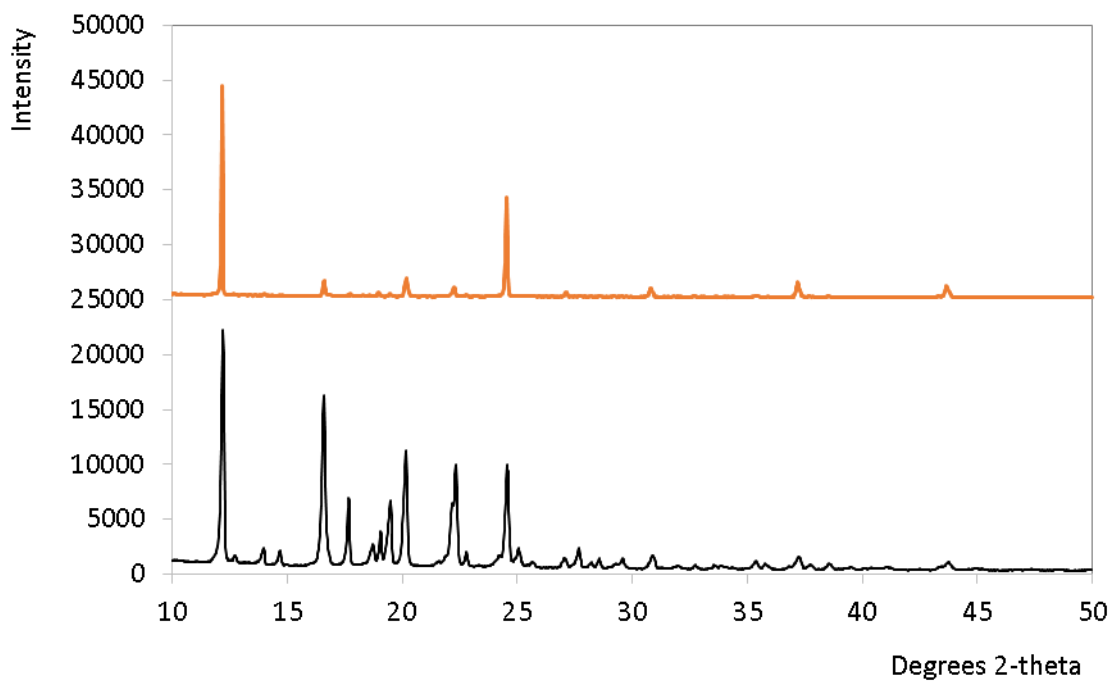


Figure S2. X-ray diffraction patterns of ibuprofen prepared from ethanol (black line) and [C₄C₁im][SCN] solution (orange line). Curves are displaced vertically in an arbitrary manner.

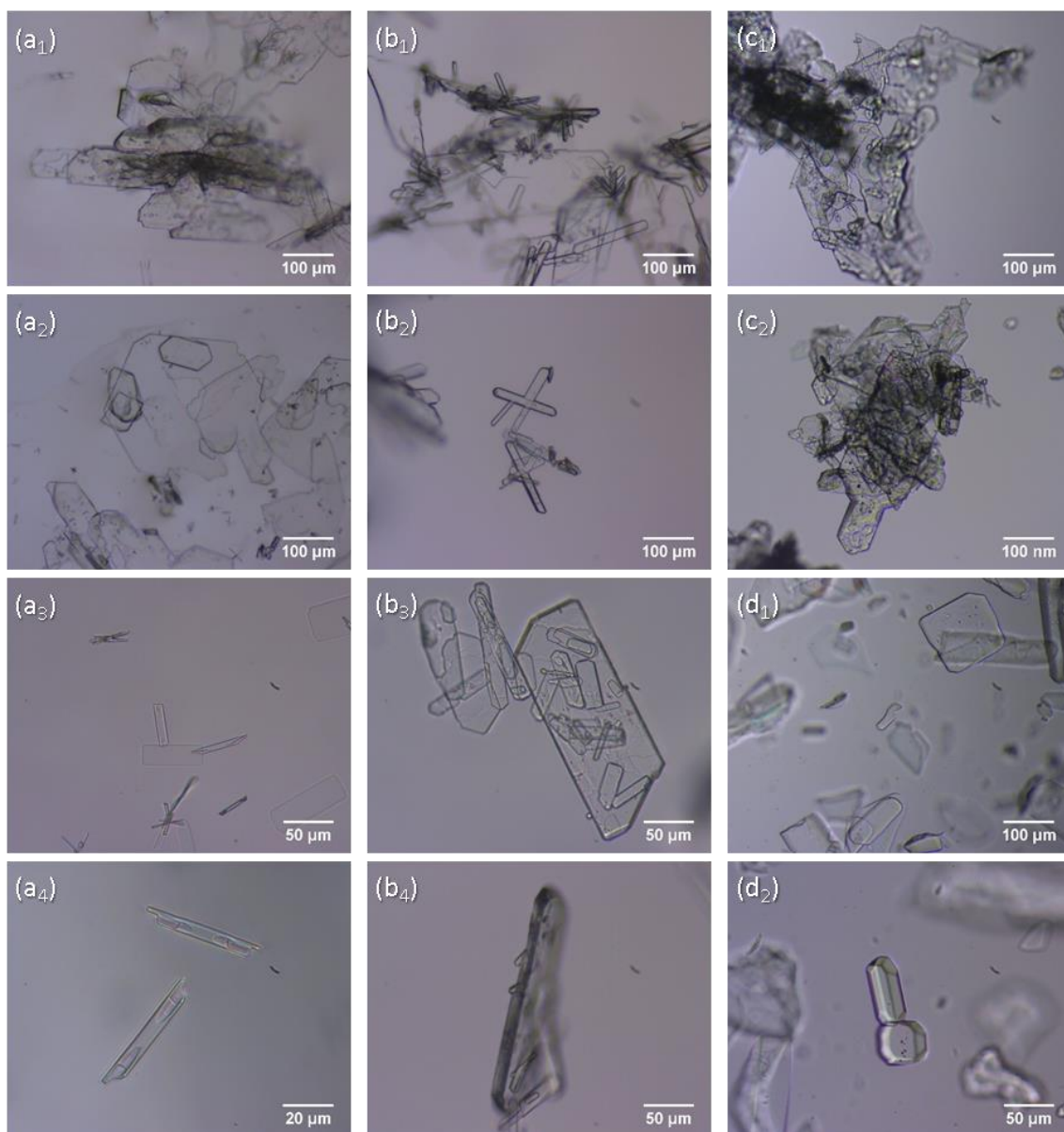


Figure S3. Micrographs of ibuprofen crystals in (a) ethanol and (b) aqueous solution with $2.5 \text{ mol}\cdot\text{kg}^{-1}$ of $[\text{C}_4\text{C}_{1\text{im}}][\text{SCN}]$. Micrographs of ibuprofen crystals after filtration and drying from (c) ethanol and (d) aqueous solution of $[\text{C}_4\text{C}_{1\text{im}}][\text{SCN}]$.