Supporting Information

The role of hydrophilicity in PEG-based aqueous biphasic systems of cholinium carboxylate ionic liquids and salts

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[Ch][Ox] $Mw = 193.20$		[Ch][Mal] $Mw = 207.22$		[Ch][Suc] $Mw = 221.25$	
100 w ₁	100 w ₂	100 w ₁	100 w ₂	100 w ₁	$100 w_2$
30.9174	47.6404	23.8163	57.5845	61.1925	15.5999
27.4920	51.5375	21.8029	59.8616	57.9170	18.8473
23.1612	56.1317	19.5132	62.5153	55.6081	20.9446
22.8127	56.5591	18.3093	64.0349	52.6514	23.8592
22.3769	57.0319	16.6508	66.4115	49.6514	27.0819
21.8895	57.6366	14.0911	69.5946	46.3085	30.4924
21.1759	58.3386	12.8175	71.1497	44.0858	32.9913
20.7226	58.8520	12.4661	71.7984	40.0241	37.4090
20.2869	59.3700	11.5805	73.0895	38.2059	39.4399
19.8933	59.8508	10.9366	73.9439	36.6513	40.9726
17.8256	62.3556	-	-	35.3499	42.5485
17.2207	62.9475	-	-	34.0708	43.8844
16.8061	63.4775	-	-	32.4783	45.7081
16.6168	63.7002	-	-	31.3441	46.8578
15.6962	64.7871	-	-	30.0165	48.3660
15.4203	65.1930	-	-	28.9439	49.6458
15.1770	65.5150	-	-	27.6294	50.9756
15.0143	65.6599	-	-	27.0829	51.5069
14.5948	66.1609	-	-	26.2591	52.5428
14.3529	66.5234	-	-	25.4936	53.4422
13.9268	67.0385	-	-	24.4458	54.5187
13.5048	67.6107	-	-	23.8447	55.2607
13.0817	68.2360	-	-	23.3138	55.8951
12.9136	68.4743	-	-	22.6808	56.5526
12.5687	68.9545	-	-	21.8554	57.5872
12.2043	69.3586	-	-	21.4454	57.9612
11.9675	69.6719	-	-	20.7065	58.8639
11.7260	70.1005	-	-	19.7838	60.2604
11.3812	70.5942	-	-	19.2927	60.4882
11.0102	71.0149	-	-	18.7710	61.1675
10.8473	71.2884	-	-	18.2599	61.8781

Table S1 Weight fraction data for the ternary systems composed of IL (1) + PEG 600 (2) + water (3) at 298 K.

[Ch][Glu] $Mw = 235.28$				[Ch][Fum]	
100 wi	100 wa	100 wi	100 ₩2	100 w	100 wa
38 7281	30 8066	15 1662	64 4031	24 4432	<u>/111758</u>
37 4076	<i>A</i> 1 107 <i>A</i>	14 6026	65 0110	23,8025	41.1758
37.4770	42 5207	14.0720	65 5111	23.0023	41.7317
22 6828	42.3297	14.5244	66 1286	22.2304	44.1730
33.0828	45.0071	12 2202	66 0806	20.1124	45.0749
32.9041	43.9071	13.2295	67 2840	20.1124	40.8030
20,2002	47.0010	12.8033	07.2840	19.3790	47.8013
30.3003	48.6779	12.5589	67.7195	18.2490	49.4040
29.4726	49.5069	12.6312	67.5227	17.4193	50.4970
28.5522	50.5758	12.2840	67.9418	16.0543	52.8884
27.8469	51.2738	-	-	15.5395	53.5488
26.8245	51.9308	-	-	14.7335	54.6415
26.1367	52.7273	-	-	14.1670	55.7207
25.3278	53.2977	-	-	13.5913	56.5971
24.2626	54.3719	-	-	12.8271	57.6765
23.7933	54.8892	-	-	11.8395	59.2239
23.5035	55.2282	-	-	11.4702	60.0005
22.6298	56.2251	-	-	9.4368	64.1856
22.1920	56.7287	-	-	-	-
21.5768	57.3466	-	-	-	-
21.1889	57.7998	-	-	-	-
20.6669	58.4809	-	-	-	-
20.2359	58.8752	-	-	-	-
19.7166	59.6102	-	-	-	-
19.3586	60.0121	-	-	-	-
18.9466	60.5138	-	-	-	-
18.5589	60.9937	-	-	-	-
18.1908	61.3634	-	-	-	-
17.8704	61.7615	-	-	-	-
17.6788	61.8278	-	-	-	-
17.2812	62.2128	-	-	-	-
18.1908 17.8704 17.6788 17.2812	61.3634 61.7615 61.8278 62.2128		- - -	- - -	- - -

Table S2 Weight fraction data for the ternary systems composed of IL (1) + PEG 600 (2) + water (3) at 298 K.

[Ch]L-ma				
Mw = 237.25				
$100 w_1$	100 w ₂			
39.7490	35.8649			
35.1069	40.3387			
33.8215	41.6890			
32.3796	43.3815			
31.3745	44.3120			
28.6416	47.5858			
26.8603	49.4460			
25.9115	50.7294			
25.2876	51.3471			
24.3968	52.3534			
23.7542	53.0042			
22.6391	54.2272			
20.5753	57.2577			
19.8831	57.7829			
19.5107	58.2075			
18.5396	59.4250			
17.9878	60.1808			
16.1315	62.8465			
15.5826	63.4316			
14.9719	64.2217			
14.3310	65.3132			
13.4134	66.6167			
12.7877	67.5016			
12.1728	68.3506			
11.3679	69.6273			

Table S3 Weight fraction data for the ternary systems composed of IL (1) + PEG 600 (2) + water (3) at 298 K.

[Ch][Mal]		[Ch][Suc]		[Ch][Glu]	
Mw = 207.22		Mw = 221.25		Mw = 235.28	
$100 w_1$	100 w ₂	$100 w_1$	100 w ₂	$100 w_1$	100 w ₂
15.3132	50.7983	11.7829	49.9010	10.7529	52.4143
19.3509	43.3103	14.1453	45.0561	20.6076	40.1912
25.0136	34.3891	14.9450	43.7481	23.2256	37.2526
29.1488	29.5790	16.2862	41.7490	26.4691	33.2754
30.5355	27.9111	16.8385	40.5915	26.8103	32.6825
31.0579	26.9937	17.2830	39.6467	28.2449	30.8015
31.9510	26.2529	18.6452	37.9111	29.0711	29.7128
32.0055	25.6941	19.6782	36.8501	29.8409	28.9054
32.6405	25.1719	20.3009	35.7260	32.7580	25.7544
32.9647	24.3946	21.9581	33.4665	-	-
33.6890	23.8316	22.5150	32.9606	-	-
34.1160	23.3536	22.8231	32.1237	-	-
34.9334	22.2703	23.4878	30.8737	-	-
35.1743	21.6567	23.9076	30.3121	-	-
35.9730	20.5738	24.8583	29.3107	-	-
36.6291	20.2785	25.0805	28.6751	-	-
36.7707	19.9333	26.3742	26.9012	-	-
37.3991	19.3411	26.7952	26.3976	-	-
37.8617	18.6199	27.6579	25.5721	-	-
38.4907	18.1577	28.0589	25.1752	-	-
38.6319	17.6831	28.1651	24.7099	-	-
40.6109	16.8858	28.5859	24.3594	-	-

Table S4 Weight fraction data for the ternary systems composed of IL (1) + PEG 4000 (2) + water (3) at 298 K.

[Ch][Fum]				[Ch]Cit	
	$M_W = 219.24$			$M_W = 295.28$	
$100 w_1$	100 w ₂	$100 w_1$	100 w ₂	$100 w_1$	100 w ₂
7.9589	53.1245	28.7250	15.5793	27.5944	40.0824
11.5561	44.5748	28.8433	15.3064	30.7137	35.4409
12.1425	41.7559	28.8472	15.1517	33.4788	31.0564
17.7063	32.8341	29.1195	14.9058	35.2693	28.8880
18.3676	31.4263	-	-	36.1188	27.4549
19.4622	29.4958	-	-	38.1326	25.5448
20.1160	28.7098	-	-	38.5035	24.8482
20.6570	27.0911	-	-	39.7433	23.4122
21.4967	26.1323	-	-	41.3356	21.8478
21.8798	25.5814	-	-	41.9189	21.1782
22.2705	24.9602	-	-	42.7231	20.3371
22.5200	24.3205	-	-	43.1559	19.7952
23.0697	23.4938	-	-	-	-
23.7369	22.6493	-	-	-	-
23.8864	22.1943	-	-	-	-
24.2122	21.7237	-	-	-	-
24.3892	21.4368	-	-	-	-
24.9521	20.9574	-	-	-	-
25.0727	20.5673	-	-	-	-
25.2405	20.1753	-	-	-	-
25.7711	19.6584	-	-	-	-
26.0868	19.1535	-	-	-	-
26.6207	18.5428	-	-	-	-
26.9887	18.0977	-	-	-	-
26.9892	17.8145	-	-	-	-
27.1015	17.5536	-	-	-	-
27.5310	17.1256	-	-	-	-
27.7362	16.8118	-	-	-	-
27.8144	16.5666	-	-	-	-
28.2433	16.1862	-	-	-	-
28.5221	15.9047	-	-	-	-

Table S5 Weight fraction data for the ternary systems composed of IL (1) + PEG 4000 (2) + water (3) at 298 K.

[Ch]L-ma						
$M_W = 237.25$						
$100 w_1$	100 w ₂	$100 w_1$	100 w ₂			
16.2441	47.6236	38.2347	17.3495			
17.7843	45.2140	38.4202	17.0607			
18.0547	44.0281	39.0713	16.5360			
19.0678	42.5996	39.0852	16.2875			
20.2941	41.2281	39.3275	16.0667			
20.6640	40.0503	39.6282	15.7625			
21.4116	38.5967	39.7858	15.4893			
23.1560	36.1691	40.2769	15.0798			
25.3339	33.6126	40.4517	14.8657			
26.9279	31.3778	-	-			
27.4504	30.4352	-	-			
27.6403	29.9263	-	-			
28.5489	29.2553	-	-			
29.1545	28.1494	-	-			
29.7066	27.0780	-	-			
30.3988	26.4348	-	-			
30.9988	25.6149	-	-			
31.6686	24.5867	-	-			
32.6316	23.9081	-	-			
32.9533	23.2433	-	-			
33.4707	22.4040	-	-			
34.1114	21.6896	-	-			
34.6365	20.9605	-	-			
35.0379	20.5140	-	-			
35.4137	20.1244	-	-			
35.7123	19.7394	-	-			
35.9257	19.3356	-	-			
36.5188	18.9151	-	-			
37.1566	18.4089	-	-			
37.5795	17.9845	-	-			

Table S6 Weight fraction data for the ternary systems composed of IL (1) + PEG 4000 (2) + water (3) at 298 K.



Figure S1 ¹H-NMR spectrum of [Ch][Ox] in D_2O .



Figure S2 ¹³C-NMR spectrum of [Ch][Ox] in D₂O.



Figure S3 ¹H-NMR spectrum of [Ch][Mal] in DMSO-d6.



Figure S4 ¹³C-NMR spectrum of [Ch][Mal] in DMSO-d6.



Figure S5 ¹H-NMR spectrum of [Ch][Suc] in D_2O .



Figure S6 ¹³C-NMR spectrum of [Ch][Suc] in D₂O.



Figure S7 ¹H-NMR spectrum of [Ch][Fum] in D₂O.



Figure S8 ¹³C-NMR spectrum of [Ch][Fum] in D₂O.



Figure S9 ¹H-NMR spectrum of [Ch]L-ma in D₂O.



Figure S10 13 C-NMR spectrum of [Ch]L-ma in D₂O.



Figure S11 ¹H-NMR spectrum of [Ch][Glu] in D₂O.



Figure S12 ¹³C-NMR spectrum of [Ch][Glu] in D₂O.



Figure S13 ¹H-NMR spectrum of [Ch]Cit in D₂O.



Figure S14 ¹³C-NMR spectrum of [Ch]Cit in D₂O.