Self-buffering and biocompatible ionic liquid based biological media for enzymatic research

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Table S.1 Results of NMR analysis, thermal decomposition temperature (T_d), water content (wt%) and the molecular structure of the synthesized GBILs.

Compounds	NMR Analysis
[TBP][TAPS]	^{1}H NMR (300 MHz, DMSO); δ *[P_{4444}]*, 0.91 (12H, *t*, C4C8C12C16's *H*), 1.37-1.50 (16H, *m*, C2C3C6C7 C10C11C14C15's *H*), 2.17 (8H, *m*, C1C5C9C13's *H*); δ *[TAPS]*, 4.18 (6H, *s*, C1-C3's *H*), 1.63 (2H, *quin*, C6's *H*), 2.55 (2H, *t*, C7's *H*), 2.45 (2H, *t*, C5's *H*), 3.32 (1H, *s*, HN), 3.28 (3H, *s*, HO) . T_d = 271°C; melting point = 104.4°C; *wt%* = 0.05, Analytical Calculation for $C_{23}H_{52}NO_6SP$ (501.70) C 55.02, H 10.36, and N 2.79; Found C 54.34, H 10.41, N 2.48.
[TBP][MOPS]	^{1}H NMR (300 MHz, DMSO); δ *[P_{4444}]*, 0.92 (12H, *t*, C4C8C12C16's *H*), 1.37-1.50 (16H, *m*, C2C3C6C7 C10C11C14C15's *H*), 2.19 (8H, *m*, C1C5C9C13's *H*); δ *[MOPS]*, 2.29 (4H, *m*, C4C6's *H*), 1.49 (2H, *quin*, C1's H), 2.39 (2H, *t*, C2's *H*), 2.50 (2H, *t*, C7's *H*), 3.55 (4H, *t*, C3C5's *H*). T_d = 300°C; melting point = 37.6°C; *wt%* = 0.3
[TBP][EPPS]	^{1}H NMR (300 MHz, DMSO); δ *[P_{4444}]*, 0.92 (12H, *t*, C4C8C12C16's *H*), 1.37-1.50 (16H, *m*, C2C3C6C7 C10C11C14C15's *H*), 2.21 (8H, *m*, C1C5C9C13's *H*); δ *[EPPS]*, 2.27 (4H, *t*, C4C5's *H*), 2.36 (4H, *t*, C3C6's H), 1.07 (2H, *t*, C8's *H*), 2.50 (2H, *t*, C1's *H*), 3.43 (2H, *t*, C9's *H*), 3.47 (4H, *t*, C2's *H*), 1.69 (2H, *quin*, C7's H). T_d = 271°C; melting point = 32.5°C; *wt%* = 0.2
[TBP][CAPS]	^{1}H NMR (300 MHz, DMSO); δ *[P_{4444}]*, 0.91 (12H, *t*, C4C8C12C16's *H*), 1.37-1.54 (16H, *m*, C2C3C6C7 C10C11C14C15's *H*), 2.20 (8H, *m*, C1C5C9C13's *H*); δ *[CAPS]*, 1.08-1.20 &1.62-1.77 (10H, *m*, C2-C6's *H*), 2.29 (H, *m*, C1's *H*), 2.40 (2H, *t*, C8's *H*), 2.55 (2H, *t*, C9's *H*), 1.59 (2H, *quin*, C7's H), 3.30 (H, *s*, HN). T_d = 271°C; melting point = -26.4°C; *wt%* = 0.3
[TBP][BICINE]	^{1}H NMR (300 MHz, DMSO); δ *[P_{4444}]*, 0.91 (12H, *t*, C4C8C12C16's *H*), 1.38-1.49 (16H, *m*, C2C3C6C7 C10C11C14C15's *H*), 2.21 (8H, *m*, C1C5C9C13's *H*); δ *[Bicine]*, 3.30 (4H, *t*, C2C4's *H*), 2.61 (4H, *t*, C3C5's *H*), 2.86 (2H, *s*, C1's *H*). T_d = 271°C; melting point = -20.3°C;

	wt% = 0.5

Table S. 2 Experimental liquid-liquid phase boundaries for GBIL (1) + Na_2SO_4 (2) + water (3) systems at 25°C and at 101.3 kPa.

[TBP][TAPS]		[TBP][MOPS]		[TBP][EPPS]		[TBP][CAPS]		[TBP][BICINE]	
100 w_1	100 w_2	100 w_1	100 w_2	100 w_1	100 w_1	100 w_2	100 w_1	100 w_2	100 w_1
39.55	3.88	45.51	2.50	49.67	1.00	45.90	1.94	40.68	5.23
37.76	4.87	39.68	5.79	46.41	2.64	43.50	3.17	39.32	5.99
36.03	5.82	36.80	7.41	44.46	3.61	40.59	4.67	37.48	7.03
34.96	6.40	35.60	8.09	42.19	4.75	38.75	5.61	35.44	8.18
33.90	6.98	33.73	9.14	39.56	6.08	36.87	6.58	33.83	9.09
32.47	7.77	32.68	9.74	37.55	7.08	35.15	7.47	32.04	10.10
31.10	8.52	31.61	10.34	36.22	7.75	34.19	7.96	30.81	10.79
30.31	8.96	30.76	10.82	35.04	8.34	32.73	8.71	28.93	11.85
29.21	9.56	29.27	11.66	33.96	8.88	31.80	9.19	27.86	12.46
27.73	10.37	28.34	12.18	33.02	9.35	30.59	9.81	26.95	12.97
26.76	10.90	27.07	12.90	31.95	9.89	29.84	10.20	25.77	13.63
25.57	11.56	26.23	13.37	30.62	10.56	28.77	10.75	24.66	14.26
24.50	12.15	25.47	13.80	29.87	10.93	28.10	11.10	23.45	14.94
23.51	12.69	24.22	14.51	28.56	11.59	27.41	11.45	22.31	15.58
22.27	13.37	23.48	14.93	27.49	12.13	26.55	11.89	21.25	16.18
21.21	13.95	22.45	15.51	26.46	12.64	25.91	12.22	20.32	16.70
20.28	14.46	21.84	15.85	25.63	13.06	25.35	12.51	19.08	17.41
19.45	14.91	20.92	16.36	25.13	13.31	24.34	13.03	18.00	18.01
18.48	15.45	20.15	16.80	24.38	13.69	23.57	13.43	17.07	18.54
17.79	15.83	19.33	17.27	23.35	14.20	23.12	13.66	16.04	19.12
16.97	16.28	18.60	17.67	22.44	14.66	22.23	14.11	15.03	19.69
16.13	16.74	17.93	18.05	21.53	15.12	21.80	14.34	14.02	20.25
15.56	17.05	17.59	18.24	20.77	15.50	20.98	14.76	13.09	20.78
14.97	17.38	17.07	18.54	19.99	15.89	20.40	15.06	12.17	21.30
14.42	17.68	16.71	18.74	19.17	16.30	20.04	15.24	11.22	21.84
13.90	17.96	16.21	19.02	18.32	16.73	19.40	15.57	10.58	22.20
13.32	18.28	15.70	19.31	17.77	17.00	18.93	15.81	9.97	22.54
12.78	18.58	15.27	19.55	17.23	17.27	18.15	16.21	9.33	22.90
12.34	18.82	14.78	19.83	16.71	17.53	17.58	16.50	8.61	23.30
11.89	19.07	14.40	20.04	16.28	17.75	17.15	16.73	7.98	23.66
11.42	19.33	14.04	20.25	15.65	18.06	16.88	16.87	7.30	24.05
11.09	19.50	13.68	20.45	15.09	18.35	16.63	16.99	6.48	24.51
10.66	19.74	13.29	20.67	14.61	18.59	16.41	17.11	5.51	25.05
10.32	19.93	13.00	20.83	14.15	18.82	16.18	17.23		
9.99	20.11	12.72	20.99	13.79	19.00	15.96	17.34		
9.61	20.32	12.34	21.21	13.30	19.25	15.63	17.51		
9.22	20.53	12.06	21.36	12.82	19.48	15.43	17.61		
8.88	20.72	11.72	21.55	12.37	19.71	15.24	17.71		

8.49	20.93	11.50	21.68	11.95	19.92	14.94	17.86		
8.17	21.11	11.26	21.82	11.53	20.14	14.57	18.05		
7.87	21.27	11.01	21.95	11.23	20.28	14.41	18.14		
7.58	21.43	10.75	22.10	10.97	20.41	14.16	18.27		
7.25	21.61	10.41	22.29	10.72	20.54	13.81	18.44		
6.99	21.76	10.29	22.36	10.38	20.71	13.58	18.57		
6.67	21.93	10.06	22.49	10.04	20.88	13.33	18.69		
6.37	22.10	9.86	22.60	9.83	20.99	13.12	18.80		
6.03	22.28	9.64	22.73	9.53	21.13	12.83	18.95		
5.76	22.43	9.41	22.85	9.25	21.28	12.61	19.07		
5.52	22.56	9.27	22.93	9.07	21.37	12.41	19.17		
5.23	22.72	9.07	23.05	8.80	21.50	12.16	19.30		
4.91	22.90	8.88	23.15	8.57	21.62	12.03	19.36		
4.55	23.10	8.75	23.23	8.33	21.74	11.85	19.46		
3.90	23.45	8.59	23.32	8.08	21.86	11.60	19.58		
39.55	3.88	8.42	23.42	7.88	21.97	11.49	19.64		
37.76	4.87	8.24	23.51	7.68	22.06	11.32	19.73		
36.03	5.82	8.11	23.59	7.45	22.18	11.10	19.84		
34.96	6.40	7.98	23.66	7.24	22.28	10.94	19.92		
33.90	6.98	7.81	23.76	7.05	22.38	10.74	20.02		
32.47	7.77	7.69	23.82	6.88	22.46	10.56	20.12		
31.10	8.52	7.54	23.91	6.74	22.54	10.37	20.21		
30.31	8.96	7.45	23.96	6.53	22.64	10.23	20.29		
29.21	9.56	7.31	24.04	6.36	22.73	10.05	20.38		
27.73	10.37	7.16	24.12	6.22	22.80	9.97	20.42		
26.76	10.90	7.05	24.19	6.06	22.88	9.88	20.47		
25.57	11.56	6.89	24.28	5.88	22.97	9.81	20.50		
24.50	12.15	6.75	24.36	5.74	23.04	9.69	20.56		
23.51	12.69	6.62	24.43	5.64	23.09	9.53	20.65		
22.27	13.37	6.51	24.49	5.51	23.15	9.41	20.71		
21.21	13.95	6.40	24.55	5.26	23.28	9.26	20.78		
20.28	14.46	6.30	24.61	5.12	23.35	9.12	20.86		
19.45	14.91	6.20	24.67	4.97	23.42	8.93	20.95		
18.48	15.45	6.10	24.72	4.74	23.54	8.80	21.03		
17.79	15.83	5.99	24.79	4.65	23.59	8.64	21.11		
16.97	16.28	5.91	24.83	4.53	23.64	8.51	21.17		
16.13	16.74	5.84	24.87	4.41	23.71	8.38	21.24		
15.56	17.05	5.79	24.90	4.22	23.80	8.27	21.29		
14.97	17.38	5.70	24.95	4.09	23.87	8.18	21.34		
14.42	17.68	5.61	25.00	3.97	23.93	8.10	21.39		
13.90	17.96	5.52	25.05	3.85	23.99	8.01	21.43		
13.32	18.28	5.44	25.09	3.71	24.05	7.90	21.49		
12.78	18.58	5.35	25.14	3.54	24.14	7.82	21.53		
12.34	18.82	5.24	25.21	3.42	24.20	7.72	21.58		
11.89	19.07	5.19	25.23	3.30	24.26	7.64	21.62		

11.42	19.33	5.09	25.29	3.16	24.33	7.54	21.67		
11.09	19.50	4.94	25.38	3.00	24.41	7.45	21.72		
10.66	19.74	4.87	25.42	2.73	24.55	7.40	21.74		
10.32	19.93	4.79	25.46			7.33	21.78		
9.99	20.11	4.71	25.51			7.22	21.84		
9.61	20.32	4.66	25.54			7.11	21.89		
9.22	20.53	4.58	25.58			7.03	21.94		
8.88	20.72	4.51	25.62			6.95	21.98		
8.49	20.93	4.46	25.65			6.84	22.03		
8.17	21.11	4.38	25.69			6.76	22.07		
7.87	21.27	4.33	25.72			6.70	22.10		
7.58	21.43	4.27	25.75			6.64	22.13		
7.25	21.61	4.22	25.78			6.57	22.17		
6.99	21.76	4.16	25.81			6.48	22.22		
6.67	21.93	4.08	25.86			6.42	22.25		
6.37	22.10	3.97	25.92			6.34	22.29		
6.03	22.28	3.94	25.94			6.25	22.34		
5.76	22.43	3.87	25.98			6.15	22.39		
5.52	22.56	3.83	26.00			6.06	22.43		
5.23	22.72	3.79	26.02			5.97	22.48		
4.91	22.90	3.76	26.04			5.88	22.53		
4.55	23.10	3.72	26.06			5.80	22.56		
3.90	23.45	3.67	26.09			5.73	22.60		
		3.63	26.12			5.67	22.64		
		3.58	26.14			5.58	22.68		
		3.55	26.16			5.52	22.71		
		3.50	26.19			5.45	22.75		
		3.47	26.21			5.41	22.77		
		3.42	26.23			5.35	22.80		
		3.38	26.25			5.29	22.83		
		3.34	26.28			5.23	22.86		
		3.24	26.33			5.17	22.89		
		3.20	26.36			5.11	22.92		
		3.16	26.38			5.06	22.95		
		3.08	26.43			5.01	22.97		
		3.04	26.45			4.95	23.00		
		3.00	26.47			4.89	23.04		
						4.82	23.07		
						4.76	23.10		
						4.72	23.12		
						4.69	23.14		
						4.63	23.17		
						4.61	23.18		
						4.58	23.19		
						4.55	23.21		

						4.50	23.23		
						4.45	23.26		
						4.40	23.28		
						4.34	23.32		
						4.31	23.34		
						4.26	23.36		
						4.21	23.38		
						4.16	23.41		
						4.12	23.43		
						4.08	23.45		
						4.04	23.47		
						3.99	23.50		
						3.94	23.52		
						3.90	23.54		
						3.87	23.56		
						3.84	23.58		
						3.79	23.60		
						3.76	23.62		
						3.72	23.64		
						3.68	23.66		
						3.64	23.67		
						3.61	23.69		
						3.58	23.71		
						3.55	23.73		
						3.51	23.74		
						3.48	23.76		
						3.42	23.79		
						3.38	23.81		
						3.34	23.83		
						3.31	23.85		
						3.27	23.87		
						3.23	23.89		
						3.19	23.91		
						3.16	23.92		
						3.13	23.94		
						3.10	23.95		
						3.07	23.97		
						3.04	23.99		
						3.00	24.01		
						2.97	24.02		
						2.94	24.04		
						2.92	24.05		
						2.90	24.06		
						2.87	24.07		
						2.85	24.09		

						2.82	24.10		
						2.79	24.12		

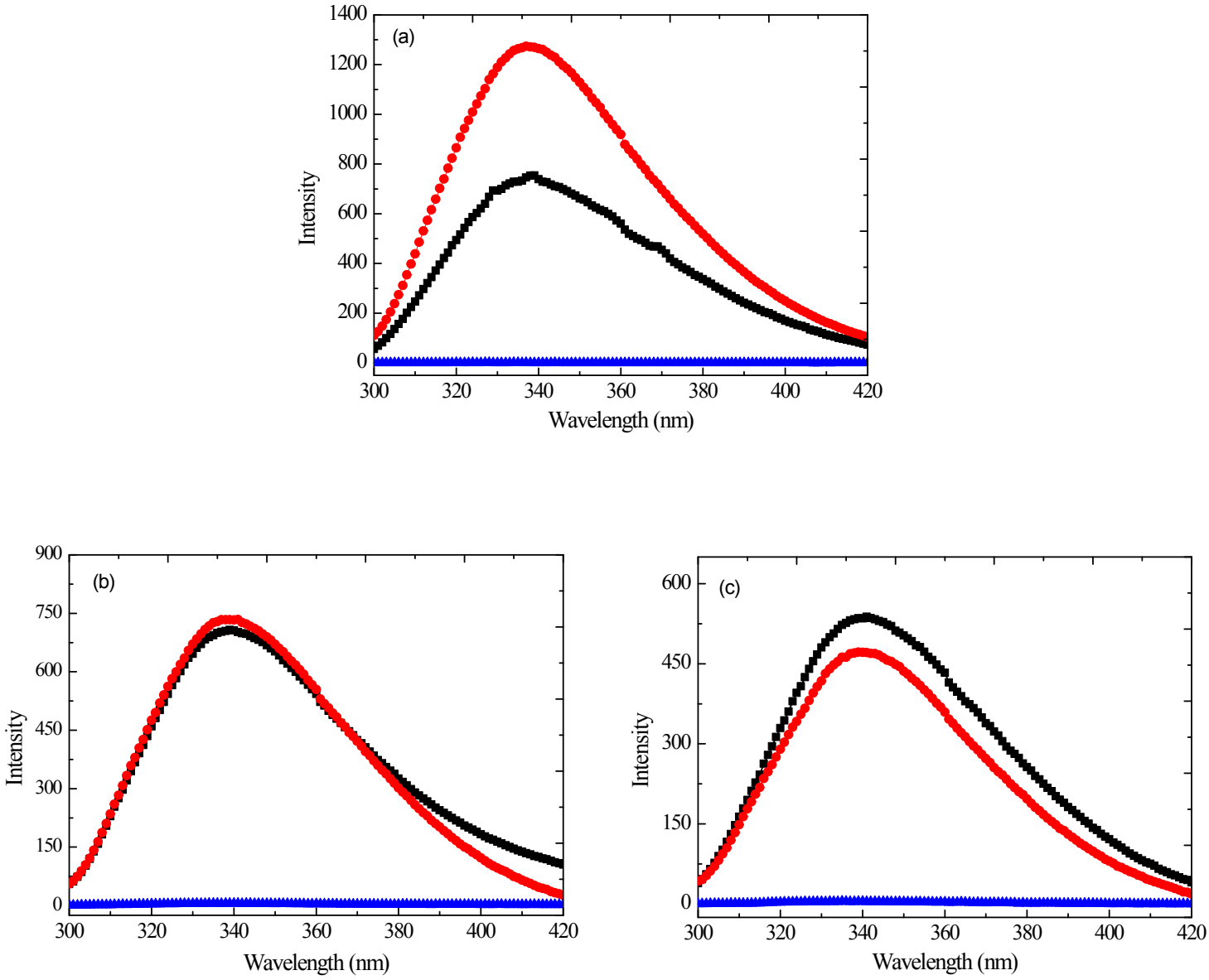

Fig. S. 1 Fluorescence spectra of α-CT in GBIL-rich phase (-●-), salt-rich phase (-▲-) and in 30% GBIL (-■-). (a), [TBP][TAPS]; (b), [TBP][EPPS]; and (c), [TBP][BICINE].