

Supplementary Materials

Table S1: Densities, ρ , excess molar volumes, V^E , apparent molar volumes, $V\phi_i$ and partial molar volumes, $\bar{V}_{m,i}$, for ([Im][C₇CO₂] (1) + water (2)) as a function of [Im][C₇CO₂] mole fraction composition, x_1 , at 298.15 K.

x_1	ρ	V^E	$V\phi_1$	$V\phi_2$	$\bar{V}_{m,1}$	$\bar{V}_{m,2}$
	(g·cm ⁻³)	(cm ³ ·mol ⁻¹)	(cm ³ ·mol ⁻¹)	(cm ³ ·mol ⁻¹)	(cm ³ ·mol ⁻¹)	(cm ³ ·mol ⁻¹)
0.0000	0.9971	0.00	–	18.07	–	18.07
0.1846	1.0029	– 0.71	211.08	17.20	213.06	17.62
0.2005	1.0031	– 0.77	211.07	17.10	213.09	17.57
0.3357	0.9986	– 0.85	212.39	16.78	213.71	17.41
0.3983	0.9966	– 0.82	212.88	16.70	213.99	17.33
0.4881	0.9941	– 0.72	213.46	16.66	214.37	17.20
0.5909	0.9917	– 0.55	214.00	16.71	214.75	16.99
0.6958	0.9900	– 0.41	214.35	16.71	214.98	16.62
0.8036	0.9888	– 0.28	214.59	16.60	215.07	16.09
0.9011	0.9879	– 0.16	214.76	16.41	215.04	15.51
1.0000	0.9870	0.00	214.94	–	214.94	–

Table S2 : Densities, ρ , excess molar volumes, V^E , apparent molar volumes, $V\phi_i$ and partial molar volumes, $\bar{V}_{m,i}$, for ([Im][C₇CO₂] (1) + acetonitrile (2)) as a function of [Im][C₇CO₂] mole fraction composition, x_1 , at 298.15 K.

x_1	ρ (g·cm ⁻³)	V^E (cm ³ ·mol ⁻¹)	$V\phi_1$ (cm ³ ·mol ⁻¹)	$V\phi_2$ (cm ³ ·mol ⁻¹)	$\bar{V}_{m,1}$ (cm ³ ·mol ⁻¹)	$\bar{V}_{m,2}$ (cm ³ ·mol ⁻¹)
0.0000	0.7715	0.00	–	53.21	–	53.21
0.1004	0.8467	– 0.67	208.25	52.46	208.26	53.21
0.2012	0.8916	– 1.09	209.50	51.84	209.72	53.15
0.3076	0.9230	– 1.46	210.18	51.09	211.01	52.84
0.4005	0.9425	– 1.71	210.65	50.34	211.93	52.36
0.5010	0.9579	– 1.89	211.16	49.41	212.73	51.64
0.5995	0.9696	– 2.03	211.54	48.12	213.24	50.67
0.7020	0.9789	– 2.10	211.95	46.15	213.55	49.43
0.8014	0.9852	– 1.98	212.47	43.24	213.73	48.12
0.8956	0.9881	– 1.43	213.34	39.44	214.06	47.03
1.0000	0.9870	0.00	214.94	–	214.94	–

Table S3 : Densities, ρ , excess molar volumes, V^E , apparent molar volumes, $V\phi_i$ and partial molar volumes, $\bar{V}_{m,i}$, for ([Im][C₇CO₂] (1) + ethanol (2)) as a function of [Im][C₇CO₂] mole fraction composition, x_1 , at 298.15 K.

x_1	ρ (g·cm ⁻³)	V^E (cm ³ ·mol ⁻¹)	$V\phi_1$ (cm ³ ·mol ⁻¹)	$V\phi_2$ (cm ³ ·mol ⁻¹)	$\bar{V}_{m,1}$ (cm ³ ·mol ⁻¹)	$\bar{V}_{m,2}$ (cm ³ ·mol ⁻¹)
0.0000	0.7900	0.00	–	58.32	–	58.32
0.1011	0.8539	– 0.53	209.65	57.72	211.83	58.07
0.2001	0.8918	– 0.73	211.27	57.40	212.55	58.00
0.2994	0.9188	– 0.94	211.77	56.96	213.10	57.75
0.4001	0.9381	– 1.03	212.36	56.59	213.63	57.47
0.5214	0.9546	– 1.00	213.01	56.21	214.18	57.04
0.6000	0.9627	– 0.92	213.40	56.00	214.47	56.71
0.6990	0.9701	– 0.63	214.03	56.20	214.89	56.33
0.8016	0.9763	– 0.31	214.56	56.75	215.18	55.79
0.8957	0.9816	– 0.12	214.80	57.09	215.18	55.04
1.0000	0.9870	0.00	214.94	–	214.94	–

Table S4 : Densities, ρ , excess molar volumes, V^E , apparent molar volumes, $V\phi_i$ and partial molar volumes, $\bar{V}_{m,i}$, for ([Im][C₇CO₂] (1) + 1-octanol (2)) as a function of [Im][C₇CO₂] mole fraction composition, x_1 , at 298.15 K.

x_1	ρ (g·cm ⁻³)	V^E (cm ³ ·mol ⁻¹)	$V\phi_1$ (cm ³ ·mol ⁻¹)	$V\phi_2$ (cm ³ ·mol ⁻¹)	$\bar{V}_{m,1}$ (cm ³ ·mol ⁻¹)	$\bar{V}_{m,2}$ (cm ³ ·mol ⁻¹)
0.0000	0.8245	0.00	–	157.95	–	157.95
0.1003	0.8448	0.21	217.12	158.19	216.43	158.03
0.2010	0.8639	0.39	216.93	158.45	216.14	158.15
0.3001	0.8818	0.50	216.62	158.67	215.87	158.27
0.3995	0.8989	0.55	216.34	158.88	215.62	158.43
0.4993	0.9156	0.50	215.96	158.96	215.35	158.56
0.6000	0.9317	0.39	215.60	158.94	215.10	158.71
0.7009	0.9470	0.25	215.31	158.82	214.90	158.92
0.8001	0.9612	0.12	215.10	158.58	214.79	159.20
0.8989	0.9744	0.03	214.98	158.28	214.80	159.61
1.0000	0.9870	0.00	214.94	–	214.94	–

Figure S1: Comparison of densities of binary mixtures of ([Im][C₇CO₂] + molecular solvent) at 298.15 K as a function of [Im][C₇CO₂] mole fraction composition, x_1 : ●, water; ○, acetonitrile; ■, ethanol; □, 1-octanol. The lines are just a guide to the eye.

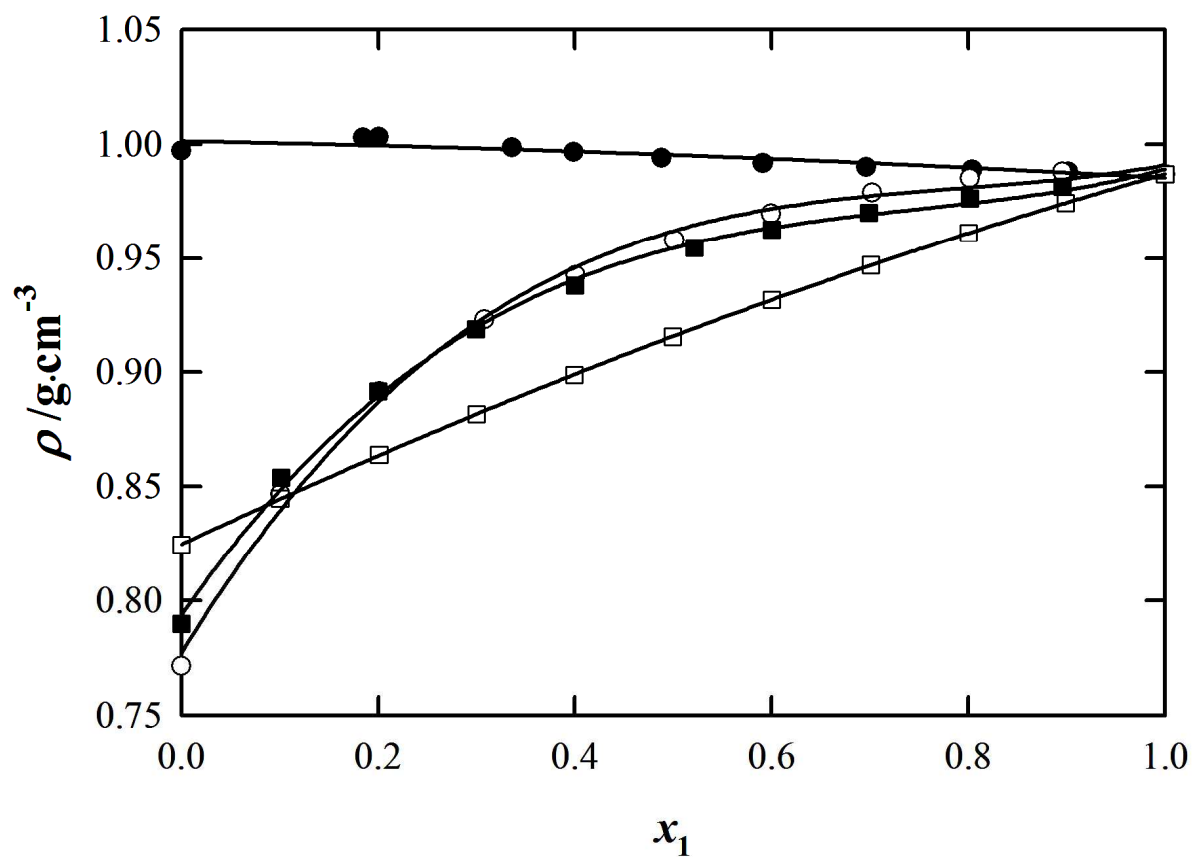


Figure S2: Comparison of apparent, V_{ϕ_l} , $\circ$; and partial molar, $\bar{V}_{m,1}$, $\bullet$, volumes of [Im][C₇CO₂] against mole fraction of [Im][C₇CO₂], x_1 , for : a, ([Im][C₇CO₂] + water); b, ([Im][C₇CO₂] + acetonitrile); c, ([Im][C₇CO₂] + ethanol); d, ([Im][C₇CO₂] + 1-octanol); mixtures at 298.15 K. The lines are just a guide to the eye.

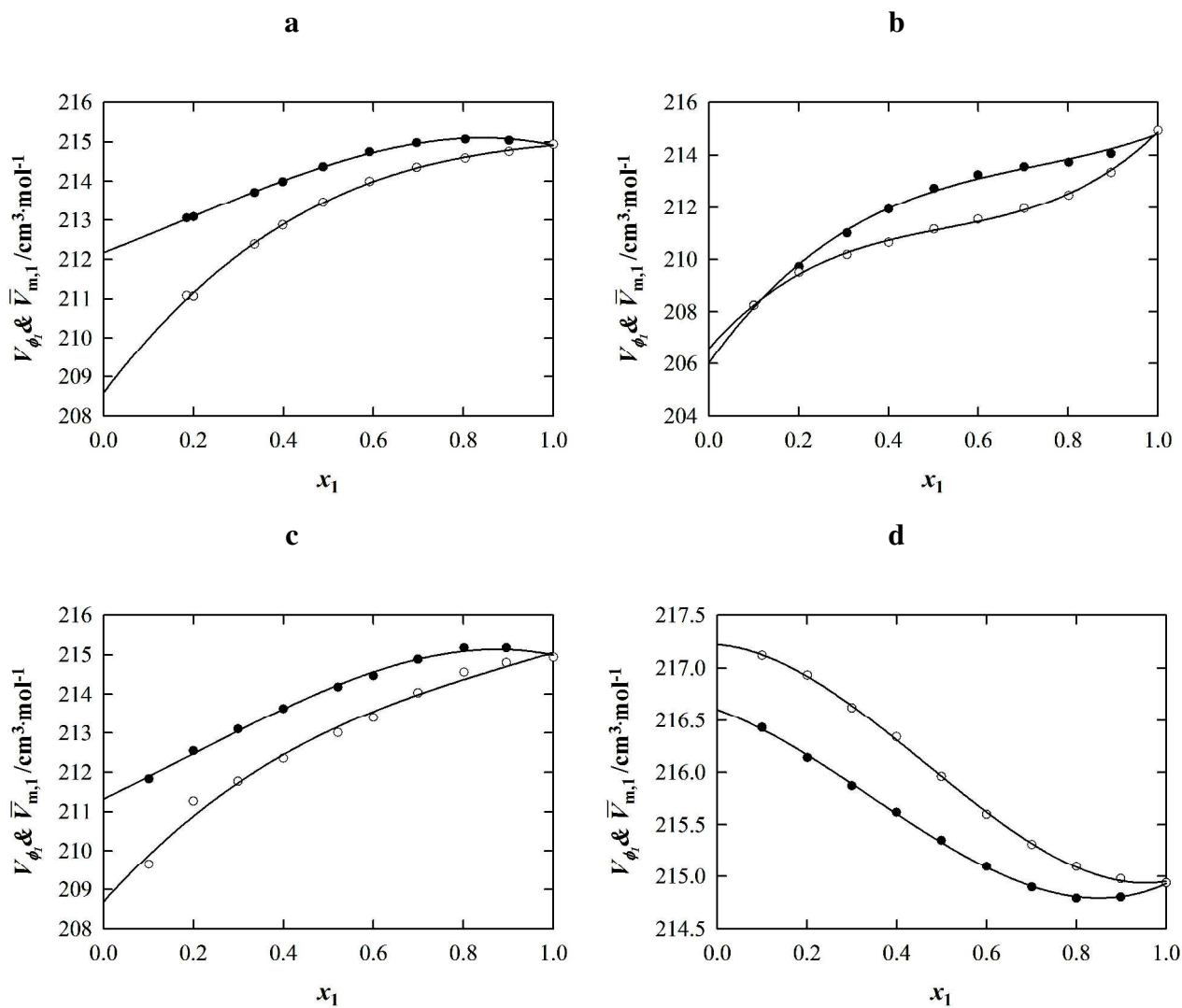


Figure S3: Comparison of apparent, V_{ϕ_2} , $\circ$; and partial molar, $\bar{V}_{m,2}$, $\bullet$, volumes of [Im][C₇CO₂] against mole fraction of [Im][C₇CO₂], x_1 , for : a, ([Im][C₇CO₂] + water); b, ([Im][C₇CO₂] + acetonitrile); c, ([Im][C₇CO₂] + ethanol); d, ([Im][C₇CO₂] + 1-octanol); mixtures at 298.15 K. The lines are just a guide to the eye.

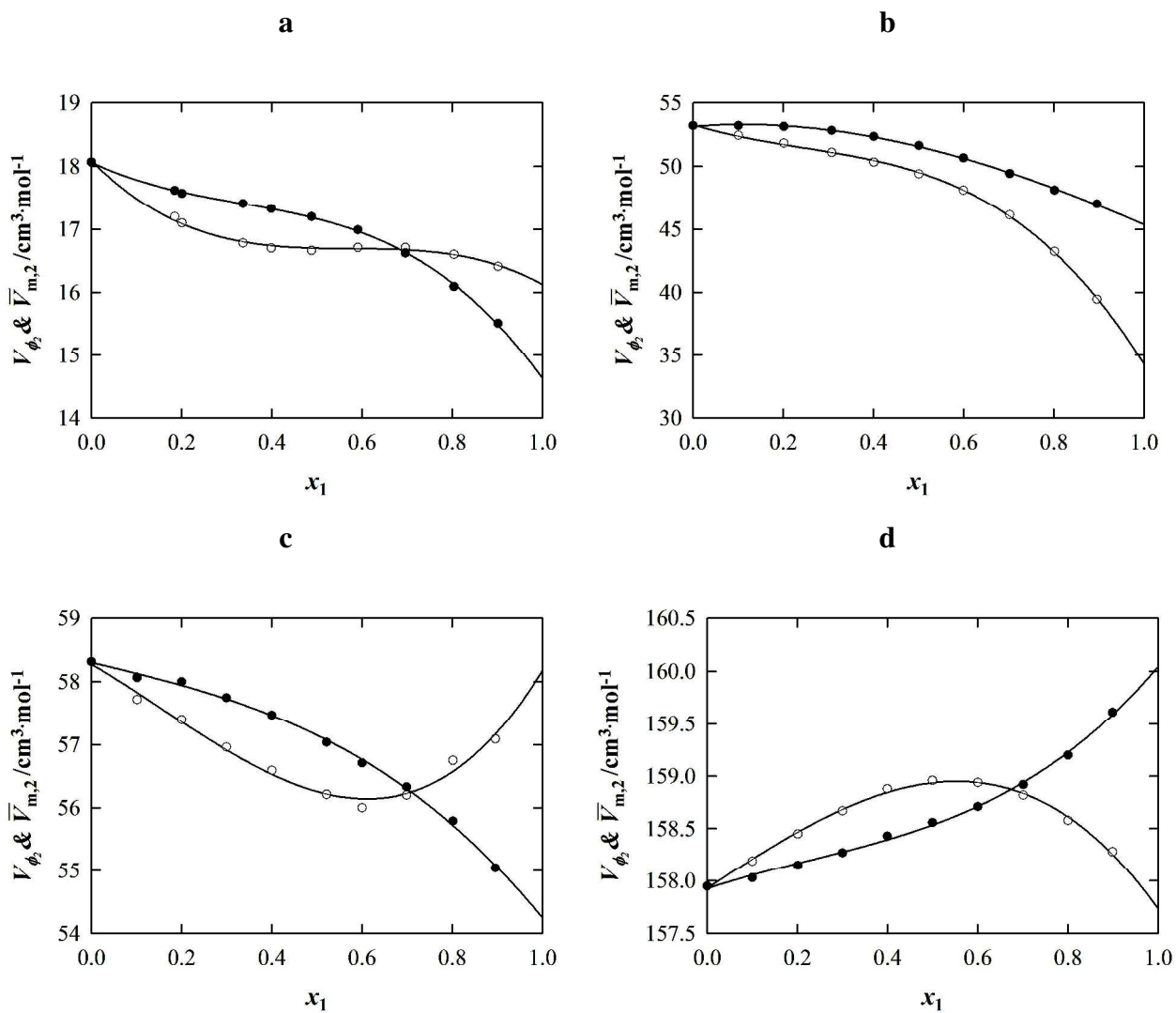


Figure S4: Comparison of viscosities, η , against mole fraction of [Im][C₇CO₂], x_1 , for : a, ([Im][C₇CO₂] + water); b, ([Im][C₇CO₂] + acetonitrile); c, ([Im][C₇CO₂] + ethanol); d, ([Im][C₇CO₂] + 1-octanol); mixtures as a function of the temperature T : $\circ$, 293.15 K ; $\bullet$, 298.15 K ; $\square$, 303.15 K; $\blacksquare$, 308.15 K; $\blacktriangle$, 313.15 K; $\triangle$, 318.15 K; $\blacktriangledown$, 323.15 K. The lines are just a guide to the eye.

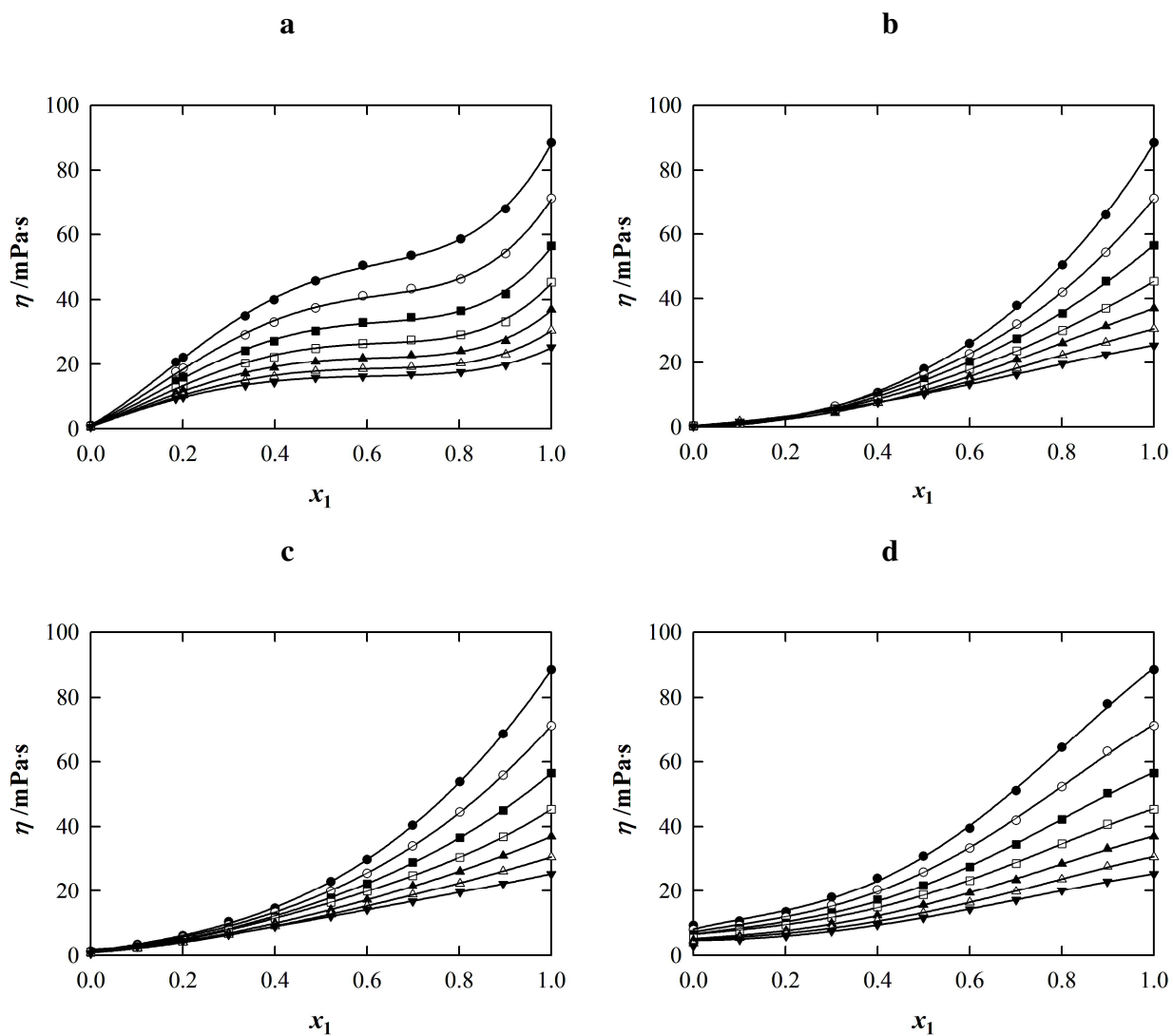


Figure S5: Temperature effect on the viscosity, η , of ([Im][C₇CO₂] + 1-octanol) mixture for a mole fraction of [Im][C₇CO₂], $x_I = 0.1$ (a) ; 0.3 (b), 0.5 (c), 0.7 (d) as a function of the temperature T from 293.15 K to 363.15 K. Viscosity data obtained by heating and cooling.

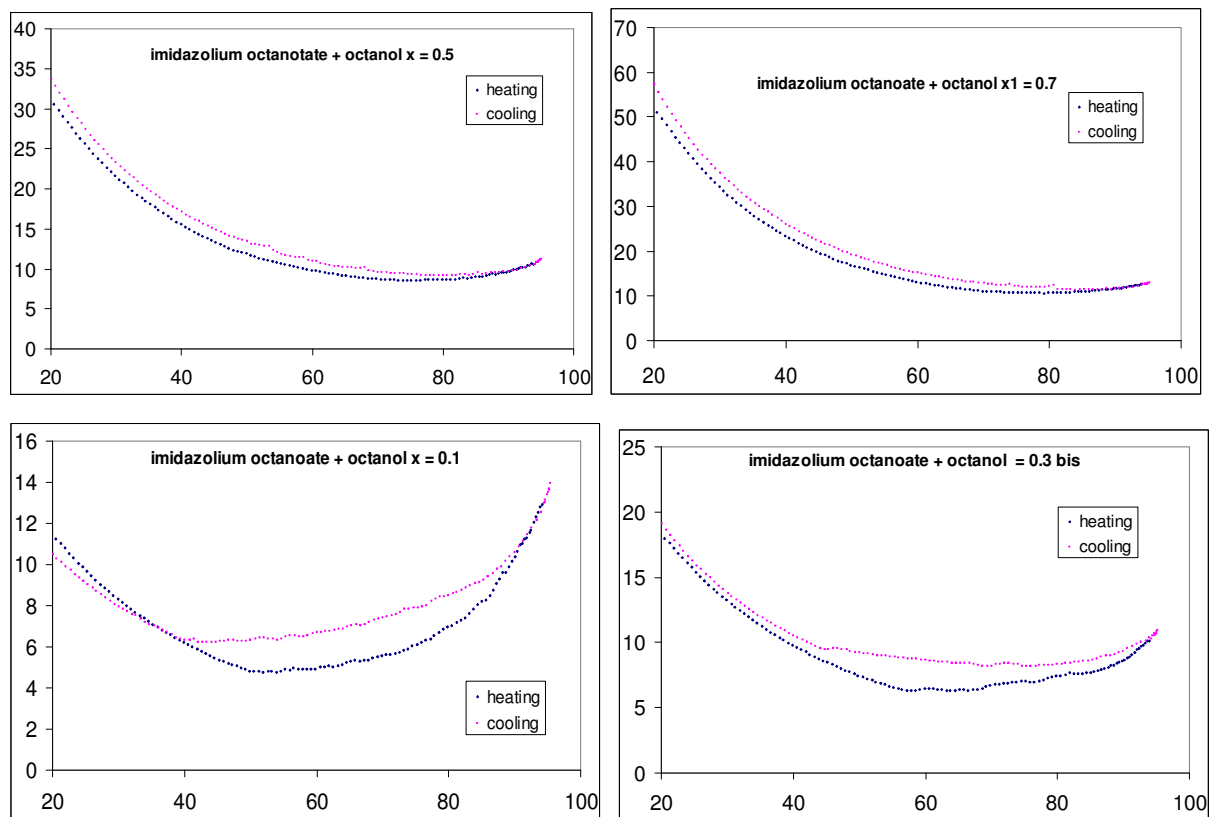


Figure S6: Characterisation of synthesized imidazolium octanoate

- (a) Differential scanning calorimetry (DSC) for 1g of sample; scan rate $v = 10 \text{ Kmn}^{-1}$
 (b) ¹H-NMR spectrometry

