Electronic Supplementary Material (ESI) for RSC Advances.

Electronic supporting information

Complexation of Triblock Reverse Copolymer 10R5 with Surface Active Ionic Liquids in Aqueous Medium: A Physico-chemical Study

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Annexure S1.

The maximum surface excess concentration (Γ_{max}) and minimum area per molecule [1, 2] at the air-solution interface can be calculated using equation (1) and (2) as follows:

$$\frac{d\gamma}{d\ln C_T} = -nRT\Gamma_{max} \quad (1)$$

$$A_{min} = 10^{20}/ (N_A . \Gamma_{max}) \quad (2)$$

The Gibbs free energy of adsorption (ΔG°_{ads}) [3] is calculated using the equation (3)

$$\Delta G^{\circ}_{ads} = \Delta G_{mic} - \Pi_{cmc}/ \Gamma_{max} \quad (3)$$

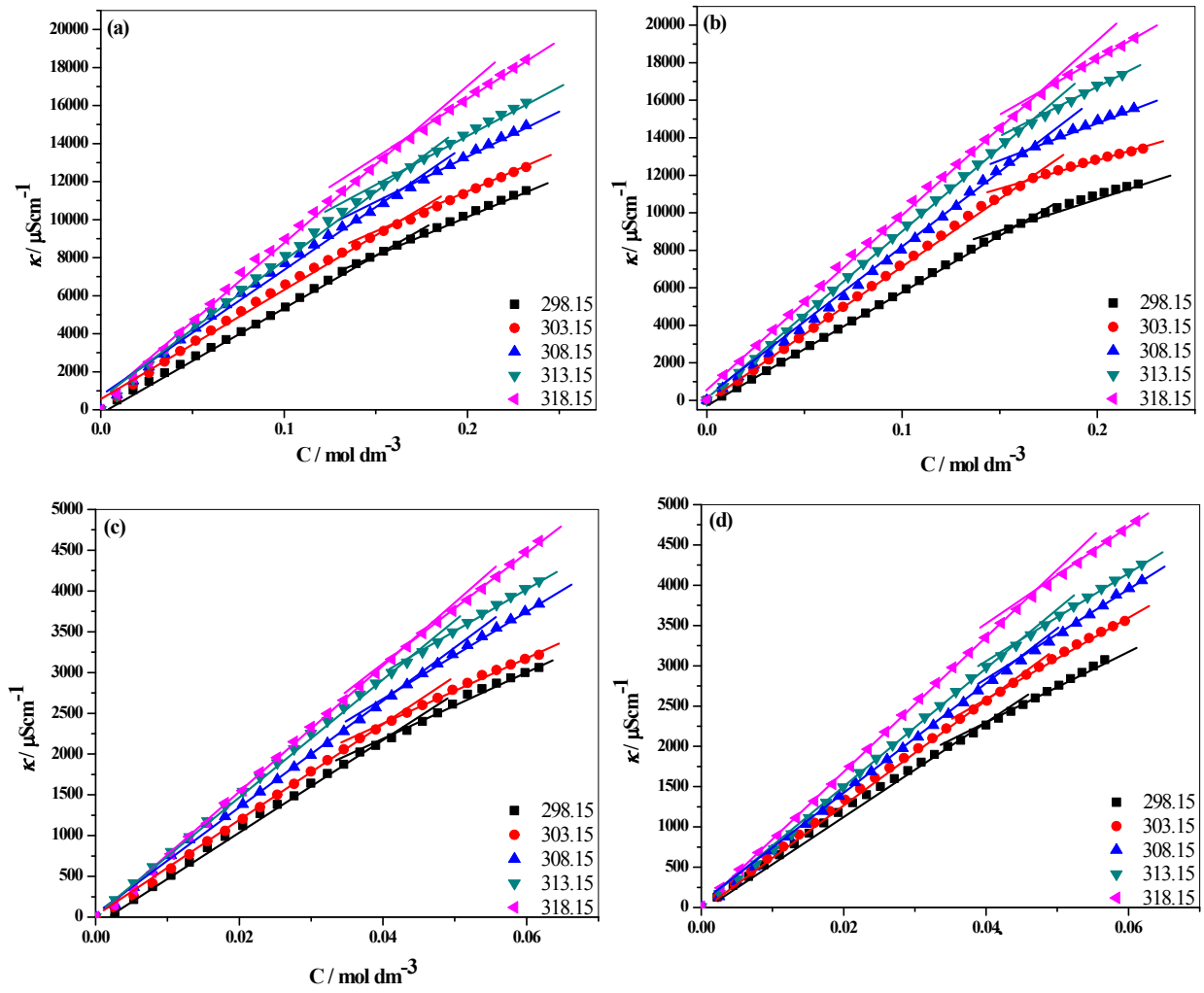

Fig. S1. Variation of specific conductivity (κ) as a function of concentration of [C_8mim][Cl] and [C_{10}mim][Cl] in the (a-c) absence; and (b-d) presence of polymer 10R5 at different temperatures.

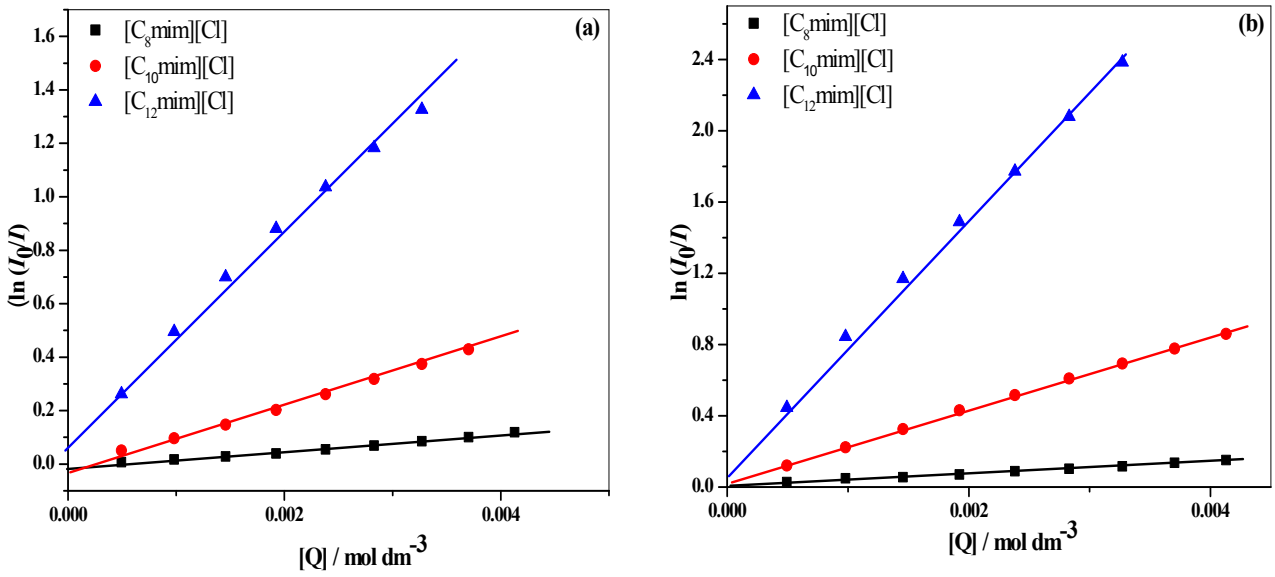

Fig. S2. Plot of ln (I_0/I) versus [Q] for 10R5-[C_8mim][Cl], [C_{10}mim][Cl] and [C_{12}mim][Cl] (a) in the absence and (b) in the presence of polymer.

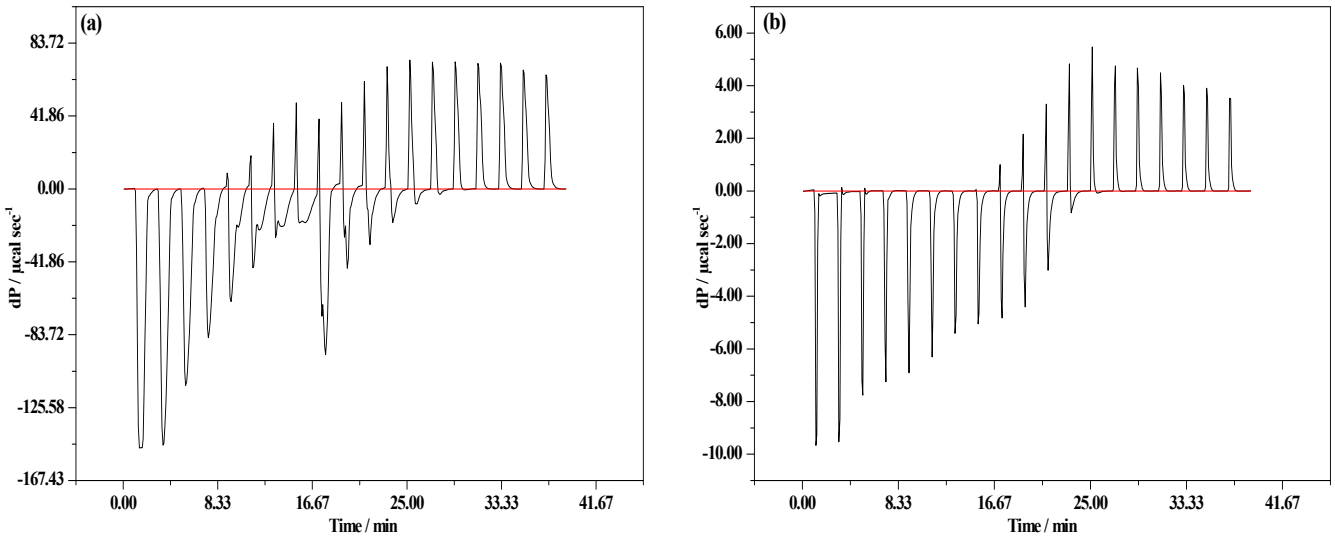

Fig. S3. Variation of differential power (dP) versus time for aqueous solution of (a) [C_{10}mim][Cl] (b) [C_{12}mim][Cl].

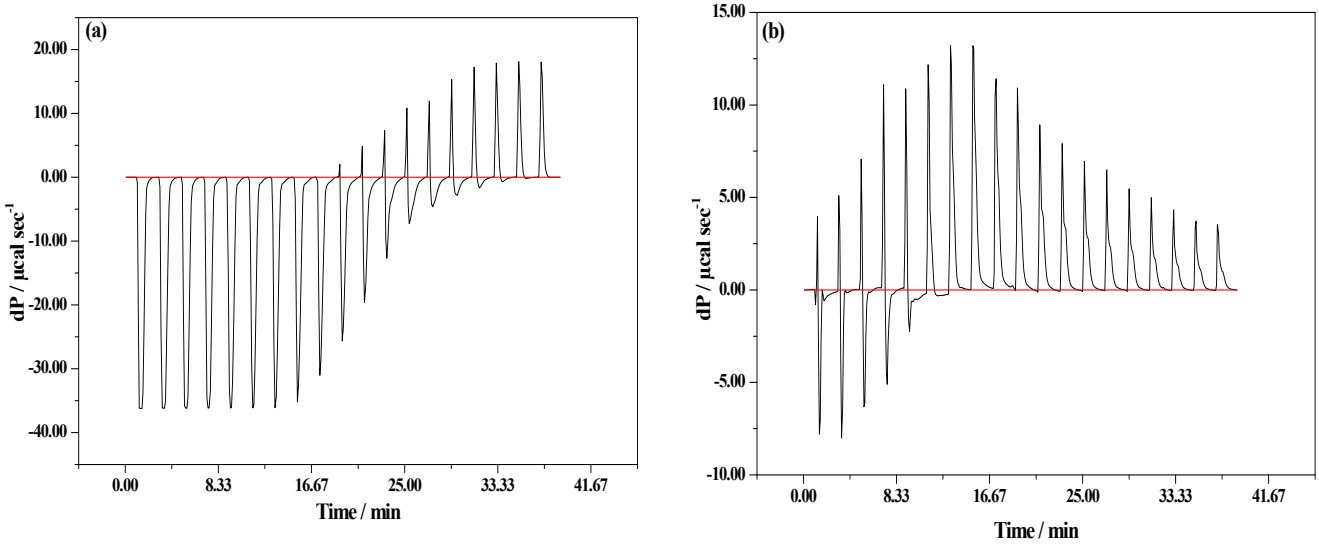

Fig. S4. Variation of differential power (dP) versus time for the interaction of 10R5 with (a) [C_{10}mim][Cl] (b) [C_{12}mim][Cl].

Table S1. Hydrodynamic diameter (D_h) and polydispersity (P) as a function of SAILs concentration in 10R5-[C_8mim][Cl] [C_{10}mim][Cl], [C_{12}mim][Cl] mixed systems.

conc. (mmol dm^{-3})	D_h (nm)	P	conc. (mmol dm^{-3})	D_h (nm)	P	conc. (mmol dm^{-3})	D_h (nm)	P
10R5-[C_8mim][Cl]			10R5-[C_{10}mim][Cl]			10R5-[C_{12}mim][Cl]		
0.0	3.1	0.24	0.0	3.1	0.24	0.0	3.1	0.24
2.5	3.1	0.34	1.0	68.0	0.39	1.0	30.0	0.34
7.4	3.1	0.44	2.0	78.0	0.41	2.0	55.0	0.14
12.2	22.0	0.37	4.3	78.0	0.46	3.4	78.0	0.10
23.8	68.0	0.31	6.5	78.0	0.48	4.8	84.0	0.13
34.9	141.0	0.21	9.9	85.0	0.59	7.0	91.0	0.17
51.6	154.0	0.18	13.0	91.0	0.65	9.1	13.0	0.19
67.1	164.0	0.14	16.7	105.0	0.59	11.5	16.0	0.22
85.1	164.0	0.22	20.0	115.0	0.65	13.8	18.0	0.24
101.6	164.0	0.22	25.9	122.0	0.62	16.0	18.0	0.26
131.0	78.0	0.25	31.0	105.0	0.61	18.0	21.0	0.27
156.4	78.0	0.28	35.5	91.0	0.60	20.0	21.0	0.27
178.5	91.0	0.28	39.4	91.0	0.63			
206.7	105.0	0.30	42.9	91.0	0.60			
230.5	122.0	0.35						

References

1. D.K. Chattoraj, K.S. Birdi, Adsorption and the Gibbs Surface excess, Plenum, New York, 1984 (Chapter 3).
2. K. Anand, O.P. Yadav, P.P. Singh, Studies on the surface and thermodynamic properties of some surfactants in aqueous and water 1, 4-dioxane solutions, Colloids Surf. A 55 (1991) 345-358.
3. P. Mukherjee, The nature of the association equilibria and hydrophobic bonding in aqueous solutions of association colloids, Adv. Colloid Interface Sci. 1 (1967) 242-275.