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Thermodynamics of aggregation of imidazolium-based surface active ionic liquids in aqueous poly(ethylene oxide) media[†]

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Abstract

The aggregation behaviour of two imidazolium-based surface active ionic liquids (SAILs), *e.g.*, 1-decyl-3-methylimidazolium chloride (C₁₀MeImCl) and 1-hexadecyl-3-methylimidazolium chloride (C₁₆MeImCl) in aqueous solutions was investigated in presence of varying amount of poly(ethylene oxide) (PEO) to explore the possible SAIL-PEO interactions. Electrical conductivity measurements were performed in aqueous solutions of PEO having two different molar mass over a selected temperature range. The critical micellization concentrations of the investigated SAILs in PEO-water media were always found to be higher than those in pure water. PEO was found to play a dual role in the SAIL-PEO-water ternaries. It has been concluded that the PEO molecules added to water modify the property of the medium besides binding a very small fraction of the surfactant ions prior to the commencement of the micellization of SAILs. The thermodynamic parameters of micellization such as Gibbs free energy (ΔG_m^0), standard enthalpy (ΔH_m^0), and standard entropy (ΔS_m^0) of aggregation were estimated from the temperature dependence of the critical micellization concentration values. The effects of concentrations of PEO, and molar mass of PEO on the self-aggregation of the C₁₀MeImCl and C₁₆MeImCl have been

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