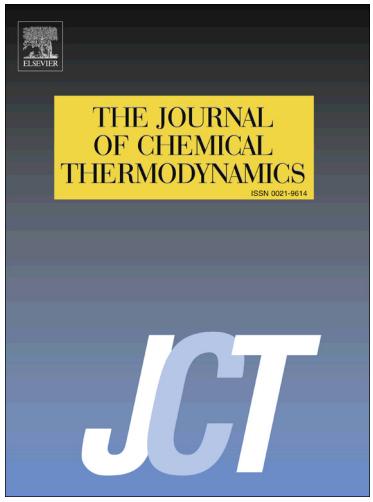

Thermodynamics of aggregation of imidazolium-based surface active ionic liquids in aqueous poly(ethylene oxide) media†

Satyajit Mondal, Dhiman Ray, Bijan Das

PII: S0021-9614(17)30316-6
DOI: http://dx.doi.org/10.1016/j.jct.2017.08.036
Reference: YJCHT 5195

To appear in: *J. Chem. Thermodynamics*

Received Date: 1 June 2017
Revised Date: 25 August 2017
Accepted Date: 28 August 2017

Please cite this article as: S. Mondal, D. Ray, B. Das, Thermodynamics of aggregation of imidazolium-based surface active ionic liquids in aqueous poly(ethylene oxide) media†, *J. Chem. Thermodynamics* (2017), doi: http://dx.doi.org/10.1016/j.jct.2017.08.036

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

Satyajit Mondal,[a] Dhiman Ray,[a] and Bijan Das*[a]

[a]Department of Chemistry, Presidency University, Kolkata 700 073, India.

E-mail: bijan.chem@presiuniv.ac.in; Tel: 91 33 94752 49401.

† Supporting information available. See DOI:

Abstract

The aggregation behaviour of two imidazolium-based surface active ionic liquids (SAILs), *e.g.*, 1-decyl-3-methylimidazolium chloride (C_{10}MeImCl) and 1-hexadecyl-3-methylimidazolium chloride (C_{16}MeImCl) 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 C_{10}MeImCl and C_{16}MeImCl have been