Micellization and Thermodynamic Properties of Cationic Surfactant Cetyltrimethylammonium Bromide in non-Aqueous Mixture of Lauric Acid

Zaheer Khan^{1,*}, Maqsood Ahmad Malik¹, Shaeel Ahmed AL-Thabaiti¹, Abdulmohsen Alshehri¹, Firdosa Nabi²

¹ Chemistry Department, Faculty of Science, King Abdulaziz University, P.O. Box 80203, Jeddah, 21589, Saudi Arabia

² Department of Chemistry, University of Malaya, Kuala Lumpur 50603, Malaysia

*E-mail: drkhanchem@yahoo.co.in

doi: 10.20964/2017.05.53

Received: 19 December 2016 / Accepted: 16 March 2017 / Published: 12 April 2017

In this work, the multi technique approach has been utilized to study the intermolecular interactions in lauric acid with the cationic surfactant cetyltrimethylammonium bromide in non aqueous media. The pseudo-phase separation model was used for the calculation of various thermodynamic parameters like standard free energy, ΔG_{mic}^o , enthalpy, ΔH_{mic}^o , and entropy, ΔS_{mic}^o , of micelle formation. The interfacial properties (the maximum surface excess at the air/solvent interface, Γ_{max} , the minimum area per surfactant molecule at air/solvent interface, A_{min}) of mixed system were calculated by using the Gibbs adsorption isotherm. The density data were applied to calculate the apparent molar volumes at infinite dilution, V_{ϕ}^o , apparent molar volumes at the critical micelle concentration, V_{ϕ}^{cmc} , and apparent molar volumes upon micellization, ΔV_{ϕ}^m , at 298.15, 303.15, 308.15 and 313.15 K. The ¹H NMR analysis suggested the intermolecular interaction especially in the hydrophilic head and interface region of CTAB with regard to shifting of proton signals.

Keywords: Micellization; Hydrophobic; Lauric acid; CTAB; Thermodynamics

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