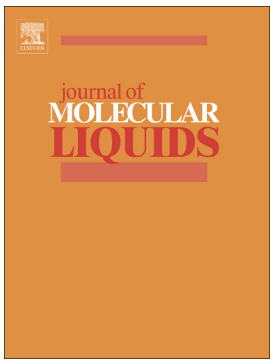

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PII: S0167-7322(17)33481-5
DOI: doi:10.1016/j.molliq.2017.11.090
Reference: MOLLIQ 8206

To appear in: *Journal of Molecular Liquids*

Received date: 2 August 2017
Revised date: 24 October 2017
Accepted date: 15 November 2017

Please cite this article as: G. Kumar, M.S. Chauhan , Conductometric investigations of surfactant behavior in aqueous polar aprotic organic additives. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Molliq(2017), doi:10.1016/j.molliq.2017.11.090

Conductometric investigations of surfactant behavior in aqueous polar aprotic organic additives

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Abstract

Micellar properties of sodiumdodecyl sulfate (SDS) and cetyltrimethylammonium bromide (CTAB) in aqueous polar aprotic additives viz., dimethylsulfoxide (DMSO), dimethylformamide (DMF), acetonitrile (AN) and 1, 4- dioxane were determined between 25 – 45^{o}C. The critical micelle concentration (CMC) determined using electrical conductivity measurements have been used to evaluate thermodynamic properties of micellization. By detailed experiments, it was observed that the DMSO and DMF have an inhibitory effect on micellization of the targeted surfactants, i.e. SDS and CTAB in aqueous solutions over the entire solvent composition range from 0.67-5.94 mol% by weight. The addition of dioxane and AN initially increase CMC of CTAB and then it decreases gradually with further increase in the concentration of dioxane and AN. A contrary trend is observed in the micellar behavior of SDS in the presence of dioxane and AN. The changes in standard enthalpy and entropy of micellization values are found to be consistent with the observed behavior of the two surfactants in the presence of these additives. Near constant counter-ion binding values are indicative of the fact that no structural transition of the micelles of the two surfactants takes place in the range of the composition studied.

Key words: Ionic surfactants; Micellization; Polar aprotic solvents; Conductivity;Counterion binding.

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