

Aggregation of Butanediyl-1,4-Bis(Tetradecyldimethylammonium Bromide) (14-4-14) Gemini Surfactants in Presence of Ethylene Glycol and Propylene Glycol

Authors : P. Ajmal Koya, Tariq Ahmad Wagay, K. Ismail

Abstract : One of the fundamental property of surfactant molecules are their ability to aggregate in water or binary mixtures of water and organic solvents as an effort to minimize their unfavourable interaction with the medium. In this work, influence two co-solvents (ethylene glycol (EG) and propylene glycol (PG)) on the aggregation properties of a cationic gemini surfactant, butanediyl-1,4-bis(tetradecyldimethylammonium bromide) (14-4-14), has been studied by conductance and steady state fluorescence at 298 K. The weight percentage of two co-solvents varied in between 0 and 50 % at an interval of 5 % up to 20 % and then 10 % up to 50 %. It was found that micellization process is delayed by the inclusion of both the co-solvents; consequently, a progressive increase was observed in critical micelle concentration (cmc) and Gibbs free energy of micellization (ΔG_0^m), whereas a rough increase was observed in the values of degree of counter ion dissociation (α) and a decrease was obtained in values of average aggregation number (N_{agg}) and Stern-Volmer constant (KSV). At low weight percentage (up to 15 %) of co-solvents, 14-4-14 geminis were found to be almost equally prone to micellization both in EG-water (EG-WR) and in PG-water (PG-WR) mixed media while at high weight percentages they are more prone to micellization in EG-WR than in PG-WR mixed media.

Keywords : aggregation number, gemini surfactant, micellization, non aqueous solvent

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