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MICELLIZATION OF QUARTERNARY BASED CATIONIC SURFACTANTS IN TRIETHANOLAMINE-WATER MEDIA: A CONDUCTOMETRY STUDY

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ABSTRACT

The effect of polar organic solvent, triethanolamine (TEA) on the micellization of a mixture of dodecyltrimethylammonium bromide (DETABr) and hexadecyltrimethylammonium bromide (HATABr) has been studied by conductance measurements at temperature range of 298.1 to 313.1K in steps of 5.1K. The values of the critical micelle concentration (CMC*) and the extent of counter-ion binding were obtained by fittings of the specific conductivity-concentration curve to the integrated form of the Boltzmann-Sigmoid equations. The values of CMC* was found to decrease with increase in the percentage composition of TEA. The degree of counter-ion binding of the mixed micelles (β) was determined from the ratio of the slopes corresponding to the post (A_2) and pre-mixed micellar regions (A_1). The thermodynamic quantities (ΔG_m , ΔH_m , and ΔS_m) was evaluated with the aid of the equilibrium model of mixed micelle formation. The negative deviation of the CMC* from the ideal system, the spontaneity, and the increased degree of randomness of the system were discussed on the basis of hydrophobic-solvophobic interactions of the monomers at elevated temperatures.

Keywords: Synergism, Mixed-micelle, Cationic surfactants, Spontaneity.