

# Thermodynamics of Micellization, Critical Micelle Concentration, Aggregation Number, of Cationic (TTAB) and Anionic (PSD) Surfactants in Alkanol + Toluene Systems

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## ABSTRACT

The conductivity for the cationic surfactant tetradecyltrimethylammonium bromide (TTAB) in methanol+ (10-60%) toluene system has been determined at 40°C and CMC as well as various thermodynamic parameters are reported. The conductivity however, decreases with increasing toluene concentration in methanol+toluene systems due to the increase of non polar character. Studies for TTAB have also been made in 10% toluene + alkanol (MeOH, PrOH-1, BuOH-1) systems at 40°C and the results obtained are reported.. The CMC values in mixed solvent systems for different compositions have been determined from the intersection of conductivity vs. conc. and are found to decrease gradually and linearly with increasing toluene content in the system. The plots of  $\log \Lambda_M$  vs.  $\log C$  are linear for all compositions of methanol+toluene systems and the values of A (i.e.  $\log \Lambda_{C=i}$ ) and B have been calculated. The values of constant A decrease as the volume percent of toluene in methanol+toluene increases for Potassium decyl Sulfate PDS as well as with the increasing number of carbon atoms in alkanols. On the other hand the values of constant B show an increase with increasing toluene content and temperature as well. The magnitudes of free energy of micellization, enthalpy, entropy and other thermodynamic parameters estimated for the studied systems were calculated and values showed the validity of the different equations.

**Key Words:** Aggregation number, Counter ion, CMC, Micelles, conductivity, Cationic surfactants, Anionic surfactants, TTAB, PDS, Thermodynamic parameters.