

## **A Conductometric Study of Interaction between Sodium Dodecyl Sulfate and 1-Propanol, 1-Butanol, 1-Pentanol and 1-Hexanol at Different Temperatures**

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**Abstract** — The critical micelle concentrations (cmc) of sodium dodecyl sulfate (SDS) in dilute aqueous solutions of 1-propanol, 1-butanol, 1-pentanol and 1-hexanol at 298, 303, 308 and 313 K have been determined from conductance measurements in the range of ~0.002 to 0.90 alcohol mol%. A relatively weak effect of temperature was observed in increasing the cmc in the narrow composition range studied. Thermodynamic parameters of micellization, enthalpy ( $\Delta H^{\circ m}$ ), entropy ( $\Delta S^{\circ m}$ ) and free energy ( $\Delta G^{\circ m}$ ) were calculated from temperature dependence of cmc. The dependence of these thermodynamic parameters on the concentration of alcohols is determined in terms of the effect of additives on micellization of SDS. In all the cases the negative value of  $\Delta H^{\circ m}$  decreases with increase in concentration, whereas the value of  $\Delta G^{\circ m} < 0$  and remained practically constant over the entire alcohol concentration range studied.  $\Delta H^{\circ m}$  and  $\Delta S^{\circ m}$  values show increasing trend with increase in concentration of alcohols. Due to different structural consequences of intermolecular interactions caused by different chain-length of alcohols, both enthalpy and entropy are different in a mutually compensating manner so that  $\Delta G^{\circ m}$  is not significantly affected. The results obtained are analyzed in terms of the effect of chain length of alcohols on micellization of SDS molecules.

**Keywords :** *Critical micelle concentration, SDS micelles, alcohols, conductivity.*