

Effect of temperature on the viscosity of cationic micellar solutions in the presence of added salts

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The effect of temperature on the viscosities of cetyltrimethylammonium salts (CTA X, X = Br⁻, NO₃⁻, Tosylate) in the presence of added salts is presented. It was found that plots of \ln of relative viscosity vs $1/T$ was linear and the activation free energy (ΔG^*) of the viscous flow was obtained from the slopes of such plots. The activation enthalpies (ΔH^*) and entropies (ΔS^*) for the viscous flow were also calculated and the entropic contribution was found to be negligible. The ΔG^* are interpreted in terms of the energy required to create a hole or an activated transition micellar structure capable of being transformed into smaller micelles and finally into spherical micelles. The ΔG^* and ΔH^* values are highly dependent on the nature of the counterions. The more strongly bound counterions produce the greatest effect on the energy of the rod-to-sphere transition. © 1987 Academic Press, Inc.