Indian Journal of Chemistry
Vol. 64, September 2025, pp. 864-870
DOI: 10.56042/ijc.v64i9.12081

Interaction between cationic and anionic surfactant using ultrasonic, physical and adiabatic parameters

Aditya Gupta, Indu Saxena*, Divyanshi Mishra & Preeti Yadav

Department of Chemistry, University of Lucknow, Babuganj, Lucknow 226 007, India
E-mail: ag121278@gmail.com, indu_lu@yahoo.com, divyanshiemishra28@gmail.com, chempreeti97@gmail.com

Received 12 July 2024; accepted (revised) 2 September 2025

Surfactants are organic amphiphilic molecules having hydrophilic and hydrophobic parts in the same molecule. The relative densities, relative viscosities, specific conductance and ultrasonic velocity of sound of binary solutions of SDS-CTAB in water, formed in different mole fraction ratios, have been measured at 298 K and 308 K. From these data, the physical parameters such as adiabatic compressibility (β_{ad}), intermolecular free length (L_f), acoustic impedance (Z), relaxation time (τ) and molar free volume (V_f) have been evaluated using standard relations. The results are thus interpreted in terms of molecular interactions between cationic and anionic surfactants. Investigated value of physical properties thus defines that the molecular interaction is feasible and associative in nature and the determined acoustical and adiabatic parameters supports that nature.

Keywords: Ultrasonication, Ionic surfactants, Acoustic impedance, Molecular interaction