The Asian Journal of Experimental Chemistry, Vol. 4 No. 1&2 (June & December, 2009) : 78-83

Research Paper :

A comparative study of dissociation/association facets of alkali and alkaline earth metal myristates

ANIL KUMAR, DEEPIKA SHUKLA AND DEEPTI TYAGI

Accepted : ***August, 2009***

See end of the article for authors' affiliations

Correspondence to:

ANIL KUMAR
Department of Chemistry,
D.A.V. (P.G.) College,
MUZAFFARNAGAR (U.P.)
INDIA

ABSTRACT

The present investigation deals with the relative facets of alkali (Li, Na, K) and alkaline earth metal (Mg, Ca, Sr, Br) Myristates at different temperatures (30^0–50^0C). Thermodynamic parameters (change in enthalpy/ free energy /entropy) for both dissociation and association processes have been used to look into the solution behaviour of these surfactants in 50% methanol +50% chloroform (V/V). Besides thermodynamic consideration, other parameters such as degree of dissociation, a and dissociation constant, K_D etc are used to delve into the dissociation aspects of these systems. The data for critical micelle concentration, cmc are also reported and explained.

Key words : Specific conductivity, Alkali and alkaline earth metal myristates, Dissociation/association behaviour, Thermodynamic approach, Critical micelle concentration (cmc).

The determination of critical Micelle concentration, cmc serves to be an important consideration while deciding the quality of a product. Researchers and academicians alike (Aicart *et al.*, 2006; Atwood and Flovenie, 1983; Avakawa and Brain, 1980; Barry and Russel, 1972 and Bufe and wolff, 2006) have already shown a keen interest for various surface active agents, also termed as Surfactants. They have been enthusiastic about their various facets *viz.* the physicochemical characterization, shape/size determination of micellar aggregates, W.J. Leigh and Co-workers (Bunajdad and Eastore, 2004; cook *et al.*, 2001 and hartl *et al.*, 2007) have, of late, shown how significant organometallics are to the wide domin of surfactants. Several national/ international publications (Jacobs *et al.*, 2006; Jaliceour and Philip, 1975 ; Kim *et al.*; Kumar, 1994 and Leigh and Li, 2002) have appeared in literature just to prove the merit of various physical properties of surfactants. Techniques such as viscometry and electrical conductivity have proved handy to study neutral polymer micelle interactions (Lelong *et al.*, 1951). Bumajdad and Eastoe (Malik *et al.*, 1984) employed conductivity to study water in oil microemulsions stabilized by mixed surfactants. Tania *et al.* (Mc. Brain, 1939) have resorted to spectroscopy and conductometry to probe interaction between water soluble poly{1,4-Pheny- lene-[9,9-bis(4-Phenaxy butyl-sulfonate)]flurenl-2, 7-diyl}Copolymer and ionic surfactants. Aicart and Co-workrs (Mehta *et al.*, 1979) examined electro- chemical, microscopic and spectroscopic characterization of vesicles and prevesicle nanostructures of mixed cationic surfactant systems.

Researchers (Mehrota *et al.*, 1970) of late have undertaken a study on electrically conductive beacterial cellulose by incorporation of carbon nanotubes. Kim and co-workers (Modaressi *et al.*, 2007) have, however, carried out a similar looking study using dielectrophoresis of surface conductance modulated single-walled carbon nanotubes with cationic surfactants. Hartl *et al.* (Niisson *et al.*, 2006) have investigated into ion sensitivity of surface conductive single crystalline diamond. Jacobs *et al.* (Niisson *et al.*, 2006) have dealt with aspects on dynamics of alkyl ammonium intercalants within organically modified montmorillohite: Dielectrical relaxation and ionic conductivity. Rajamani *et al.* (Robins *et al.*, 2003) have performed a study on carbon nanotube based transparent conductive thin films. NMR diffusometry and electric conductometric techniques have been employed to study interactions between gemine surfactants, 12-s-12, and beta cyclodextrin (Sarah *et al.*, 2006). Bufe and wolf (Sibel and Aoman, 2007) have recently undertaken a study on switching electrical conductivity in an AOT-isooctane- water microemulsion through photodimerization of solubilized N-methyl-2-quinoline. Conductometirc measurements have been found extremely handy to look into CTAB aggregation in aqueous solutions of ammonium based ionic liquids (Sharma *et al.*, 1986). Conductometric method (Shun-Cheng *et al.*, 2004) has also been a worthy tool to investigate interaction between some anionic dyes and cationic surfactants. Sarah *et al.* (Tania *et al.*, 2005) have carried out work on