

Effect of organized assemblies, part VIII: Spectrophotometric study on the effect of micellar media on the pK of some substituted N-benzylideneanilines

Sagarika Panigrahi^a, Padmini Suna^b, Pramila K. Misra^{b,*}

^a Silicon Institute of Technology (Silicon West), Sason Sambalpur-768200, Odisha, India

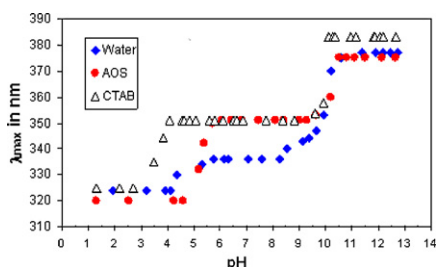
^b Centre of Studies in Surface Science and Technology, School of Chemistry, Sambalpur University, Jyoti Vihar-768019, Odisha, India

HIGHLIGHTS

- The results have been attributed to the surface charge of the micelle.
- These studies also evidence that the structure of the micelles are of Menger type.
- The hydrophobic chain length and charge of the head group determine the trend of the pK values.
- Both pK₁ and pK₂ suffer change on varying substituent of the aldimines.
- The intramolecular hydrogen bonding in o-substituted aldimines affects the pK values.

GRAPHICAL ABSTRACT

The pKs of a set of substituted N-benzylideneanilines have been determined from the plot of their $\lambda_{\max}$ s versus pH of the solution. The nature of the plot is found to be bi-sigmoid for hydroxyl substituted N-benzylideneanilines whereas for non-hydroxy substituted species the plot is single sigmoid. The number of plateaus in the sigmoid corresponds to the number of stable species formed during protonation-deprotonation equilibria. Basing on the trend in pK values, the localization sites of the N-benzylideneanilines within the surfactant assemblies and the structure of the surfactant assemblies have been established.



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ABSTRACT

The dissociation constants (pK values) of six N-benzylideneanilines with various substituents in 2% 1,4-dioxane-water(v/v) medium with or without aqueous micelles of ionic and nonionic surfactants have been determined spectrophotometrically. Three distinct peaks are observed for N-benzylideneanilines containing hydroxyl group and two distinct peaks for the species without hydroxyl group when the pH is varied within the pH range 1–14. The peaks are assigned to the neutral or protonated/ionized species of the corresponding N-benzylideneanilines. The pK values have been determined by observing the change in wavelength maximum ($\lambda_{\max}$) of the corresponding species as a function of pH. The pK values of the benzylideneanilines are found to be affected significantly by the substitutions as well as the environment of the ionic and nonionic micelles. The data support the presence of intramolecular H-bonding in o-hydroxy substituted N-benzylideneanilines. The localization site of N-benzylideneanilines within the organized assemblies has been established from the pK data and the structure of the organized assemblies has been suggested to be of Menger's type.

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1. Introduction

Benzylideneanilines belong to a class of compound called aldimines, which are the condensed products of aldehydes or ketones with primary amines and have azomethine group ($-\text{CH}=\text{N}-$) as the characteristics functional moiety. Interests in these compounds are largely due to their structural similarities

* Corresponding author. Tel.: +91 6632430983/6632430114; fax: +91 6632430158.

E-mail address: pramila.61@yahoo.co.in (P.K. Misra).