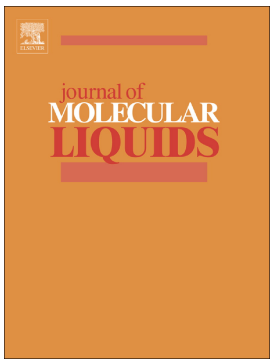

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Experimental and modeling study of the surface tension and interface of aqueous solutions of alcohols, cetyltrimethylammonium bromide (CTAB) and their mixtures

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Abstract

In this study, the experimental surface tensions were measured for aqueous solutions of cetyltrimethyl ammonium bromide, 1-propanol, 2-propanol, and 1-butanol with a pendant drop apparatus. The temperature and pressure of all experiments were 298.15 K and 1 bar, respectively. Subsequently, a model based on the equality of the chemical potential of components at the interface and the bulk liquid was used. The results of this part showed that the surface tensions were reproduced well. The average absolute deviation percent of surface tension was 1.11. Then the surface tensions of (cetyltrimethylammonium bromide+alcohols) aqueous mixtures were measured at different concentrations. Moreover, the critical micelle concentrations of the applied systems were determined. The present model was used for aqueous mixtures of (cetyltrimethylammonium bromide+alcohols). The average absolute deviation percent of surface tension was 2.72, so the model successfully predicted the surface tension for aqueous solutions of (cetyltrimethylammonium bromide+alcohols). Furthermore, the results of the model proved that the presence of alcohols decreased the surface coverage of cetyltrimethylammonium bromide and increased the values of the critical micelle concentration.