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Study of interaction between cationic surfactants and cresol red dye by electrical conductivity and spectroscopy methods

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ABSTRACT
Interaction of cresol red in aqueous cationic surfactants (CTAB, CTAC) was studied by electrical conductivity and spectroscopy methods. Critical micelle concentration (cmc), degree of ionization (α), and thermodynamic parameters of micelle formation were determined. The partial molar volumes of the surfactant ($V_{2,m}$), of the dye ($V_{2,m}^{\infty}$), and of the dye in the presence of surfactant ($V_{2,m}^{\infty}$) were calculated from density measurements. The results showed that the cmc of the surfactant increased in the presence of the dye, and the degree of ionization of the micelle increased with increasing dye concentration. The interaction between the dye and the surfactant was found to be more favorable for the cationic surfactant CTAB than for CTAC. The partial molar volume of the surfactant increased with increasing dye concentration, and the partial molar volume of the dye was found to be higher in the presence of surfactant than in the absence of surfactant