Behavior of low-solubility detergents

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The solubility behavior in water of different salts of cetyltrimethyl ammonium (CTA+), such as iodide (CTAI), thiocyanate (CTASCN), and perchlorate (CTAClO4), is reported. The order of solubilities is CTASCN > CTAI > CTAClO4. Ion-pair association was established by using the Kraus-Bray conductimetric method. Results indicate that CTAI is 50% and CTASCN is about 30% associated in water solutions. CTAClO4 has solubility too low to measure by the conductimetric method. In the presence of CTAB and CTAOTOS micelles, the conductivity of these systems is constant as a function of detergent concentration above the micellar concentration, indicating that the dissolved monomers are incorporated into the micellar phase. This produces an increase in the micellar size and in the degree of dissociation. Finally, micellar features of the series (CTAF, CTACl, CTAB, and CTAI) can be related to the radii of the hydrated counterions.