# STRUCTURE, MOLECULAR DYNAMICS, AND THERMOTROPIC PROPERTIES OF STEARIC ACID-CTAB CATANIONIC SURFACTANTS WITH DIFFERENT MOLAR RATIOS

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S u m m a r y

Solid phase complexes containing cetyltrimethylammonium bromide (CTAB) $[H_3C\text{-}(CH_2)_{15}\text{-}N^+(CH_3)_3]Br^-$ (cationic surfactant) and stearic fatty acid (SA) ($H_3C\text{-}(CH_2)_{16}\text{-}COOH$) (anionic surfactant) were prepared with different SA:CTAB molar ratios ranging from 4:1 to 1:4. The prepared catanionic (CA) surfactants are characterized by using X-ray powder diffraction, DSC analysis, and temperature-variable FTIR spectroscopy. It is shown that the obtained CA complexes in the solid state are assembled into a phase-segregated layered structure. The aggregate composition is close to equimolar with the coexisting excessive SA or CTAB phase, which is confirmed by FTIR spectroscopy. Complicated phase behaviors depending on the SA:CTAB molar ratio are observed in these systems. Upon heating, a series of phase transitions occurs, yielding finally an orientationally disordered hexagonal structure. With DSC analysis, the greatly enhanced stability of the complexes (particularly, the 1:1 one) over pure acid (by about 40 °C) is found. The structural effects on the phase diagram and the molecular dynamics of SA:CTAB aggregates are discussed.