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Comparison between lyotropic cholesteric phase behavior with partly fluorinated surfactants and their exact hydrogenated counterparts

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Abstract

In this study, we examined lyotropic intrinsic cholesteric phase properties of some amino acid based chiral surfactants, with partly fluorinated and hydrogenated chains, to investigate the effect of the twist structure of fluorocarbon chain on the helical twisting power of chiral surfactants. We synthesized some chiral and achiral surfactants, and their fluorinated/hydrogenated counterpart surfactants, taking into account the rule that [1 CF₂=1.5 CH₂]. We prepared lyotropic mixtures exhibiting discotic cholesteric phases by dissolution of chiral surfactants L-alaninehydrochloride undecylester (L-AUnDE), L-serinehydrochloride undecylester (L-SUnDE) and their partly fluorinated counterparts (L-APFOE and L-SPFOE, respectively) into sodium chloride (NaCl)/water mixtures, separately. The pitch measurements were used to evaluate the helical twisting powers of each fluorinated/hydrogenated chiral surfactants. The results indicated that the twist structure of fluorocarbon chain provides higher helical twisting power with respect to the hydrocarbon chain.

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