Struttura e dinamica di microemulsioni

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Breve descrizione del progetto. Under suitable conditions (T, P, composition) water, apolar compounds, and surfactants give rise to thermodynamically stable mixtures called microemulsions. However, in order to attain the appropriate packing of amphiphiles at interface, the addition of others surface-active substances is often required. Therefore, without a quantitative description of the dependence of the partition equilibria on the system composition, a full understanding of quaternary microemulsions cannot be attained. We have studied in detail the microstructure of the quaternary CTAB/water/n-pentanol/n-hexane system. By increasing the pentanol/CTAB mole ratio, the system evolves from oil-in-water to water-in-oil structures. For very large 1-pentanol loading some water is expelled from the reverse micelles resulting in a \( L_2 \) plus water equilibrium (emulsification failure). The adsorption of cosurfactant at the interface of direct micelles, planar lamellae, bicontinuous microemulsions, and spherical reverse micelles follows the same adsorption isotherm (independently from the curvature of the interface). Moreover, the results obtained unambiguously show that the interface composition dictates the spontaneous curvature of interfacial film. Actually positive, null, and negative curvatures correspond to different compositions of the interfacial film. Once the influence of cosurfactant on the spontaneous curvature of the interface is understood, the appearance of the emulsification failure upon pentanol loading can be rationalised within the framework of the flexible surface model.

Parole chiave. Microemulsioni, tensioattivo cationico, pentanolo, cotensiattivo, CTAB.

Pubblicazioni