

Colloid-chemical properties of nonionic gemini surfactants Surfynol® 400 series with different degrees of oxyethylation

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Keywords: gemini surfactants, oxyethylated surfactants, Surfynol® 400 series, surface tension, micelle formation, wetting.

Abstract

Adsorption at water – air interface and micelle formation in water for nonionic gemini surfactants Surfynol® 400 series with different degree of oxyethylation (30, 10, 3.5 и 1.3, respectively) have been investigated. Colloid-chemical properties of surfactants given have been studied, their adsorption characteristics and critical micelle concentration (CMC) values have been experimentally determined. Decrease of the oxyethylation degree results in increase of the surface activity and decrease of CMC values. Gemini surfactants have higher surface activities in comparison with monomeric surfactants (sodium laurylsulphate and sodium laurethsulphate). The less ethoxylated gemini surfactants show the lowest CMC values (2.1 и 4.6 mmol/l) whereas more ethoxylated gemini surfactants have CMC values close to that of monomeric surfactants (10.0 mmol/l).

The values of average hydrodynamic radius of micelles have been determined, the micellar mass and average aggregation number values for gemini surfactants have been calculated. The average hydrodynamic radius is slightly dependent of the oxyethylation degree of surfactant whereas aggregation number increases with decreasing of the oxyethylation degree.

The wetting ability of Surfynol® 400 series on teflon surface has been studied. The decrease of the surfactant oxyethylation degree results in improvement of wetting properties. The wetting ability of highly ethoxylated gemini surfactants is almost equivalent to that of ethoxylated monomeric surfactants (ethoxylated nonylphenols Neonol AF9-10 and Neonol AF9-12).

For gemini surfactants examined cloud point dependence from the oxyethylation degree is typical for ethoxylated nonionic surfactants.

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