

Characterization of isooctane/AOT/water reverse micelles by dielectric spectroscopy, dynamic light scattering and acoustic methods.

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Streszczenie

Reverse micelles are complex systems, where polar phase is enclosed in surfactant shell surrounded by non-polar solvent (water-in-oil microemulsion). Our previous studies proved their large sensibility to an external electric field and revealed a presence of pronounced maximum in the non-linear dielectric effect measured in function of concentration of water. The results obtained previously do not allow for an unequivocal explanation of the observed maximum. In this paper the micellar system of isooctane/sodium docusate (AOT)/water was investigated by dielectric spectroscopy, non-linear dielectric effect, dynamic light scattering and acoustic methods. The measurements were performed along pathways of constant AOT-to-isooctane ratios. The existence of maximum of the nonlinear dielectric effect investigated in function of water content was confirmed. It was shown that the maximum occurs for mixtures for which the molar ratio of water to surfactant (w_0) is 10. Strong maxima were also observed in the measurements of electric permittivity and conductivity. The maxima were found for the same concentrations as those for non-linear dielectric effect. Sound velocity and dynamic light scattering studies do not evince any anomalies in the mixtures under discussion. No convincing evidence has been found that the maxima noticed in dielectric studies are related to critical phenomena. They were interpreted basing on the percolation effect, but not all the observed properties can be explained in this way.

Słowa kluczowe

Aerosol OT, Sodium docusate, Reverse micelle, Electric permittivity, Conductivity, Compressibility, Percolation

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