View Abstract

ABSTRACT SYMPOSIUM NAME: Basic Research in Colloids, Surfactants and Interfaces

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TITLE: Volatile aroma surfactants: characterization and areas of application

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ABSTRACT BODY:

Abstract: Presented work discloses characteristic interfacial behavior of amphiphilic aroma molecules and justifies the advantages of their usage as surfactants and co-surfactants in dynamic interfacial processes. Surface tension γ of solutions of a mono terpene alcohol (linalool), an aromatic alcohol ester (benzyl acetate), and of conventional surfactant sodium dodecyl sulfate (SDS), is compared under equilibrium and non-equilibrium conditions, and is shown to depend strongly on the chosen method.

At equilibrium conditions the studied surfactants exhibit similar interfacial behavior, which is well rationalized using classical theoretical approaches. At non-equilibrium conditions, aroma compounds demonstrate a high interfacial dynamic activity, i.e. an ability to decrease the surface tension of aqueous solutions at a time scale of milliseconds.

Tensiometric methods with pendant drops reveal that in open systems the adsorption-desorption at the liquid / air boundary is accompanied by evaporation, and the dynamic interplay of these processes defines the surface tension. A phenomenological model is developed and applied to account for the increase of the surface tension of the drop with time, γ(*t*), spanning the time range of ~10 min, which allowed to achieve a good agreement between theory and experiment. One adjustable parameter (material constant) is determined – the mass transfer coefficient of the volatile amphiphile across the water-air boundary.

Reported here high dynamic interfacial activity of volatile surfactants suggests revisiting numerous interfacial phenomena and processes which involve aroma molecules (perfumes), such as emulsion preparation, foam stability, spraying and cleaning.

References:

[1] O.A. Soboleva, L.A. Tsarkova, Surface Properties of Aqueous Solutions of Mixtures of Sodium Dodecyl Sulphate and Linalool under Equilibrium and Dynamic Conditions, Colloid J., 82 (2020) 437-447. https://doi.org/10.1134/s1061933x20040146.

[2] O.A. Soboleva, P.V. Protsenko, V.V. Korolev, J. Viktorova, A. Yakushenko, R. Kudla, J.S. Gutmann, L.A. Tsarkova, Aroma Molecules as Dynamic Volatile Surfactants: Functionality beyond the Scent, ACS Appl. Mater. Interfaces, 11 (2019) 40988-40995. https://doi.org/10.1021/acsami.9b15596.

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(No Image Selected)