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Volatile surfactants: characterization and areas of applications

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The research aiming at the development of experimental and theoretical basis of the interfacial behaviour of volatile surfactant will be presented. As non-conventional volatile surfactants we study commercially available compounds such as synthetic perfumes, essential oils, terpenes. Typically such light amphiphilic compounds possess a distinct odour, and have low to negligible solubility in water. In contrast to basic physico-chemical properties, e.g. boiling temperature, solubility, partition coefficient, such properties of volatile amphiphiles as polarity, volatility and interfacial activity are not systematically studied and therefore are not available in handbooks and databases.

A distinctive feature of volatile amphiphiles is that they provide low dynamic values of the surface tension. Also they can act as plasticizers for fabrics, plastic and hair. On the other side, in contrast to conventional surfactants, volatile amphiphiles evaporate from air-water interface, so that the static surface tension increases with the surface age time on a time scale of seconds. Using facile and low cost measurements such as static and dynamic tensiometry, we systematically evaluate valuable information on the volatility of the volatile surfactants which is not straightforward to evaluate using even more complex analytical techniques. Several examples of experimental database of characterized volatile surfactants with established "structure-property-function" relationship will be presented. This methodological approach is further developed to disclose dynamic interactions of volatile surfactants with other components of detergent and cosmetic formulations.

Due to their high surface activity, volatile surfactants are envisaged to be useful in processes and technologies which involve newly creating interfaces at the time scales of milliseconds and below, such as spraying, coating technologies, laundry, stabilization of emulsions in cosmetic and food industry.

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