

Correlation between the emulsions and foams stability and the drop/bubble coalescence

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The presented study concerns the investigation on the existing relation between the stability of disperse systems and the coalescence of single bubble/drops and the interfacial properties of the corresponding liquid interfaces.

Foams and emulsions have been obtained in the presence of silica nanoparticles (NPs) and palmitic acid. In particular, the foams are stabilised by complexes of NPs and palmitic acid dispersed in the aqueous phase, and the emulsions are prepared by aqueous NPs dispersions in hexane solution of palmitic acid. The stabilization of the dispersed systems have been reached thanks to the formation at the fluid interface of complexes between the NPs and the surfactant, which are able to modify the interfacial properties and the rheological behaviour of the systems.

These systems have been studied under different point of view: interfacial properties by measurements of dynamic interfacial/surface tensions and interfacial dilational rheology, coalescence of drops/bubbles by a drop-drop micromanipulator and the stability of the corresponding emulsions and foams both by direct observations and by Diffusion Wave Spectroscopy.

The obtained results provide interesting information on the mechanisms involving in the stabilization of the studied dispersed systems and on the processes occurring at the fluid interfaces.

These results can be useful to address the utilisation of emulsions and foams as smart platforms for the assembling of new nanomaterials or in the design advanced chemical processing devices (ex., liquid-liquid extraction).

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