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Emulsions are a class of disperse systems consisting of two immiscible liquids [1–4]. The liquid droplets (the disperse phase) are dispersed in a liquid medium (the continuous phase). Several classes may be distinguished: oil-in-water (O/W), water-in-oil (W/O) and oil-in-oil (O/O). The latter class may be exemplified by an emulsion consisting of a polar oil (e.g. polyolene glycol) dispersed in a non-polar oil (paraffinic oil), and vice versa. To disperse two immiscible liquids one needs a third component, namely the emulsifier. The choice of the emulsifier is crucial information of the emulsion and its long-term stability [1–4].

There are many examples one could quote of naturally occurring emulsions: milk and the O/W and W/O emulsions associated with oil bearing rocks are just two examples. Emulsion types can be classified on the basis of the nature of the emulsifier or the structure of the system as shown in Tab. 1.1.

Tab. 1.1. Classification of emulsions

Nature of emulsifier	Structure of the system
Simple molecules and ions	Nature of internal and external phase: O/W, W/O
Nonionic Surfactants	Nanoeulsions
Ionic surfactants	Miscelle emulsions and micellants
Surfactant mixtures	Microemulsions
Nonionic Polymers	Bilayer droplets
Polyelectrolytes	Double and Multiple Emulsions
Mixed polymers and surfactants	Mixed emulsions
Liquid crystalline phases	
Solid particles	

## 1.2 Nature of the Emulsifier

The simplest type is ions such as  $\text{Cl}^-$ , which can be specifically adsorbed on the emulsion droplet, thus producing a charge. An electrical double layer can be formed which provides electrostatic repulsion. This has been demonstrated with very dilute O/W emulsions by applying an electric field. Clearly that process is not practical. The most effective emulsifiers are surface-active reagents, such as alcohol ethoxylates with the general formulae  $\text{C}_{12}\text{H}_{25}(\text{O})_n\text{C}_2\text{H}_5\text{C}_6\text{H}_5$ ,  $\text{O} \cdot \text{H}$ , which can be used to emulsify oil in water or water in oil. These reagents can stabilise the emulsion against floccu-