

Subject Proposal for « Exchange students » in Chemistry

Formulation of Winsor I, II, III microemulsions

The "HLD" or Hydrophilic Lipophilic Deviation is a dimensionless number which expresses the difference in affinity of a surfactant between an aqueous phase and an oil phase. The expression of HLD takes into account the contributions of physicochemical variables such as temperature or formulation variables like the nature of the oil, characterized by the Equivalent Alkane Carbon Number (EACN). EACN indicates the hydrophobicity of the oil phase and can be determined by measuring the temperature corresponding to the optimal formulation when no ionic surfactants are used.

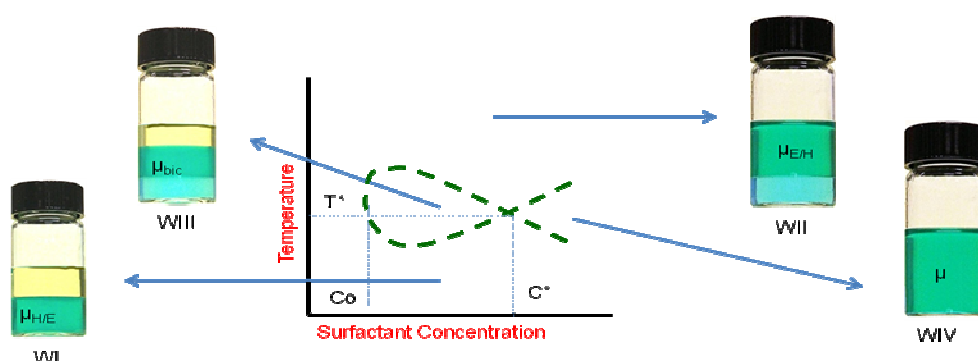
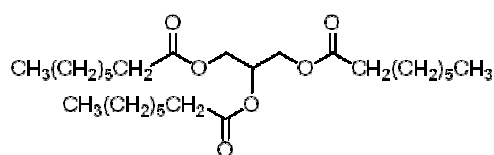
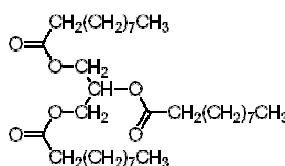


Figure 1. γ phase diagram of the Surfactant/Oil/Water system.

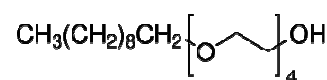
Esters (oil phase) are very used in cosmetics and food industry, often formulated with nonionic surfactants. The temperature (T^*) and the surfactant's concentration (C^*) for three phases to one phase (WIII \rightarrow WIV) transition (optimal formulation) has been determined in our laboratory for many esters: isopropyl myristate, glyceryl trioctanoate; glyceryl tridecanoate and ethyl alkanoates (Figures 1, 2).



Glyceryl Trioctanoate



Glyceryl Tridecanoate



Non ionic surfactant: $C_{10}E_4$

Figure 2. Esters oil and non ionic surfactant used for this work

The work will be focused on :

- The establishment of phase diagram (Figure 1) from several esters used in cosmetics emulsions and as pharmaceutical compounds (such as Mygliol 810)
- The study of the size and the viscosity of the emulsions.

Keywords : Microémulsion, Phase diagram, Laser granulometry, Rheology

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