Master **COSOM**

Intership Proposal

Group Oxidation & Physicochemistry of Formulation

(University of Lille 1, Villeneuve d'Ascq, France)

Subject:	**Influence of fragrances onto emulsion properties and application to low energy emulsification**
Duration:	6 months **Monthly Allowance:** ≈ 450 €

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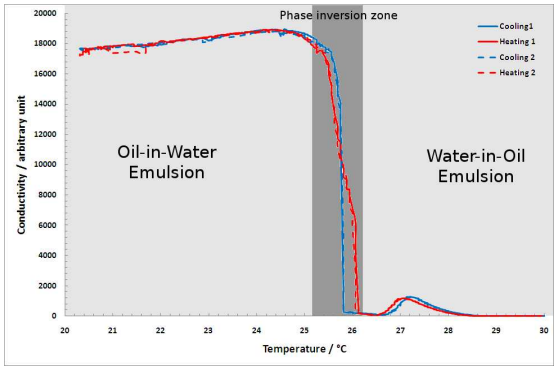
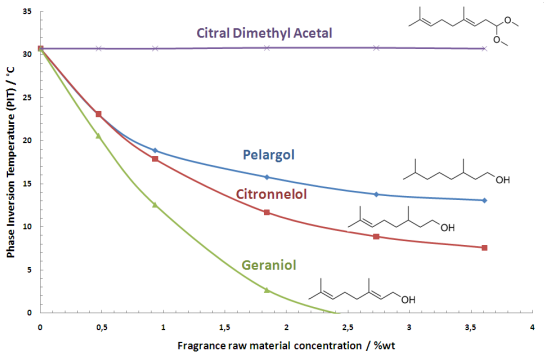
Abstract:

In order to provide a pleasant smell and to fulfill consumer needs, perfumes are added to numerous consumer end-use products. The composition of such systems is always a challenge for the formulator as fragrance raw materials tend to destabilize emulsions and other delivery systems. Even with small amounts of fragrances, typically 0.3 - 0.5% wt, emulsions are often destabilized within a short time. As far as nonionic surfactants (such as polyethoxylated alcohols) are used, the temperature is the formulation variable of choice as it constitutes an accurate, non-invasive and reversible formulation variable. A change of temperature can cause emulsion inversion from Oil-in-Water to Water-in-Oil (and reverse) at the so-called Phase Inversion Temperature (PIT). The inversion can be observed by tracking the conductivity change as a function of the temperature but also by backscattering measurement. The figures below report some examples of fragrance raw materials influence on the PIT of a Brij30/Decane/Water emulsion.





The project will be organized around 3 steps: 1) Synthesis of pure ethoxylated alcohol surfactants C_iE_j which are more appropriate to understand and rationalize the physicochemical effects than commercial surfactants such as Brij30 which are complex mixtures (the synthesis is known in our lab, easy to perform and should not take more than 2 weeks); 2) Development of a screening method to determine the ability of a fragrance raw material (single molecule) to destabilize an emulsion based on the Phase Inversion Temperature (PIT); 3) Taking advantage of the PIT decrease and of the partitioning of the fragrance into the emulsion to produce perfumed and stable emulsions via low energy emulsification at room temperature. This last part will be based on the elaboration of a composition-formulation map for one or two fragrances.

Keywords: fragrance, alcohol, emulsion, phase inversion temperature, stability, Turbiscan, conductivity