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Understanding phase inversion in emulsions

“We see great potential for OF2i in the online measurement of particle concentrations enabling characterization and further development of our formulas on the road to innovative cosmetic products.”

Determining the particle concentration of PIT nanoemulsions

In a feasibility study with Henkel, we tested two innovative emulsion types to better understand their composition. The results revealed significant differences between the samples.

Challenge

Phase inversion is an important industrial process to make stable emulsions e.g. for personal care products. After phase inversion, the liquid-in-liquid dispersions have a droplet size in the nano-range. This brings a number of benefits due to e.g. high surface area per volume, high stability and other desirable properties. However, it is not always easy to control and predict the final droplet size during the production process.

Application highlights

During measurement the live datastream of particles already gave an indication of differences between the two samples.

The number of particles (shown as strips of light) passing through the measuring cell was noticeably lower for Emulsion 1 than for Emulsion 2 (see Figure 1).

Results

Subsequent comparison of the OF2i® data for both samples revealed that the object concentration (number of objects) of Emulsion 2 was 4.8 times higher than for Emulsion 1 (see Figure 2).

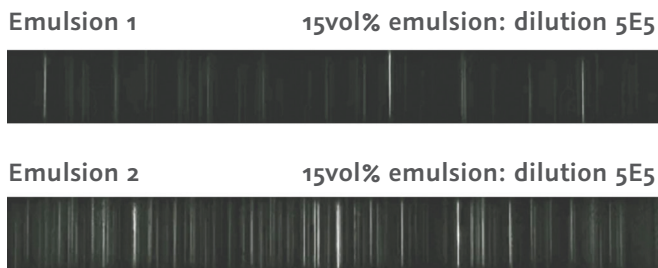


Figure 1: Comparison of the live datastreams of Emulsion 1 (left) and Emulsion 2 (right) showing noticeably more particles passing through the cell during measurement of Emulsion 2

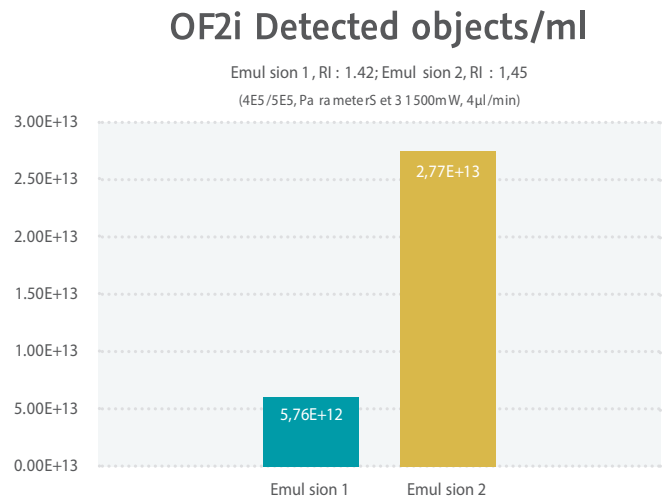


Figure 2: Results of the OF2i® measurement of object concentration on Emulsion 1 and Emulsion 2