



## Overview of a surfactant structure

SAXS/WAXS measurements were performed on the Head & Shoulders Classic Clean Shampoo from Procter & Gamble and reveal its inner structure.

### Introduction

Many personal care products are concentrated surfactant systems displaying a multi-phasic microstructure. To design new properties through innovative formulation and to control the latter during the production process, good knowledge of the associated structure is required. Besides, evolution during the use of the product (dilution in water) or stability during storage (which mainly means under temperature variation) need also to be studied to ensure the final product performance.

X-ray Scattering is a powerful technique, complementary to NMR and Cryo-TEM for instance, to elucidate the organization of the associated micellar formulation on a wide range of length scales, as a function of the environment.

### Measurements & results

A sample of the Head & Shoulders Classic Clean Shampoo was investigated. Simultaneous SAXS/WAXS measurements were performed at room temperature, under vacuum. Thanks to the single shot measurement, the same sample portion is illuminated during SAXS and WAXS data collection, which provides an accurate data collection while saving time.

The resulting 1D curve is plotted in Figure 1.

The SAXS/WAXS pattern reveals a structure made of:

1/ a wormlike micelle, evidenced by a form factor with two observed orders related to the cross-section signature, and a change of slope at smaller  $q$  values associated to the characteristic dimension of 38.31 nm.

2/ a crystalline phase characterized by the very well defined peak positions from WAXS measurements, and a sponge phase.

### To go further

The Nano-inXider enables further investigation of the sample under temperature control, using the integrated temperature control stage, the Linkam HFSX350. The SAXS/WAXS single shot measurement allows a proper temperature investigation as there is no need for sample replacement to prevent from hysteresis phenomenon.

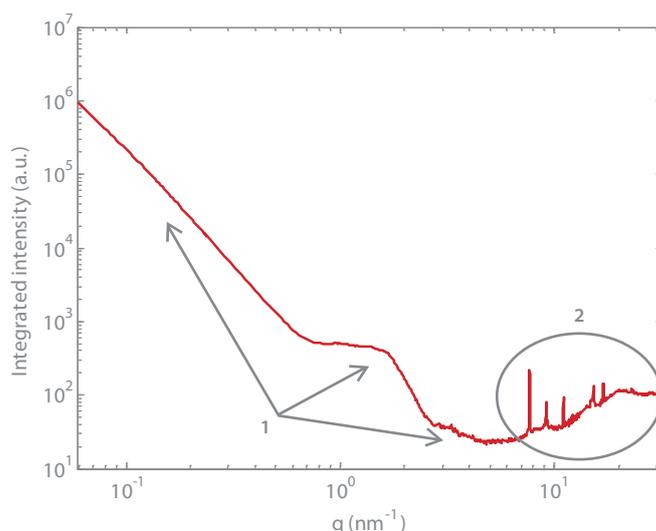


Fig. 1 - 1D SAXS/WAXS curve from Head & Shoulder Classic Clean Shampoo sample. Exposure time = 600 s.