

Improved formulation for STEPAN surfactants

Stepan is one of the world's largest producers of surfactants, with more than 1800 employees and 16 manufacturing locations worldwide. Stepan provides surfactants expertise for commercial and industrial applications - ranging from foaming agents for shampoo to emulsifiers for agricultural insecticides or agents for oil recovery.

In its quest for formulations tailored to customer requirements, the company needed to validate hypotheses developed on the microstructure of surfactants. Their questions could not all be answered using standard techniques.

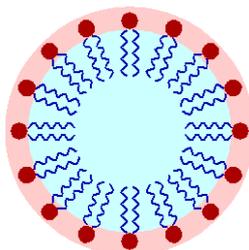
Stepan's chemists therefore decided to use small-angle neutron scattering (SANS) on an instrument at the Institut Laue-Langevin (ILL) in France.

SANS can reveal the average size and distribution of particles. It also provides information on shape and chemical structure (from about 1 nm to 1 μm).

"The SANS measurements gave us indications on the self-assembly structure of our surfactants. We were able to distinguish between different structures, findings which challenged our knowledge to date. The time spent with the ILL scientist was invaluable.

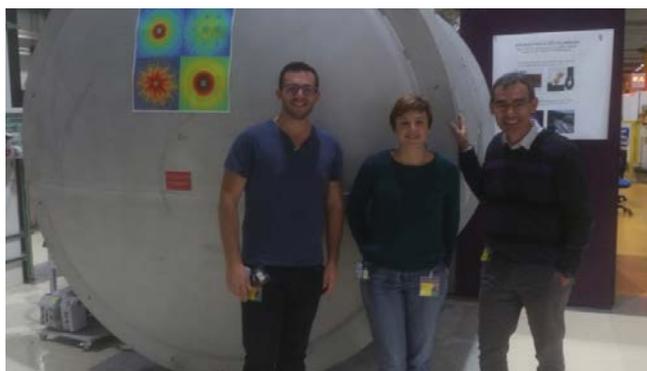
Without the SINE2020 programme, we would probably not have approached the ILL for experiments, not being aware of the technique."

Elodie Shaw, technical manager, Stepan Europe

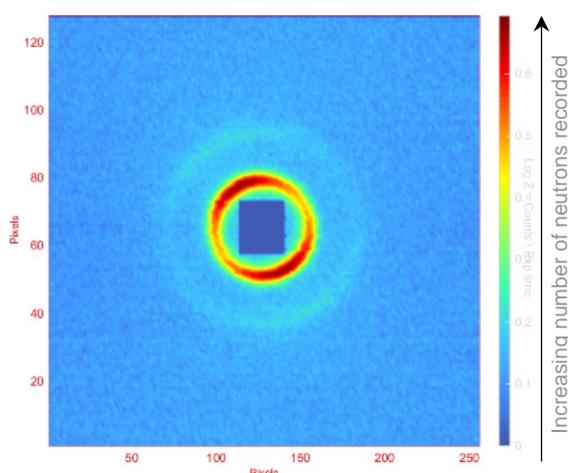


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The surfactant molecule has a hydrophilic head (in red) and a hydrophobic (lipophilic) tail (in blue). When surfactants are added to water, they self-assemble in spheres called "micelles".



Personnel from Stepan in front of the SANS instrument at the Institut Laue-Langevin (France)



This image shows the neutrons scattered from one of Stepan's samples. This is the kind of image that enables the microstructure of fluids or solids to be determined!

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