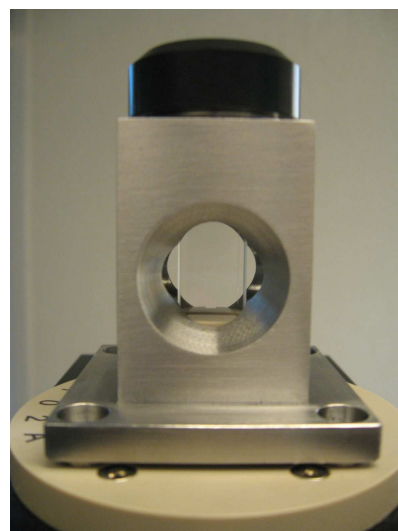


NEUTRON SCATTERING

Compatible with { SFM-20
SFM-300
SFM-400



SOFT CONDENSED MATTER STUDIES BIOLOGY STUDIES

Small-angle neutron scattering (SANS) is a technique that measures the deviation to small angles (from less than one degree to several degrees) of a neutron beam due to small particles in the sample. These structures could be clusters in alloys, polymers or biological macromolecules and their dimensions is usually in the range of 10 to 100 nanometers.

Combination of stopped-flow technology to small-angle neutron scattering gives the user precious information about the early stage of reactions occurring during growth and formation micelles or vesicles. But it can also be applied to other soft condensed matter studies such as growth of inorganic particles in organic matrix or growth of mesoporous structures.

Stopped-flow with SANS detection can be useful in biology applications such as protein/protein interactions, protein binding or changes of quaternary structures.

The design of the neutron scattering observation head is based on the standard stopped-flow head. One observation window is specially engineered to get the largest solid angle (20° opening) so the detector can get the maximum scattering information. Mixing is done in a Berger Ball mixer specially designed to create turbulent mixing conditions. Reaction takes place in a quartz cuvette (2 mm light path) which is directly connected to the Berger ball mixer. When the stopped-flow is equipped with Isolast o'rings, neutron scattering experiments can be performed with most organic solvents. The stopped-flow instrument is compact and can easily be fitted onto the neutron beamline, if space is not available around the beam the neutron head can be combined the umbilical link without any loss of performance. With this neutron cell the maximum flow rate is usually limited to 2 ml/s which does not affect the dead time as limitation will be the acquisition speed of the detector.

Neutron scattering accessory includes :

- Observation head with large opening window
- isolast o'rings (stopped-flow must also be equipped with isolast for full solvent compatibility)
- Quartz cuvette
- Berger Ball mixer

Example of applications :

- **Dynamics of structural transitions in amphiphilic systems monitored by scattering techniques**

M. Gradzielski, I. Grillo, T. Narayanan
Prog Colloid Polym. Sci. (2004) 129: 32-39

- **Formation and growth of anionic vesicles followed by small angle neutron scattering (ILL, D22)**

I.Grillo, E.I. Kats, A.R. Muratov
Langmuir (2003), 19 (11) 4573-4581

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