

# Low Noise Flow Cell

The use of the Xenocs Low Noise Flow Cell enables the minimization of container scattering and allows water scattering detection for a short exposure time.

## Introduction

Small Angle X-ray Scattering (SAXS) enables the determination of protein structures. Such diluted solutions display a weak scattering signal and the lower the background of the container, the more efficient the measurement is. Water measurements have been performed using the Xenocs Low Noise Flow Cell, thus demonstrating just how low the scattering of the latter is compared to that of the water itself.

## Measurements & results

SAXS measurements within 10 minute exposure time were performed on water (thickness 1 mm) on the Xeuss 2.0 SAXS/WAXS system, with the Xenocs Low Noise Flow Cell.

Figure 1 shows the resulting 1D scattering curves. Comparison between water in flow cell (red), empty flow cell (black) and water only (blue) demonstrates the high efficiency of the Xenocs Low Noise Flow Cell. Empty flow cell and water in flow cell are corrected from dark and transmission. Nearly one decade in intensity ratio between water and container is displayed!

To enhance comparison, 2D patterns of the empty Low Noise Flow Cell

and of the Flow Cell filled with water are shown in Figure 2. No correction was applied. The same color scales were used for both images.

One can observe the lower scattering of the empty cell compared to that of the cell filled with water.

Furthermore, the empty Low Noise Flow Cell shows a much lower scattering level compared to that of an empty capillary, as plotted in Figure 3. Normalization was applied to the capillary and to the Low Noise Flow Cell data, using the scaling factor deduced from water measurements.

Such a low background cell enables extremely reliable data subtraction.

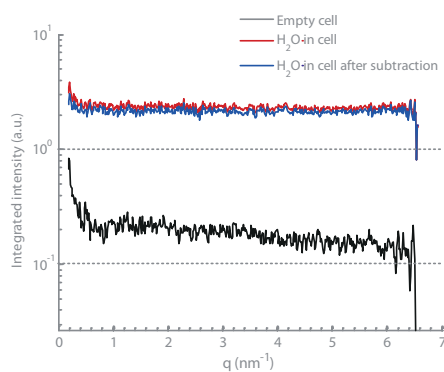


Fig. 1 - 1D scattering curves of Water measurement. Exposure time = 10 min.

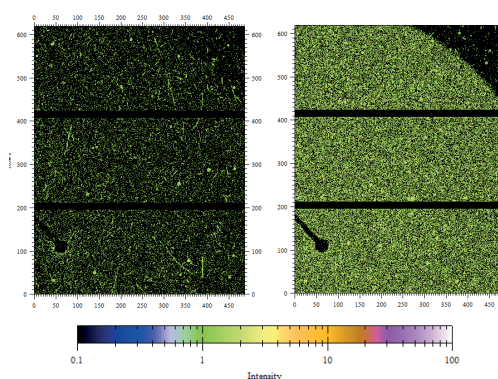


Fig. 2 - 2D Scattering patterns from Empty Flow cell (left) and Water in Flow cell (right). Exposure time = 10 min.

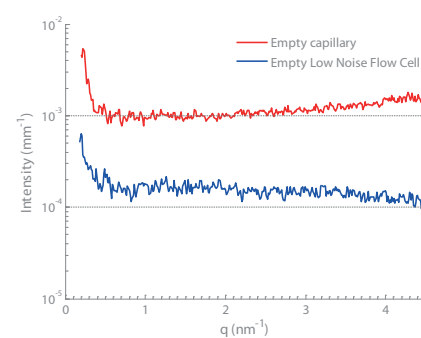


Fig. 3 - 1D scattering curves of empty cells. Exposure time = 10 min.

## To go further

The Low Noise Flow Cell is available for the complete range of Xenocs systems allowing investigation of weakly scattering diluted systems which require high signal-to-noise ratio ( $I/\sigma$ ). Integration of Scatterless slits 2.0 technology and a low background camera - available in the Xeuss 2.0 SAXS/WAXS system as well as in the Nano-inXider - combined with the use of the Low Noise Flow Cell ensure high data quality collection and accurate analysis.