SEC-SANS measurement on standard proteins for a proof of concept

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Contrast-variation small-angle neutron scattering (SANS) measurements on protein containing samples for assessing the optimal conditions for SEC-SANS analysis were conducted at SANS-J-II.

キーワード Keywords：contrast variation SANS; protein-based complexes;

１．目的 Objectives

The main objective of the experiment was to use contrast-variable small-angle neutron scattering (SANS) to investigate and resolve the morphology of protein and polymer complexes formed together or in combination with other compounds, such as minerals, in order to determine the optimal conditions for an SEC-SANS measurement. SEC-SANS offers the possibility of analyzing different components in such mixtures separately using SANS, the complexes and the still individual proteins, polymers, or minerals, by filtering them through the SEC column and collecting them at different elution times in the SANS cuvette. Therefore, knowledge of the initial morphology stage of various mixtures is essential.

２．方法 Methods

SANS measurements were performed using the SANS-J-II instrument from JRR-3 on different gel-samples containing proteins, bio-polymers and minerals using contrast matching to suppress the scattering of selected component in the mixture. Contrast matching SANS measurements were performed between 0.1 and 5 nm^{-1}, combining measurements with the main detector of SANS-J-II at 2m and 10m detection distances.

３．結果及び考察 Results and Discussions

Figure 1 shows an example of scattering curves collected from complexes formed in aqueous solution by a biopolymer and clay minerals. Scattering of each component was matched out by using appropriate H_2O/D_2O mixtures. Model analysis of all collected data is still ongoing.

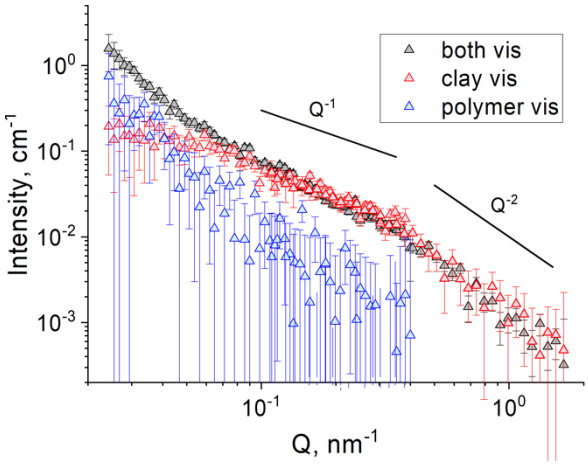

Figure 1 - Scattering patterns from a biopolymer-clay sample in aqueous solution measured in various contrast conditions - the gel network consists of fibrils with 2D aspect at local scale.