



Extensive small angle neutron scattering (SANS) studies of Mucin polyelectrolyte solutions

Monday, 20 March 2023 16:00 (2 hours)

Mucins and mucin-like molecules[1] are an important group of biomacromolecules characterized by a charged and highly glycosylated linked peptide backbone. The fundamental structural unit is a bottle-brush-like morphology organized into higher level aggregates or networks forming a gel which is resistant to flow. The electrostatic interactions between polymer chains are of interest to understand the transport properties of these gels since gel forming attractive interactions are opposed by the electrostatic chain repulsion. In this study we have examined dilute solutions of the particles formed by pig gastric mucin (PGM) in increasing ionic strength by small angle neutron scattering (SANS) over an extended range of scattering vectors to encompass the hierarchical nature of the PGM particles. Ultra small angle neutron scattering measurements made on the Bonse-Hart type diffractometer KOOKABURRA[2] (ANSTO, Lucas Heights, Australia) are sensitive to the radius of gyration of the particles and the electrostatic interactions between particles. Conventional pin-hole SANS measurements were made on the two SANS instruments BILBY[3] and QUOKKA[4] (also ANSTO). These measurements were sensitive to the electrostatically mediated intra-particle mucin chain correlations and thus the degree of compaction within the particle. The dependence of the scattered intensity over the extended range of scattering vectors in this study reveals the interrelationships between chain and particle electrostatic interactions.

References:

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2. Rehm, C. et al. *J Appl Crystallogr* 51, 1 (2018).
3. Sokolova, A. et al. *J Appl Crystallogr* 52, 1 (2019).
4. Wood, K. et al. *J Appl Crystallogr* 51, 294 (2018).

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Session Classification: Poster Session MONDAY

Track Classification: Soft Condensed Matter