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Advances in the study of stimuli-responsive core-shell microgel particles

Thursday, December 10, 2020 9:30 AM (30 minutes)

The synthesis of complex microgel architectures triggers the necessity of structural characterization. Small angle neutron scattering (SANS) is well suited for this purpose. SANS is capable of simultaneously measuring both average particle sizes and polydispersity, as well as the local structure of colloidal gels. SANS and isotopic substitution may reveal the distribution of monomers within particles, as for example in core-shell microgels having one monomer deuterated. It is the ultimate goal of our approach extracting radial density profiles of the microgel network. The talk will discuss modelling approaches to analyse SANS data from such systems. Contrast matching through the solvent and employing isotopic substitution of either shell or core monomers enables studying the monomers selectively in SANS. One should note that deuteration causes differences in swelling, as published by us for p(NIPMAM) [1], but its impact remains negligible far from the volume phase transition temperature. We add that although SANS is not the only technique to observe microgels [2], it is indeed very powerful due to the possibilities of deuteration allowing differentiating core and shell polymer, in bulk suspensions [3].

[1] Cors M, Wiehemeier L, Oberdisse J, Hellweg T (2019). *Polymers* 11(4):620

[2] Bergmann S, Wrede O, Huser T, Hellweg T (2018). *Phys Chem Chem Phys* 20:5074

[3] Cors M, Wrede O, Wiehemeier L, Feoktystov A, Cousin F, Hellweg T, Oberdisse J (2019). *Sci Rep* 9(1).

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