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Altering of PNIPAM microgels: pressure vs. temperature

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Poly(*N*-isopropylacrylamide)(PNIPAM) is a classical representative of stimuli-responsive polymers in various polymer systems like microgels, brushes, micelles [1-2]. Application of external stimuli such as temperature or pressure induces structural alterations of the polymer systems. It makes them the promising candidates for various application. However, the polymer parameters and the polymer phase transition strongly depends on the applied trigger and a detailed understanding of the stimuli-induced processes is of high demand.
Since PNIPAM is known to be thermo-responsive, T-induced transition of homopolymer gels as well as PNIPAM-based microgels is widely studied. In turn, the knowledge of pressure driven transition of PNIPAM microgels is still limited. We thus present the structural investigation of the cross-linked PNIPAM microgels within a wide pressure-range (0–5 kbar) at different temperatures by means of VSANS using a sapphire windows HP-cell for liquids at the KWS-3 instrument (JCNS at MLZ). The temperature- and pressure-increase leads to the change of the structural parameters of the PNIPAM microgels, for instance a difference in p- and T-driven transition was found. The results of the effect of the temperature and pressure on the above mentioned system will be presented and the temperature dependence of the pressure point at the phase transition will be discussed.
[1]T. Kyrey et al., Soft Matter (2019) 15, 6536
[2]J. Witte et al., Soft Matter (2019) 15, 1053

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