PC 31

RESPONSIVE HYDROGELS FROM AMPHIPHILIC BLOCK COPOLYMERS WITH A RESPONSIVE HYDROPHILIC BLOCK

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Triblock copolymers consisting of a thermosensitive hydrophilic middle block, poly(*N*-isopropylacrylamide) (PNIPAM), and two hydrophobic polystyrene end blocks, are expected to form physically cross-linked gels in aqueous solution by self-assembly. These gels are expected to be swollen below the lower critical solution temperature (LCST) and collapsed above. They constitute an attractive alternative to the commonly prepared PNIPAM microgels or PS/PNIPAM core-shell latices, because the building blocks are much smaller. We present here a study of the conformational changes of the micellar shell as a function of temperature and the PNIPAM volume fraction.

Several triblock copolymers with different PNIPAM volume fractions and deuterated polystyrene blocks were studied, both in micellar solution and in the gel state.[1,2] The overall changes of the micellar size at the LCST were investigated using dynamic light scattering in the solution. Smallangle X-ray and neutron scattering allowed us to get detailed information about the core-shell structure, the collapse of the shell and the correlation of the micelles in micellar solutions below and above the LCST. In the gel state, the amount of the volume change could be quantified on a mesoscopic level.

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2. W. Wang, K. Troll, G. Kaune, E. Metwalli, M. Ruderer, K. Skrabania, A. Laschewsky, S.V. Roth, C.M. Papadakis, P. Müller-Buschbaum, Macromolecules, ASAP.