Preparation of Unique Core/Shell pNIPAm-based Microgel Particles with Hydrophilic Shells

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The synthesis of responsive microgel particles has attracted a considerable interest in the last decades [1]. However, to meet the challenges of nanotechnology, there is compelling need to develop synthetic methods for controlling the internal structure of the microgel beads. In this contribution we report a new approach to synthetize soft, responsive poly(*N*-isopropylacrylamide) based microgel particles with controlled core/shell structures. Contrary to previous multi-step methods that allowed the formation of only pNIPAm rich shells, our approach makes it possible to prepare microgel particles with a pNIPAm based core and one or more shells with unrestricted composition in a single pot reaction.

To achieve this goal the monomer conversion during the polymerization of pNIPAm microgel particles has been investigated. Based on the kinetic data we were able to control the monomer conversion during the particle synthesis to form various core/shell structures. This approach allowed us to prepare unique core/shell microgel particles, such as pNIPAm particles with single or double hydrophilic shells. We will show examples for microgel particles with 100% anionic and cationic polyelectrolyte shells as well as particles stabilized with a hydrophilic polymer shell (PEG or PVA).

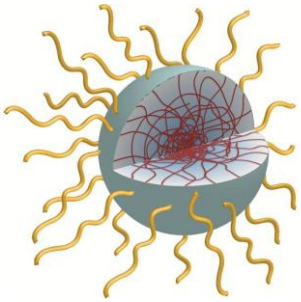

Figure 1 A schematic representation of the prepared core/shell microgel particles.

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[1] B. R. Saunders et al., *Adv. Coll. Int. Sci*. 2009, **147-148**, 251-262.