

Swelling behavior of Poly(N-isopropylacrylamide)(PNIPA) and Poly
(N-isopropylmethacrylamide)(PNIPMA) core-shell nano-sized gels in aqueous alcohol
solutions

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The cononsolvency effect on the swelling of different stimuli-sensitive microgels were investigated in aqueous alcohol systems. Poly(N-isopropylacrylamide)(PNIPA) and Poly(N-isopropylmethacrylamide)(PNIPMA) homo polymer gels, PNIPA-core-PNIPMA-shell gel are synthesized via precipitation polymerization. PNIPA and PNIPMA polymers exhibit LCST(lower critical solution temperature) phase transition in aqueous solution. But both polymers exhibit UCST(upper critical solution temperature) phase transition as alcohol fraction is increased. Swelling behavior of core-shell microgel that is related to swelling behaviors of each homo polymer gels. For theoretical treatment of the mixtures, modified double-lattice (MDL) model and Flory-Rehner chain model is employed for the free energy of elasticity. The swelling behaviors of core-shell, PNIPA and PNIPMA microgels were calculated using interaction parameter obtained from ternary phase diagrams of linear polymer. The predicted results represent the experimental cononsolvency and re-swelling experimental data.