

Abstract Submitted
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Demixing transition and molecular interactions in Poly(N-isopropyl acrylamide) solutions compared to its monomer MORITZ FUTSCHER, MARTINE PHILIPP, PETER MUELLER-BUSCHBAUM, Technical University Munich, ALFONS SCHULTE, University of Central Florida — Temperature-sensitive hydrogels such as poly(N-isopropyl acrylamide) (PNIPAM) exhibit a coil to globule transition of the polymer chains with a lower critical solution temperature (LCST) near 305 K. The cooperative dehydration of bound water molecules upon heating plays a significant role. The hydrogen bonding with the amide groups in the side chains has to be contrasted with the hydration interaction of the hydrophobic main chain hydro-carbons. Employing FTIR spectroscopy we probe molecular changes in the various chemical groups. PNIPAM and its monomer NIPAM are investigated at a concentration of 20% in aqueous solution. We observe a nearly discontinuous shift of the peak frequencies and the intensities of vibrational bands (amides, CH) in PNIPAM, whereas in NIPAM there is a continuous linear shift with temperature. The results are discussed with respect to hydration changes in the amide group and cooperative interactions with bound water along the backbone chain.

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