

Abstract Submitted
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Mechanical Properties of Individual Microgel Particles SARA HASHMI, ERIC DUFRESNE, Yale University — Microgels are important materials for both basic science and engineering and have wide applications from the study of phase transitions to the delivery of drugs. These micron and sub-micron particles, made of hydrogel materials, respond to solvent conditions. The most common microgels are environmentally sensitive, responding to temperature and pH. Our material of interest, poly(N-isopropylacrylamide) or NIPAM, undergoes a deswelling transition above a critical temperature. The deswelling behavior of this polymeric material has been thoroughly studied in ensemble microgel systems as well as in bulk hydrogel samples. We present measurements of the elastic properties of single microgel particles using atomic force microscopy. We observe a stiffening of the Young's modulus by an order of magnitude at temperatures well above the transition, where the cross-linked polymer network has fully collapsed. Interestingly, near the transition we observe a comparable softening of the material.

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