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The Rheology of Concentrated Cross-Linker-Free Polymeric Microgels: Particulate Dispersions or Polymer Solutions?[1] ZHIYONG MENG, CHINEDUM OSUJI[2], Yale University — Microgel particles based on N-isopropylacrylamide and acrylic acid have been synthesized using emulsifier-free radical precipitation polymerization without a cross-linking agent. The resulting particles display very low modulus with pH-, ionic strength-, and thermo-sensitivity. The absence of a cross-linking agent results in dramatic volume
shrinkage and expansion in response to the aforementioned stimuli. We study the concentration and temperature dependent rheology of concentrated dispersions of these particles. Several features emerge, including a marked dependence of the yield strain on temperature as well as aging of the complex viscosity over time. We discuss these results in the context of the rheology of stiff particles and that of branched polymer solutions.

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