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Rheological and scattering properties of cross-linker-free microgels ZHIYONG MENG, CHINEDUM OSUJI, Yale University — Microgel suspensions are intriguing tunable systems in part due to their pH/temperature responsiveness at the single particle level. Particle collapse during volume transitions is heavily mediated by the presence of cross-links in the system. Here we examine the rheology and light scattering of microgel suspensions based on poly(*N*-isopropylacrylamide-*co*-acrylic acid) (pNIPAm-AAc) in the limit of vanishing cross-linking density. One issue of concern is centered on the nature of these fluids – are they simple polymer solutions or real particulate suspensions? A combination of concentration-dependent viscometry and static light scattering demonstrates conclusively that these are particulate suspensions. The absence of cross-linkers provides a sharper volume collapse at the LCST in comparison with heavily cross-linked particles. Furthermore, at fixed mass content, cross-linker-free microgel suspensions display a much higher shear modulus than cross-linked counterparts due to their larger particle size, which implicates the use of these particles in rheological modification. We survey the frequency dependence and yielding response of these suspensions as a function of temperature and composition.

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