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Osmotic pressure of microgel suspensions JUAN JOSE LIETOR-SANTOS, BENJAMIN SIERRA-MARTIN, JUSTIN FREDERICK, YESENIA LAPORTE, GEORGE MARKOU, ALBERTO FERNANDEZ-NIEVES, Georgia Institute of Technology — Microgels are crosslinked-polymeric networks in the colloidal domain, whose size can be change in response to external stimuli. They are soft particles by construction and can exhibit a very different behavior compared to hard sphere suspensions. In some cases, this different behavior has been understood by alluding to particle de-swelling at low volume fractions. For this to happen, the suspension osmotic pressure at such volume fraction should be comparable to the particle bulk modulus. In this work, we independently measure the bulk modulus of microgel particles and the suspension osmotic pressure and find that both magnitudes become comparable at a volume fraction corresponding to a liquid-to-solid transition, which we asses using rheology. Interestingly, in the solid region, the shear and compressional moduli of the suspension exhibit the same behavior with volume fraction, in analogy to emulsions. However, by contrast to emulsions, they are almost two orders of magnitude apart. This reflects the contributions from the internal modes of the microgel particles, which are absent for the case of an emulsion drop.

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