Abstract Submitted
for the OSF20 Meeting of
The American Physical Society

Finding Size and Structure of Polymeric Microgels Using Light Scattering[1] ANDREW SCHERER, KIRIL STRELETZKY, SAMANTHA TIETJEN, SAMANTHA HUDSON, Cleveland State University — The effect of the amount of crosslinker on the structure and dynamics of polysaccharide microgels was studied below and above volume phase transition using Dynamic and Static Light Scattering (DLS and SLS) techniques. When the relative amount of crosslinker was varied by a factor of a hundred, three (possibly four) apparent behavioral regimes emerged. At low crosslinker concentrations, behavior was found to be consistent with soft or fuzzy sphere microgel models that displayed significant particle deswelling. At high crosslinker concentrations, instead of typical deswelling, microgels grew in size with the temperature increase, suggesting inhomogeneous structure and crosslinking densities. At intermediate crosslinker concentrations, microgels behaved erratically and did not significantly grow or deswell at the volume phase transition. The apparent regimes are likely due to nonuniform crosslinker distribution in the polymer microgel, which leads to nonuniform density of microgel particles, especially at large concentrations of the crosslinker. Microgels' molecular weight in all crosslinker regimes was measured below and above volume phase transition leading to the estimates of density and preliminary conclusions on microgel architecture at various crosslinking densities.

[1]Cleveland State Undergraduate Summer Research Award (USRA) Program, NSF REU Award 1659541

Andrew Scherer
Cleveland State University

Date submitted: 08 Oct 2020 Electronic form version 1.4