Poster Board No. 146 - STUDYING THE EFFECT OF CROSSLINKER ON POLYMERIC MICROGELS. Samantha C. Tietjen[1,2], stietjen.2015@gmail.com, Samantha Hudson[3], Kiril A. Streletzky[1],[1] Cleveland State University, Cleveland OH, [2] 4530 Poe Road, Medina OH 44256, [3] Hiram College, Hiram OH.

Microgels are spherical particles suspended in solution, comprised of crosslinked polymer chains. Due to the amphiphilic property of the parent polymer, microgels display a temperature dependent volume phase transition (de-swelling), and thus have the potential to be used for drug delivery. Previous studies suggest that increasing the concentrations of the chemical cross-linker reduces the hydrodynamic radius (Rh) and the de-swelling ability, thus primary experiments focused on the variation of cross-linker to polymer ratios. Microgels were synthesized using the polysaccharide polymer hydroxypropyl cellulose (HPC) and chemical cross-linker divinyl sulfone (DVS), in a surfactant solution. Synthesized particles were characterized using dynamic light scattering (DLS) for temperature and angular dependence to study their shape and determine the apparent Rh of the swollen and de-swollen states. Initial microgel synthesis revealed a dependence of Rh on microgel concentration in samples, requiring a correction for infinite sample dilution during analysis. Increasing DVS:HPC ratio from 1 to 30 causes Rh to decrease from 150 to 190 nm at 25 °C, and from 65 to 95 nm at 50 °C. Ratios from 40 to 50 resulted in swelling from 70 nm at 25 °C to 165 nm at 50 °C. At a ratio of 60, an apparent bulk gelation occurred. The increase in DVS:HPC ratio allowed for the controlled synthesis of more compact microgels that display reversible temperature controlled deswelling. However, at ratios above 30, particles were found to grow in size above the transition temperature.