Contribution ID: **650** Type: **Poster (Student, In Competition) / Affiche (Étudiant(e), inscrit à la compétition)**

Deuterium NMR and Rheology of Microgel Colloids at Ambient and High Pressure

Wednesday, June 17, 2015 7:16 PM (2 minutes)

Because they can exhibit a collapse transition at high temperatures or pressures, microgel colloids are of interest because of their potential for applications in areas like drug delivery and chemical separation that involve the uptake, encapsulation and release of small or biological molecules. In this work, we have used deuterium NMR and dynamic light scattering (DLS) to relate the microscopic dynamics of cross-linked poly-N-isopropylacrylamide (p-NIPAM) chains, in microgel colloids, to the observed changes in particle size with temperature and pressure. Microgels have been synthesized with deuteron labels on the NIPAM side chains (d7-NIPAM) or on the NIPAM backbone (d3-NIPAM). DLS observations obtained while heating suspensions of these materials have shown that particles in suspensions of both undergo a collapse transition, around 35°C, at which the radius of gyration is roughly halved. ^{2}H-NMR spectra of the d7-NIPAM microgel can be modeled as a superposition of doublets having a smooth distribution of small quadrupole splittings. This is interpreted as reflecting the combined effects of methyl rotation, sidechain reorientation, and polymer backbone motions. At the collapse transition, the distribution of splittings required to simulate the observed spectra extends to larger splittings, presumably reflecting the more constrained backbone motion in the collapsed phase. Comparison with spectra being obtained using the backbone-deuterated microgel material will be used to more directly characterize changes in the polymer backbone motion at the transition. Supported by NSERC.

Primary author: SBEIH, Suhad (Memorial University of Newfoundland)

Co-authors: YETHIRAJ, Anand (Memorial University); MORROW, Michael (Memorial University of Newfoundland)

Presenter: SBEIH, Suhad (Memorial University of Newfoundland)

Session Classification: DCMMP Poster Session with beer / Session d'affiches, avec bière DPMCM

Track Classification: Condensed Matter and Materials Physics / Physique de la matière condensée et matériaux (DCMMP-DPMCM)