

Abstract Submitted  
for the MAR06 Meeting of  
The American Physical Society

**Osmotic Pressure induced by Poly(ethylene glycol) at High Salt Concentrations** SUNGKYUN SOHN, HELMUT STREY, SAM GIDO, Polymer Sci. & Eng., Univ. of Massachusetts Amherst — The osmotic pressure method is one of the most effective tools that can be used in controlling self-assembly of polymers in solution, especially of water-soluble biopolymers. This study investigated if there is a noticeable synergistic osmotic pressure increase between co-existing polymeric osmolyte and salt when extremely highly concentrated salt molecules are present both at sample subphase and stressing subphase. PEG 8,000 and LiBr were chosen as osmolyte and salt, respectively, since this model system can be directly applied to the case of silk protein self-assembly, where hydrogen bonding plays a major role. In addition to the conventional methods for measuring osmotic pressure, such as membrane osmometry, vapor pressure osmometry, and ultracentrifuge, an ‘equilibration method’ that measures osmotic pressure relative to a reference with known osmotic pressure, was introduced. PEG 400 solution was chosen as the reference for this method. Osmotic pressure of aqueous LiBr solution up to 2.75M was measured and it was found that the synergistic effect was insignificant up to this salt concentration. Solution parameters and Arrhenius kinetics based on time-temperature relationship during the equilibration process were derived as well.

Sungkyun Sohn  
Polymer Sci. & Eng., Univ. of Massachusetts Amherst

Date submitted: 07 Dec 2005

Electronic form version 1.4