Abstract Submitted for the MAR12 Meeting of The American Physical Society

Comparative study of polymer chain dynamics in aqueous solutions by FPR and DLS KIRIL STRELETZKY, RYAN MCDONOUGH, Cleveland State University, RAFAEL CUETO, PAUL RUSSO, Louisiana State University - Self diffusion of tagged polymer chains in aqueous solutions of hydroxypropylcellulose (HPC) was measured by Fluorescence Photo-bleaching Recovery (FPR) and compared to mutual diffusion of scattering species in the same solutions measured by Dynamic Light Scattering (DLS). The effect of the dye presence on thermodynamic concentration fluctuations observed by DLS was also studied. The observed multimodal spectra in DLS and FPR were analyzed with CONTIN and stretched exponential fits. A set of consistent dissimilarities in the modal distributions of FPR and DLS spectra was found. This indicates a comparative limitation or sensitivity in range of detectable diffusive processes between FPR and DLS in this complex system. In addition, it was found that the fluorescent tag and/or tagging process seem to alter the mutual diffusion processes seen by DLS. In particular, a slower mode which is apparent in the non-tagged sample does not appear in the tagged sample. It seems likely that the dye chemically affects the polymer chains keeping them from clustering with each other, altering the solvent environment preventing formation of polymer clusters responsible for the slow mode usually seen in HPC.

> Kiril Streletzky Cleveland State University

Date submitted: 22 Nov 2011

Electronic form version 1.4