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Diffusive Properties of Dilute HPC Solutions: Comparative Study with DLS and FPR RYAN MCDONOUGH, KIRIL STRELETZKY, Cleveland State University, PAUL RUSSO, Louisiana State University — The dynamics of HPC (Hydroxy-propyl-cellulose) solutions were studied by two fundamentally different methods: FPR (Fluorescence Photo-bleaching and Recovery) and DLS (Dynamic Light Scattering). FPR captures diffusive processes by establishing a photo-bleached boundary and “seeing” only tagged particles diffusing back into bleached area, which yields a contrast function. DLS auto-correlates scattered light intensity from particles in order to determine a statistical decay function. Inverse Laplace transform (CONTIN) and stretch exponential line shape analysis (LSA) serve to quantitatively decompose decay data into different diffusion processes or modes. The first finding is that the CONTIN and LSA results on the same sample are fairly consistent. The second finding is that the modal distributions for FPR and DLS spectra on the same sample show consistent dissimilarities. This indicates a comparative limitation or sensitivity in range of detectable diffusive processes between FPR and DLS in a complex system. The third finding is that the fluorescent tag and tagging process seem to alter the diffusion processes seen by DLS in a way that is consistent; there is a slower mode apparent in non-tagged sample which does not appear in the tagged sample.

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