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Dynamic Light Scattering Studies of Light Absorbing Solutions
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— Dynamic light scattering (DLS) is a powerful tool for characterizing polymers in solution and is especially useful for observing polymer-polymer interactions. The ease of sample preparation and *in situ*, non-perturbative nature are powerful advantages to a technique capable of probing 9 decades of dynamic behavior in a single measurement. However, application of scattering methods is greatly restricted when the sample absorbs light at the scattering wavelength. Absorption leads to sample heating, deflection of the probing laser beam and convection in otherwise quiescent solutions. Convective flow contributes an oscillating component to the smoothly decaying correlation functions that are normally obtained from DLS. These effects have limited the application of DLS in studies of conducting polymers, nanotubes, heme containing proteins and noble metal nanoparticles. We have a theoretical model that provides broad agreement with the behavior observed for light absorbing solutions of polyaniline, carbon nanotubes, cytochrome-C and silica coated gold nanoparticles and we have a physical model system that produces oscillating correlation functions using non-absorbing scatterers and absorbing dyes.

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