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**Studying Polymer Solutions using Light Scattering Spectroscopy**
KIRIL A. STRELETZKY, Cleveland State University, GEORGE D.J. PHILLIES, Worcester Polytechnic Institute — Light scattering spectroscopy provides a non-destructive analytic technique for probing structure and dynamics of polymer solutions. Light scattering spectroscopy in our laboratory combines measurement of the average scattering intensity (static light scattering- SLS) with careful monitoring of the average temporal evolution of intensity fluctuations (dynamic light scattering -DLS) in samples at thermal equilibrium. While SLS yields polymer molecular weight and radius of gyration, DLS yields information on the translational and rotational dynamics of polymers in solution. We also apply optical probe diffusion to measure the transport of dilute mesoscopic probes in polymer solution. If tracer particles are the dominant scatterers in solution, their diffusion provides important information for inferring the physical properties of the polymer. By combining DLS, SLS, and optical probe diffusion, and measuring the low- shear solution viscosity, we studied the neutral, high molecular weight, semiflexible, water-soluble polymer hydroxypropylcellulose (HPC). By combining this wide range of information we obtained important insights into the multimodal dynamics of dilute and concentrated solutions of this multi- application polymer system.

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