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Measuring dn/dc of HPC polymer and microgel solutions KRISTA FREEMAN, KIRIL STRELETZKY, Cleveland State University — The refraction process is the basis of light scattering experiments on transparent solutions where light refraction depends on spontaneous concentration fluctuations in solution caused by molecular Brownian motion. The specific refractive index increment (dn/dc), the change in index of refraction with concentration, is essential for static light scattering (SLS) experiments on polymer solutions. With a reliable value for dn/dc, SLS yields radius of gyration and molecular weight of the polymer, and second virial coefficient. This study focuses on determining dn/dc values of hydroxypropylcellulose (HPC) polymer and microgel solutions. Precise calibration of the Brice-Phoenix differential refractometer (BP) was necessary to attain accurate values for dn/dc. Using the BP, HPC solutions were analyzed at a range of concentrations, molecular weights, wavelengths, temperatures, and filtration protocols. Through the course of the study it was determined that dn/dc of HPC polymer is independent of temperature in good solvents, slightly dependent on molecular weight, inversely proportional to wavelength squared, and sensitive to polymer solution's filtration protocol. HPC microgel testing produced dn/dc values one order of magnitude larger than the dn/dc of HPC polymer solutions and did not support the expected wavelength dependence.

Kiril Streletzky
Cleveland State University

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