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Diffusive Transport in Hydroxypropylcellulose:Water KIRIL A. STRELETZKY, Cleveland State University, GEORGE D.J. PHILLIES, Worcester Polytechnic Institute, ROBERT O'CONNELL, University of Minnesota, PAUL WHITFORD, UCSD, HELEN HANSON, Worcester Polytechnic Institute — A systematic analysis of mode structure of diffusive relaxations in solutions of neutral polymer of 1MDa hydroxypropylcellulose (HPC) is presented. Experimental techniques that have been applied in our studies include static light scattering, dynamic light scattering, optical probe diffusion, and viscometry. In the optical probe diffusion method we monitor the translational diffusion of dilute monodisperse spheres through aqueous polymer solutions over a range of temperatures, distances, and time scales. Based on the data from these extensive studies we conclude that: 1) HPC solutions have a characteristic length of 50-70nm that matches the polymers hydrodynamic radius; 2) the diffusion rate of optical probes through aqueous polymer solutions is not determined by the macroscopic viscosity of the solutions; 3) probe and polymer relaxations are not generally the same; 4) the apparent viscometric crossover near 6g/L is confirmed by the optical probe behavior.

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