Scaling behavior of a wormlike polyelectrolyte xanthan chain

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Analyzing the dynamics of polyelectrolytes became an interesting issue in nanobio science and technology. Polyelectrolyte xanthan chain is distinguished from neutral polymers by the presence of charged groups with long-range electrostatic interactions. Therefore, scaling theories developed for neutral polymers is not appropriate for polyelectrolyte chains. Brownian dynamics (BD) simulations of coarse-grained models can be significant roles for predicting conformational and rheological properties of polymers. We have developed coarse-grained models of polyelectrolytes xanthan as a bead-spring chain with additional electrostatic, hydrodynamic, and Lennard-Jones (LJ) interactions between beads to explore the scaling behavior of xanthan chains. Moreover, for experimental verifications, single molecule visualization has been performed on fluorescein-labeled xanthan using an inverted fluorescence microscope. BD simulation results have been compared with those by experiments on scaling behavior and the longest relaxation time of xanthan molecule.