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Molecule Configurations in a Droplet Detachment Process of a Semdilute Xanthan Solutions

Christian Wagner[(1)], Andriy Kityk[(2)]

(1) *Experimentalphysik, Universitat des Saarlandes, Saarbrucken, Germany*
(2) *Institute for Computer Science, Technical University of Częstochowa, Poland*

The detachment process of a droplet of an elastic liquid is characterized by the suppression of the pinch off finite time singularity and the formation of a cylindrical filament between the droplet and the nozzle. The flow in this filament is purely elongational. The resistance to such a flow is macroscopically described by the elongational viscosity. However, a sound understanding of the functional connection between the microscopic configurations of the macromolecules and the macroscopic flow is still missing. We present birefringence data that are taken simultaneously to the macroscopic flow measurements. By changing the ionic strength of the solvent we can tune the flexibility of our polyelectrolytic macromolecules and correlate them with the microscopic polymer configurations and the measurements of the elongational viscosity.

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