

Dynamics of ionomer melts and reversible networks

H. Watanabe

hiroshi@scl.kyoto-u.ac.jp

For type-A chains having dipoles parallel along the chain backbone, the equilibrium chain motion is reflected in their viscoelastic and dielectric properties in the linear response regime. For the simplest and well-established Rouse dynamics for unentangled polymers, the relationship(s) between those properties and the chain motion is well established, so that the associative dynamics of single-end functionalized type-A unentangled chains can be well resolved through comparison of viscoelastic and dielectric properties.¹⁻³

The lecture explains the formulation of those properties and the underlying conformational coupling of chains occurring through the end-association/dissociation and analyzes the data of polyisoprene (typical type-A chain) having -COOH group at one end to extract/discuss its association/dissociation kinetics.

A brief comment will be added for nonlinear damping behavior of single- and double-end functionalized polymers⁴ if possible within the lecture time.

References:

- 1) Watanabe, Matsumiya, Masubuchi, Urakawa, and Inoue, *Macromolecules*, **48**, 3014-3030 (2015).
- 2) Matsumiya, Watanabe, Urakawa, and Inoue, *Macromolecules*, **49**, 7088-7095 (2016).
- 3) Watanabe, Matsumiya, and Kwon, *J. Rheol.*, **61**, 1151-1170 (2017).
- 4) Pei, Chen, Matsumiya, and Watanabe, *Macromolecules*, **58**, 953-967 (2025).