

Abstract Submitted
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Simple Model of Polymeric Viscoplasticity¹ ROBERT HOY, Yale University — I develop a simple theory for polymeric viscoplasticity and test it using molecular dynamics simulations. The evolution of stress at large strains is controlled by the large scale orientation ϵ_{eff} of chains, which serves as a mesoscale internal state variable. The evolution of ϵ_{eff} is described by a Maxwell-like model. The strain rate, temperature and chain length dependence of the key relaxation times are surprisingly simple. Relaxation in actively deformed systems is faster than in nondeforming systems because the former is coherent and strain activated. Entanglements serve to limit the coherence of this relaxation. Results are briefly compared to recent theoretical and experimental work.

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Robert Hoy
Yale University

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