



Jay Schieber

Professor

Department of Chemical and Biological Engineering, and Department of Physics

Director of the Center for Molecular Study of Soft Condensed Matter

Illinois Institute of Technology

Lessons in Entanglements and Viscoelastic Memories

ABSTRACT

The DE tube model provides by far the most popular basis for a molecular model of entangled polymer dynamics. However, in order to provide reasonably quantitative agreement with observation, there have been many independent phenomenological additions to the model, such that there really is no single tube model, but rather different models for different kinds of flows, different chain architectures, or blends. As a result of these shortcomings, there have been new efforts to seek a microscopic or atomistic basis for the model. Seeking such a basis is not new, and was first started by R. Byron Bird and Charles F. Curtiss almost immediately after Doi and Edwards proposed the original model. Such a microscopic basis now seems possible. We will discuss current efforts to connect the molecular structure of polymers with their macroscopic transport phenomena. In fact, almost ab initio predictions of nonlinear polymer rheology are possible.

BIOGRAPHY

Prof. Jay Schieber is currently director of the Center for molecular study of condensed soft matter (μ CoSM), Professor of Chemical and Biological Engineering, and Professor of Physics, all at the Illinois Institute of Technology. He received his bachelor's degree in Chemical Engineering at the University of Illinois-Urbana, and his Ph.D. degree in Chemical Engineering at the University of Wisconsin-Madison. Prof. Schieber subsequently was a NATO-NSF Postdoctoral Fellow at the Universit at Freiburg in Germany, in the Physics Department. He was also a postdoctoral fellow at McGill University before becoming a faculty at the University of Houston. He has received three departmental teaching awards, was the Hougen Scholar at the University of Wisconsin in 2004, and has been a visiting professor at ETH-Zurich, Switzerland; the University of Wisconsin-Madison; Nagoya University in Japan, Technical University/Delft in the Netherlands; Technical University/Eindhoven in the Netherlands; and Instituto Politecnico Nacional in Mexico City. His research focuses on transport phenomena in soft matter and complex fluids, including experiment, theory and computation.