Seminar

Prof. Jun Xu

jun-xu@mail.tsinghua.edu.cn

Department of Chemical Engineering, Tsinghua University, Beijing, China
Humboldt Research Fellow, presently at the Institute of Physics,
University of Freiburg

A Microscopic Kinetics Model for Polymer Crystallization and its Application

Though crystallization has been studied for centuries, there are still much unknown, especially for polymer crystallization far from equilibrium. For example, what are the precursors of a crystal like? What is the distinct nature of polymer crystallization? How does crystallization choose a route when there are different pathways? These questions still remain unsolved. Here, a microscopic model for crystallization based on the attaching and detaching kinetics is proposed, attempting to understand these questions. The key concept of the model is correlation of the unit motifs in the crystal. For crystallization of polymers, there is additional correlation between segments along the chain direction. From our kinetics model, the equivalent free energy change and the interfacial free energy can be deduced. Besides the equilibrium melting temperature, we predict other characteristic temperatures in case of polymer crystallization. Some deductions of the microscopic kinetics model are consistent with the observed results and the others remain for validation. Furthermore, the difference of our model and the previous crystallization theories will be commented. The model can be applied to other kinetic phenomenon, such as crystallization of copolymers, crystallization in blends or solutions, and diffusion of macromolecules, etc.

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Hörsaal Makromolekulare Chemie, Stefan-Meier-Str. 31

Contact: Barbara Heck, IRTG Soft Matter Science
Tel +49 761 203 97778 Email softmattergraduate@uni-freiburg.de