

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Thermodynamics and Kinetics of Crystallization of Flexible Molecules BERNHARD WUNDERLICH, Retired — The crystallization of a single atom (as in a metal) is a one- step transfer across the liquid-crystal interface. A flexible chain molecule of n segments needs considerably more steps. A simple description gives it $(n - 2)^3$ possible conformations in the liquid, i.e., for pentcontane C₅₀H₁₀₂ 111,000, but only one conformation in the crystal, making the crystallization a multi-step process. At what length are there too many steps to allow the crystallization to be reversible? How can one describe phase separation for flexible molecules containing segments of different chemical nature? How do random segments of different nature and precisely spaced segments of different nature influence the phase separation on crystallization? How is reversible crystallization influenced by chain folding and crystal perfection in the solid state? Some of these old questions can now be answered by temperature-modulated differential scanning calorimetry of precisely made molecules of different length and copolymerized structure.

Bernhard Wunderlich
Retired

Date submitted: 29 Nov 2007

Electronic form version 1.4