



Scaling Concepts in Polymer Physics

By Pierre-Gilles Gennes

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The first stage of the physics of long, flexible chains was pioneered by eminent scientists such as Debye, Kuhn, Kramers, and Flory, who formulated the basic ideas. In recent years, because of the availability of new experimental and theoretical tools, a second stage of the physics of polymers has evolved. In this book, a noted physicist explains the radical changes that have taken place in this exciting and rapidly developing field. Pierre-Gilles de Gennes points out the three developments that have been essential for recent advances in the study of large-scale conformations and motions of flexible polymers in solutions and melts. They are the advent of neutron-scattering experiments on selectively deuterated molecules; the availability of inelastic scattering of laser light, which allows us to study the cooperative motions of the chains; and the discovery of an important relationship between polymer statistics and critical phenomena, leading to many simple scaling laws. Until now, information relating to these advances has not been readily accessible to physical chemists and polymer scientists because of the difficulties in the new theoretical language that has come into use. Professor de Gennes bridges this gap by presenting scaling concepts in terms that will be understandable to students in chemistry and engineering as well as in physics.

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