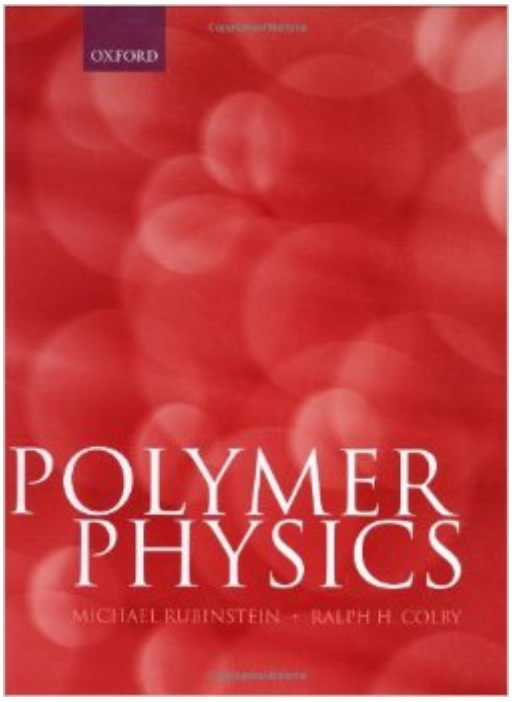
Polymer Physics (Chemistry)



Synopsis

Polymer Physics thoroughly details the fundamental concepts of polymer melts, solutions, and gels in terms of both static structure and dynamics. It goes beyond other introductory polymer texts, deriving the essential tools of the physical polymer chemist or engineer without skipping any steps.The book is divided into four parts. Part One summarizes the necessary concepts of a first course on polymers and covers the conformations of single polymer chains. Part Two deals with the thermodynamics of polymer solutions and melts, including chain conformations in those states. Part Three applies the concepts of Part Two to the formation and properties of polymer networks. Part Four explains the essential aspects of how polymers move in both melt and solution states.The text assumes a working knowledge of calculus, physics, and chemistry, but no prior knowledge of polymers. It is ideal for upper-level undergraduate and first-year graduate courses in Condensed Matter Physics, Soft Materials, and Polymers.FeaturesÂ Presents established results in an easily accessible wayÂ Emphasizes physical insight rather than mathematical rigorÂ Provides detailed experimental sections at the end of each chapterÂ Includes more than 200 illustrations and 350 exercises

Book Information

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Customer Reviews

Polymer Physics by Michael Rubinstein and Raplh Colby is a fascinating introduction to the realm of polymer statics, dynamics and phase behavior. It embodies the depth of Flory’s classic text on

Principals of Polymer Chemistry, classic delight of de Gennes' Scaling concepts in Polymers and the rigor of Theory of Polymer Dynamics by Doi and Edwards. The authors manage to do this with a textbook authority and clarity, which definitely makes this book a definite buy for anyone interested in polymer physics.The book has four main sections. The first part talks about the polymer statics: ideal and real chains and how their size and size dependent properties are characterized. Then comes thermodynamics of polymer blends and solutions, which includes a discussion on polymer brushes and adsorption of chains. The authors devote the third section to networks and gels and this part includes a very thorough discussion of gelation, rubber elasticity and swelling. The last section is devoted to the polymer dyanmics, where chain models and polymer relaxation ideas are developed and discussed. The last two sections of the book cover topics which are of immense current interest, and have had original and critical contributions from the authors. Most highly recommended, both for beginners and for experts.

I am a Chemist working on applied R&D in the oil refining industry. I bought this text as I needed a good understanding on polymer containing fluids (viscosity, solutions behavior). It is very well written and quite detailed. It is not the sort of text that tries to introduce excessive and not useful mathematical details but is anyway very accurate. I advice it also for professionals

The book is an excellent introduction to statistical polymer physics.Its great strength is that it offers a mathematical treatment of polymerphysics with a minimum of mathematics i.e. only dimensional analysis and simpleordinary differential equations. In addition, one needs to have an introductorycourse in equilibrium statistical physics (statistical thermodynamics).It is valuable to both academics and industrial practitioners, since it representsa very complete picture of polymeric solutions, gels and networksgiven with remarkable intuition. Certainly it does not go deep intomore advanced analytic (e.g. functional integral or numerical approaches),but it is a necessary background to these fields. Recently, there has beenrenewed interest for the development of relativistic Brownian dynamics.This text is a must read for those working in the latter field and seeka deep background in the classical theory.The only negative aspect of this book has nothing to do with the authors,but with OUP that produce such difficult to use book formats. I do notunderstand why the book has to be so large in dimensions making anyhandling difficult and awkward. I hope that soon is reissued in a morecompact and usable format that is made for the joy of reading. In this respect,it must be noted that the actual book producer (Antony Rowe Ltd) did aVERY poor job and my book disintegrated within a few months. OUP seems on theway of no return (e-books).

As a polymer physicist, among other things (mechanical engineer/tribologist) I can tell you that this is must for anybody trying to understand polymer physics. Whether you are a scientist or worked in applied sciences (engineering) this will make a great text book and reference.

From the equations of Flory-Huggins to the fractal nature of polymer confirmations, this book covers everything you need to know about the physical nature of polymers.

Rubinstein and Colby have produced a real gem that will stand the test of time. I have multiple copies of this book and it is mandatory reading for all members of my lab. All of our copies are well-worn and it is a treasure trove of insights. I recommend solving the problems because there are hidden treasures that apply directly to understanding conformational heterogeneity of biomacromolecules. One often hears that the tenets of polymer physics do not apply to problems in protein biophysics. A deep understanding of the concepts, so lucidly explained by Rubinstein and Colby should catalyze a change in one’s views about the place for polymer physics in the study of biomacromolecules. In my view, this book should be essential reading for every serious molecular biophysicist.

This book was required for my course on polymer physics and I’ve found it to be an essential resource. The class was my first introduction to the subject and the book has been very helpful in my understanding of the basic methods used to describe the behavior of polymers. The scaling arguments seem obvious once learned, but getting there can be a challenge without precise explanations. This book is a great way to learn about polymers, and could be used without a class to learn the material. Some basic understanding of thermodynamics and statistical mechanics (and of course physics...) is needed to fully grasp some of the arguments within this book.

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