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The Structure And Rheology Of Complex Fluids (Topics In Chemical Engineering)



Synopsis

Defying the classical definitions of solids and liquids, complex fluids include polymers, colloids, emulsions, foams, gels, liquid crystals, surfactants, and other materials that form flowable microstructures. They are vital to industries that produce polymers (e.g., plastic packaging), colloids (paint), foods (ketchup), and consumer products (toothpaste and shampoo), and are also used in countless other products manufactured by the petroleum, microelectronics, and pharmaceutical industries. The first advanced textbook on this subject, *The Structure and Rheology of Complex Fluids* provides a multidisciplinary and comprehensive introduction to these fascinating and important substances. It offers an up-to-date synopsis of the relationship between the microstructure of complex fluids and their mechanical and flow properties, and also emphasizes the similarities and differences among the various types of complex fluids. Easy to read, it includes over 350 illustrations, extensive literature citations, and many interesting problems, worked examples, and practical applications. Featuring coverage of both foundational material and special topics, this text is highly adaptable for use in a one- or two-semester graduate-level course in chemical engineering, materials science, or physics. It also serves as a valuable monograph for academic and industrial researchers and as a reference book for researchers and educators.

Book Information

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Customer Reviews

Ronald G. Larson is at University of Michigan.

In this advanced text, Larson presents essential understanding required to appreciate the physics and dynamics of complex fluids (or soft condensed matter). In fact, he starts each chapter by presenting comprehensive introduction to the complex fluid, and then proceeds to provide detailed and erudite experimental and theoretical insight into dynamical behavior. The chapters include: polymers, glassy liquids, polymer gels, particulate suspensions, particulate gels, electro- and magneto-responsive suspensions, foams, emulsions and blends and lastly liquid crystals, liquid crystalline polymers, surfactant solutions and block copolymers. Each chapter in itself a complete overview of the structure and rheology of that system. It is written in a very readable fashion for self education, and also could serve as an excellent text for graduate courses. Larson has presented the essential theoretical ideas about the chosen substance, summarised all the important references, and included many experimental results and other illustrations, mulled over solved and unsolved issues, provided applications, solved and unsolved examples, and created a text that every serious student, practitioner in the dynamics of any of the complex fluids discussed in this book must have on his shelf. If you are just starting out as a researcher in the structure and rheology of gels, polymers, liquid crystals or block copolymers, this book is a perfect starting point for it provides necessary detail and knowhow with a clarity that would appeal to students across all disciplines. For polymer dynamics, the texts by Doi-Edwards and de Gennes; for liquid crystals by de Gennes; for colloidal dispersions by Russel and for meaty details of condensed matter physics the textbook by Lubensky and Chaikin will prove as inevitable supplementary reading.

it is gift for PhD graduated - loved it

After taking off the plastic-wrapped, I could tell this was a used book in someone's chemistry lab. It stunk like formaldehyde and other chemicals, and questionable particulates were always released into the air any time I closed the book.

A truly extraordinary book, packed with usable information. A must have for anyone interested in complex fluids, from biochemists to material scientists and from food chemists to chemical engineers, whether in the academic lab or in the processing plant. Very clearly written, at a fairly advanced level, sometimes a little bit too concise (inevitable, covering such a wide area). May need to be supplemented, especially if used as a textbook for undergrads. But there is no doubt about it: this is "the" book on the subject.

This book is an excellent review of the rheology of complex fluids and polymers. I would highly recommend this book to thesis students and researchers.

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