biased here). In addition, a presentation of new computational methods such as time-dependent density functional theory or the time-dependent generalization of the so-called electron localisation functions (ELF) would have stimulated the reader into new areas. After all, as W. Kohn put it: "For large many-particle systems, the wave function is an illegitimate scientific concept".

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Structured Fluids

Polymers, Colloids, Surfactants.
By *Thomas A. Witten* and *Philip A. Pincus.*

*Oxford University Press, Oxford **2004**. 232 pp., hardcover £ 39.95.—ISBN 0-19-852688-1*

There is no doubt: Liquids containing polymers, surfactants, or colloid particles are of great interest for physicists, chemists, engineers and other scientists. The properties of such liquids are connected to structures in the mesoscopic regime and, in principle, they dominate the physical environment within living cells. For a long time, the subjects of structured-fluid phenomena, when ever, were taught in different lectures without showing the connections to each other. However, these phenomena have now moved into a coherent discipline with substantial predictive power. The aim of the book is now to provide more view into exactly this new filed. Thomas A. Witten together with Philip A. Pincus present a book which is intended to give simplicity, unity and depth not found in previous treatments. In their first intention, it is meant to be a textbook for teachers teaching undergraduates in physical science and physical chemistry.

Indeed, the authors were more than successful in giving an excellent textbook. First, some fundamentals are given which are necessary for further understanding. Here, a short overview of statistical physics and explanation about the magnitude of liquids' response are presented in a highly didactical way. In the part about experimental probes of structured fluids, the authors introduce only very few techniques for characterizing structured fluids. Here, measurements of macroscopic responses such as the dynamic modulus, the osmotic pressure, and surface forces are mentioned. In order to measure spatial structures, microscopic (AFM, STM) and scattering (light scattering and neutron scattering) methods are introduced. As example for the measurement of the atomic environment, nuclear magnetic resonance spectroscopy is briefly explained. In the following chapters, the characteristics of polymer molecules, polymer solutions, colloids, interfaces, and surfactants are explained in detail. The chapter about polymer molecules gives first an overview of types of polymers. This part is mainly meant as an introduction for physicists. Then, random-walk polymers, the interior structure and the self-avoidance and self-interaction are nicely described. In the chapter about polymer solutions, first a description of properties in dilute and semidilute solutions, then the motion in polymer solutions is treated in more detail. The chapter about colloids which is heavily based on an earlier draft by Pincus describes the attractive (why colloids are sticky) and repulsive forces. In the part about the organized states, colloidal crystals, lyotropic liquid crystals, fractal aggregates and anisotropic interaction are in the focus of interest. The chapter interfaces starts with the explanation of simple fluids and some introductory words about interfacial tension. It mainly treats then polyatomic solutes. In the final chapter about surfactants, first the main terms of mixing principles are introduced. Then, the properties of surfactant molecules, their aggregation behavior in solution and the micelle interaction is nicely described and illustrated. The authors chose then as special subjects the mixing of immiscible liquids in microemulsions, the aggregation behavior of amphiphilic polymers, and dynamics and rheology of wormlike entanglements and lamellar solutions.

It is really a pedagogically excellent book for teachers who want to prepare lectures and for students who have to learn the material. But of course this book is not limited only to students and teachers, but it is also excellent for industrial scientists who want to gain a better understanding about structured fluids. First, there is the main text. On the border of the pages, there are many useful notes which help the reader to understand terms, which give interesting details and which show important connections to other fields. In many cases, these are informations which are not mentioned in other books or should be read between the lines. Additionally, it is very helpful for the readers that a new term is printed in bold letter when it is formally introduced.

It is also a strength of the book that several ideas to quite easy experiments are given, sometimes from the daily life, which can be used in a lecture as instructive examples (e.g., the suggested experiment proving the rubber elasticity of rubber in dependence of the temperature or the experiment showing the turbidity of polymer solutions). Many figures illustrate nicely and in a highly didactic manner the explanations. It is also important to give students an idea of numbers and orders of magnitude (students may not always know for example, the Bjerrum length of water or the magnetization of a typical ferrofluid).

The overall impression of the book is very positive, the "new" formation of nylon 6–6 as given by a physicist on page 47 is an interesting alternative for polymer scientists, but otherwise the book is well edited.

In conclusion: I only can highly recommend this excellent book. It is a pleasure to read it and even a greater pleasure to have such a book for the preparation of courses in complex fluids.

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DOI: 10.1002/cphc.200400537

Fluid-Struktur-Kopplung â€” Als Fluid Struktur Kopplung (englisch Fluid Structure Interaction) wird im Ingenieurwesen die BerÃ¼cksichtigung der gegenseitigen Beeinflussung von Struktur und StrÃ¶mung bezeichnet. Dabei werden numerische Verfahren zur StrÃ¶mungs undâ€¦ â€¦ Deutsch Wikipedia. Fluid-structure interactions. The fully coupled. solution of fluid flows with structural interactions, a rapidly. evolving discipline, represents the natural next step in. simulating me chamcal systems. By Klaus'Jiirgen Bathe. rNrr-E ELEMENT METFIoDS are now widely r-rsed in the. analysis of solids and structures, and they provide. I. great benefits in product design. Abstract: The proposed fluid-structure interaction (FSI) approach is based on a two-way coupling between finite-element code Abaqus and finite-volume code FlowVision. The FSI simulation is possible due to a unique mesh generation method used in FlowVision. The method is called Sub-Grid Resolution Method (SGRM). The SGRM connects seamlessly FE and CFD meshes without introducing any intermediate structures into the FSI layer.