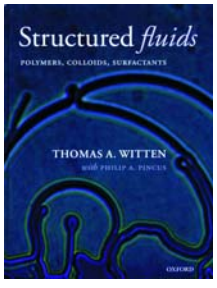
matter physics. The physics departments of some major academic institutions still do not cover it, perhaps in part because of a lack of suitable textbooks. *Structured Fluids: Polymers, Colloids, Surfactants* by Thomas Witten, one of the preeminent theorists in the field, represents an important and valuable contribution that should help fill the gap.

Soft condensed matter physics is the physics of materials around us, materials that we can touch, see, and feel. The study of the field should reflect this definition, and teaching it should include both intuitive and physical explanations for the materials and their properties. Yet such a task is very difficult because it requires profound knowledge about the subject. In this respect, Witten's book excels. The author explains topics elegantly and in detail and provides a unique depth of understanding and intuition about physics. The book is full of delightful "Wittencisms"—explanations that provide tremendous insight while teaching readers how to make a valid order-of-magnitude estimate. For example, the author offers a thorough explanation of why all simple fluids have roughly the same viscosity, and he shows how to estimate the value of their viscosity from basic, physical arguments.



Soft condensed matter physics is a very broad field, and Witten does not pretend to cover all aspects of it. Instead, he focuses on topics mentioned in the title: polymers, colloids, and surfactants. He covers the subjects well and provides an excellent overview of each. Of course, the individual topics are covered more completely by other textbooks, such as *Statistical Thermodynamics of Surfaces, Interfaces, and Membranes* (Addison-Wesley, 1994) by Samuel Safran, which covers surfactants, and *Polymer Physics* (Oxford U. Press, 2003) by Michael Rubinstein and Ralph Colby.

Some topics are conspicuously missing from Witten's book, among them foams and emulsions. Liquid crystals are discussed only briefly, in the chapter on colloids, as representing anisotropic particles. But in no way do such omissions detract from what is covered overall. For readers seeking broader coverage but at a less mathematical level, Richard Jones's *Soft Condensed Matter* (Oxford U. Press, 2002) is available, which I also reviewed for the June 2003 issue of PHYSICS TODAY (page 63). Although Witten's text lacks the depth and rigor of Paul Chaikin and Tom Lubensky's classic *Principles of Condensed Matter Physics* (Cambridge U. Press, 1995), it straddles all those mentioned and provides a wonderful combination of insight and breadth of coverage.

Structured Fluids is clearly written by a theorist; nevertheless, many experimental techniques are discussed, albeit briefly. The author provides a detailed discussion of scattering, although it is in the chapter on polymers rather than the one on experimental methods. Also, for completeness, Witten includes in chapter 2 a brief introduction to statistical physics. Although that introduction will never replace a full course on the topic, it does offer enough background to make the book a self-contained textbook.

Structured Fluids is well constructed and a pleasure to read. Its text covers about two-thirds of each page, with space alongside reserved for figures and notes. Several of the chapters have lengthy appendixes in which the author discusses certain topics in more depth. Witten provides one such appendix on colloid aggregation, an area in which he has made many important contributions.

At the advanced undergraduate or beginning graduate level, Witten's book will make an excellent textbook for a physics course on condensed matter, soft condensed matter, or complex fluids. It contains many exercises, embedded directly in the text, that are particularly apt for a course on soft condensed matter physics. They emphasize intuition and order-of-magnitude estimates over rigor and precise numerical calculations—exactly the sort of philosophy that is essential in order to appreciate modern soft condensed matter physics. Moreover, the problems sometimes entail numerical simulation and even some simple but illuminating experiments. Such features are exactly what a textbook on soft condensed matter physics should have.

I suspect *Structured Fluids* will be widely used and will be a must for any student of soft condensed matter physics. Even practicing condensed matter physicists will gain a great deal of insight from it, and I predict it will become a fixture on many bookshelves. It certainly is one on mine.

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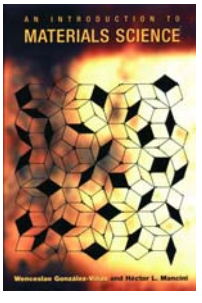
An Introduction to Materials Science

Wenceslao González-Viñas and Héctor L. Mancini
Princeton U. Press, Princeton, NJ, 2004. $60.00 (180 pp.). ISBN 0-691-07097-0

An Introduction to Materials Science by Wenceslao González-Viñas and Héctor Mancini is a concise and informative entry-level text for students in any area of materials science. It has an ambitious scope and thorough table of contents, with 12 chapters on such topics as crystalline solids; imperfections; electrical, mechanical, and thermal properties; magnetic materials; superconductivity; optical, noncrystalline, and polymeric materials; and surface science. The authors cover these topics in a range of detail, from the comprehensive presentation on processes within optical materials in chapter 8 to the more succinct descriptions of crystalline solids and surface science in chapters 2 and 11, respectively.

The strengths of the text include chapter 10 on polymeric materials. The authors present an excellent introduction, followed by classification schemes and a relatively in-depth treatment of molecular structure. Physical properties of polymeric materials receive an extensive review, and references to earlier portions of the text are useful and appropriate. Also notable is chapter 9 on noncrystalline materials, which, combined with chapter 8, makes for a very thorough presentation on noncrystalline solids in general. The authors note in the preface that they strive to focus on more current, developing topics (new materials, biomaterials, devices, and so forth) and have thus chosen to omit more classical topics such as metallurgy and ceramics. Their decision is appropriate, in my opinion, and omitting those topics from the text is by no means detrimental to its vision.



The book, however, is not without its shortcomings; some of them are rather troubling. In general, I get the impression that the authors have not properly decided on an audience. The preface mentions that "this book tries to reach undergraduate students," yet much of the text and its corresponding mathematics are often presented at such disparate levels of difficulty that

one must wonder about the authors' stated objective. Examples of this disparity are rampant in chapter 2, where equations are presented without derivation, origin, or even definitions of some terms. I can understand that the book, as an entry-level text, needs to be concise, but some key concepts are lost in the interest of brevity.

One could argue that the authors' approach will inspire students to pursue more rigorous texts. Indeed, the breadth of topics covered in this volume is welcome, but the bibliography and chapter references fall a bit short in guiding students to the classic texts. As a result, the authors miss an opportunity to have their introductory textbook be among the standards. The writing style throughout the book is also a bit choppy, with a number of grammatical errors. According to the overleaf, the text is translated from Spanish; in my opinion, the translation has room for improvement.

An Introduction to Materials Science will serve well as supplemental reading for an introductory or advanced materials-science course. It might not make a good primary text without significant supplementation. Faculty from non-materials-science departments who teach more traditional courses—for example, inorganic chemistry—may find this book particularly useful for optical and magnetic materials, and for electrical and thermal properties. I would compare it with *The Physics and Chemistry of Materials* (Wiley, 2001) by Joel I. Gersten and Frederick W. Smith, which is a significantly more comprehensive and advanced text (see the book review in PHYSICS TODAY, July 2002, page 59). The objectives of Gersten and Smith are different from those of González-Viñas and Mancini, but I believe the two books somewhat complement one another. Any shortcomings in depth or derivations in *An Introduction to Materials Science* could be offset by references to Gersten and Smith's book. Concomitantly, the brevity of González-Viñas and Mancini's book may help students sort through *The Physics and Chemistry of Materials*.

In summary, *An Introduction to Materials Science* is a useful addition to the texts in the field. Its broad range of topics and brevity of coverage are both assets and, in some cases, liabilities. With that said, the book should not be overlooked; its contribution to a materials-science course or its ability to motivate individual study is likely to be significant.

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New Books

Cosmology and Relativity

Phi in the Sky: The Quest for Cosmological Scalar Fields. C. J. A. P. Martins et al., eds. *AIP Conference Proceedings 736*. Proc. wksp., Porto, Portugal, July 2004. AIP, Melville, NY, 2004. $127.00 (204 pp.). ISBN 0-7354-0218-3

Device Physics

Modern Microwave Circuits. N. Kinayman, M. I. Aksun. Artech House, Norwood, MA, 2005. $131.00 (604 pp.). ISBN 1-58053-725-1, *CD-ROM*

Optoelectronic Devices: Advanced Simulation and Analysis. J. Piprek, ed. Springer-Verlag, New York, 2005. $249.00 (452 pp.). ISBN 0-387-22659-1

Thermophotovoltaic Generation of Electricity. A. Gopinath, T. J. Coutts, J. Luther, eds. *AIP Conference Proceedings 738*. Proc. conf., Freiburg, Germany, June 2004. AIP, Melville, NY, 2004. $168.00 (491 pp.). ISBN 0-7354-0222-1

Energy and Environment

Annual Review of Environment and Resources. Vol. 29. P. A. Matson, A. Gadgil, D. M. Kammen, eds. Annual Reviews, Palo Alto, CA, 2004. $89.00 (509 pp.). ISBN 0-8243-2329-7

The Bottomless Well: The Twilight of Fuel, the Virtue of Waste, and Why We Will Never Run Out of Energy. P. W. Huber, M. P. Mills. Basic Books, New York, 2005. $26.00 (214 pp.). ISBN 0-465-03116-1

Essentials of Medical Geology: Impacts of the Natural Environment on Public Health. O. Selinus et al., eds. Academic Press/Elsevier, Burlington, MA, 2005. $99.95 (812 pp.). ISBN 0-12-636341-2

The Rebirth of Cold Fusion: Real Science, Real Hope, Real Energy. S. B. Krivit, N. Winocur. Pacific Oaks Press, Los Angeles, 2004. $25.95 *paper* (298 pp.). ISBN 0-9760545-8-2

Scientists Debate *Gaia*: The Next Century. S. H. Schneider, J. R. Miller, E. Crist, P. J. Boston, eds. MIT Press, Cambridge, MA, 2004. $50.00 (377 pp.). ISBN 0-262-19498-8

Fluids

Handbook of Mathematical Fluid Dynamics. Vol. 3. S. Friedlander, D. Serre, eds. Elsevier, San Diego, CA, 2004. $175.00 (674 pp.). ISBN 0-444-51556-9

Geophysics

The Interaction of Ocean Waves and Wind. P. Janssen. Cambridge U. Press, New York, 2004. $120.00 (300 pp.). ISBN 0-521-46540-0

Multiscale Processes in the Earth's Magnetosphere: From Interball to Cluster. J.-A. Sauvaud, Z. Němeček, eds. *NATO Science Series 2: Mathematics, Physics and Chemistry 178*. Kluwer Academic, Norwell, MA, 2004. $179.00 (328 pp.). ISBN 1-4020-2766-4, *CD-ROM*

History and Philosophy

Annus Mirabilis: 1905, Albert Einstein, and the Theory of Relativity. J. Gribbin, M. Gribbin. Chamberlain Bros., New York, 2005. $25.95 (310 pp.). ISBN 1-59609-144-4, *DVD*

The Book Nobody Read: Chasing the Revolutions of Nicolaus Copernicus. O. Gingerich. Penguin Books, New York, 2005 [2004, reissued]. $15.00 *paper* (306 pp.). ISBN 0-14-30-3476-6