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A review of: ""Introduction to Liquid Crystals Chemistry and Physics" by P.J. Collings and M. Hird, Taylor and Francis, Philadelphia, 1997; ISBN 0-7484-X (paperback): xi+ 298 pages; $29.95"

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Book Review

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"Introduction to Liquid Crystals Chemistry and Physics" by P.J. Collings and M. Hird, Taylor and Francis, Philadelphia, 1997; ISBN 0–7484-X (paperback); xi+ 298 pages; $29.95

Violating conventions when writing a text book for undergraduates takes courage. This little volume on liquid crystals by Collings and Hird suggests the authors have such courage. Scientists, who are as prone as anyone, if not more so, to convention when it comes to producing articles or books almost invariably begin such items with some historical perspective moving on gently to set the material of the article in some modern context. After this one expects to find a theoretical analysis section and then further sections dealing with the various specializations or issues relevant to the primary material of the article. This book rather riskily violates almost all the standard conventions, and succeeds.

Liquid crystals are known to be one of the primary display technologies of the 20th Century, indeed one could argue that they are ubiquitous being found in many areas of life from vehicle displays to laptops, watches, etc., yet this book places the chapter on displays last. Even more surprisingly the history of the subject does not really become introduced until 13 pages of underpinning science has been discussed. Additionally the mathematical theory of liquid crystals only appears, in any depth, in the penultimate and pre-penultimate chapters. Curiously this rather odd order of chapters I found refreshing and the book, as a whole, held my attention rather well.

The authors claim they are aiming at an audience of graduate students (those undertaking Ph.D. or Masters research) who have little previous knowledge of the subject matter of liquid crystals. The style and level of presentation generally succeeds in meeting their claim, if the book does err at all it is in assuming a rather more advanced knowledge of chemistry than may be found amongst otherwise technically competent engineers and scientists. A minor irritation of the book is the lack of equation numbers, and it could also be argued that the key

points within the text would have benefited from referencing to more advanced work. However this latter point could be taken as a favourable comment since as a text book, which this aims to be, it should be self-contained without the detailed referencing found in research texts.

The primary themes of liquid crystal science are all covered in the several, pleasingly coherent and readably short, chapters. These range from chemical synthesis (a later chapter) through the procedures for rapid identification of mesophases and on to the various types of liquid crystals which have been extensively studied.

There is no doubt that the reader is given a reasonable introduction to the basics of liquid crystal science with a particular emphasis on the types of molecule which may form different mesophases. This emphasis is, on occasion, somewhat irritating with a large number of molecular structures presented. It would have been helpful to have replaced a few of the diagrams of chemical structures with some illustrative physical properties, particularly in chapters 3, 4 and 5 which cover the main mesophases. This is the major flaw of the whole text in that in these chapters there is, to my mind, and I confess to being a physicist, too strong an emphasis on chemical structure and too little on illustrating and discussing the resultant physical properties. Also it has to be said that in one or two places the explanation of the physics is rather limited, particularly on layer diffraction and optical reflection from chiral nematics. However apart from these minor negative points I did find the book helpful and I will certainly use parts of it in teaching advanced undergraduate courses as well as in helping to broaden the education of some of my Ph.D. students.

The authors are to be commended in having condensed a vast subject, the science of liquid crystals, into a reasonably digestible single volume without losing too much rigour or burying the reader in too much detail. As for violating conventions, it worked.

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