

## Book reviews

**D. I. Bower: 'An introduction to polymer physics'**, 2002, Cambridge, Cambridge University Press, xx+444 pp., £75.00 (hardback), ISBN 0 521 63137 8, £27.95 (paperback), ISBN 0 521 63721 X

This book claims to be appropriate for advanced undergraduate and graduate students, but I take leave to suggest that it would be a very specialised student who would need to use it in its entirety.

It begins with an excellent review of the development of synthetic polymers and their chemistry, properties and processing. Then comes a survey of physical techniques for investigating polymers, including thermal, spectroscopic (infrared, Raman and NMR) as well as optical techniques. This is followed by a pair of chapters; the first considering the sizes and shapes of molecules and of chains together with crystallinity, all on the molecular scale. The second deals with the structure, relationships and motion of polymer chains on a larger scale. Then come chapters covering the mechanical properties; elasticity which is independent of time, viscoelastic properties and the related features of yield and fracture.

So far virtually all the properties considered are relevant to the vast majority of polymers. Now there follow three chapters of more limited applicability; the first deals with electrical and optical properties and the following two with oriented polymers and all their particular properties. Finally there is a chapter dealing with polymer blends and co-polymers in all their aspects.

Each chapter concludes with suggestions, with comments, for further reading. In this context it is pleasing to note that the author is not afraid to go back thirty years or so to quote classical references. In addition a series of problems are provided together with solutions.

The whole book is excellently presented. Particularly in each of the sections sufficient introduction is provided to make the whole self-contained, at least at a first reading, which make the whole more 'user friendly' to anyone who may be a novice in the field.

The price, at least for the paperback edition, seems very reasonable which should bring it within the reach of the audience for whom it is designed.

Professor K. W. ALLEN  
Joining Technology Research Centre  
Oxford Brookes University

**François Cardarelli: 'Materials handbook: a concise desktop reference'**, 2000, London, Springer-Verlag, 595 pp., ISBN 1 85233 168 2

There is an almost bewildering range of engineering materials in use today and, if we are honest, even the best informed amongst us will admit to, at best, a reasonable understanding of only a part of the field. Our initial training, or our careers, or both have dictated our own fields of interest and expertise. Therefore, when we need to know about another field we must reach for a book or some other source of knowledge – and of course it is there somewhere but we may spend hours in finding what we seek. This slim, attractive, and well produced book will be the first place for me to look in future!

It is no small task to present the essentials on the normal range of engineering materials between one pair of covers: to include wood, ores, minerals, and gemstones as well is very ambitious. The author has succeeded by presenting the essentials in the text and, most usefully, tables and by providing a list of further reading for each chapter and a comprehensive supporting bibliography at the end of the book. The 14 chapters cover groups of material including ferrous metals and alloys, semiconductors, superconductors, insulators and dielectrics, and polymers and elastomers. There are also appendices and a bibliography. Each chapter has a good, but brief, introduction describing usually methods of manufacture and processing, together with an outline of the most common materials in the group and tables presenting much useful data.

It is the tables that make this book so invaluable. They are clearly laid out, easy to read and present both chemical and physical properties, including such often difficult to find data as magnetic permeability and corrosion performance.

In fewer than 600 pages and with a truly ambitious coverage this book cannot make you an instant expert, but is an excellent place to start.

The appendices contain a mass of additional information and my only disappointment is that the listing of scientific and professional societies does not include The Institute of Materials, but instead reflects the presumed main market for this book and is dominated by North American bodies.

In summary, this book provides a broad range of information useful to students, engineers, and materials scientists and engineers working across the whole spectrum of our discipline. It has become a well used part of my desktop, rarely making it as far as the bookshelf!

Eur-Ing STEVE HARMER  
Materials Information Service, IoM