Mass Transport in Solids and Fluids
David S. Wilkinson, Cambridge Solid State Science Series, Cambridge University Press, Cambridge, London, 2000, p. 270, £ 70.00 (hardback), £ 24.95 (paperback), ISBN 0-521-62409-6 (hardback), 0-521-62494-0 (paperback)

An understanding of matter transport is vital to the successful study of processing of materials. This book is aimed squarely at undergraduate (and early postgraduate) students looking for a firm grounding in the fundamentals of matter transportation processes.

The book is split up into four parts; Part A (Chapter 1) an overview, Part B (Chapters 2, 3, 4, 5 and 6) solid state diffusion in dilute alloys, Part C (Chapters 7, 8 and 9) mass transport in concentrated alloys and fluids and Part D (Chapter 10) alternative driving forces for diffusion. The book also includes useful appendices containing details of mathematical methods, selected data and how to solve problems by developing fundamental conceptual models.

The overview contains an introduction to mass transport mechanisms. It includes straightforward coverage of diffusion mechanisms in a variety of situations. Fick's first law is also clearly presented. A useful addition to the chapter is several worked examples that serve to develop the reader's understanding. The section concludes with recommendations for further reading and several further problems. It is a shame, however, that the author did not include (at least) the numerical answers to the questions to enable students to check their working.

Part B is restricted to diffusion in the solid state involving dilute binary alloys. As in Part A, this section is liberally scattered with excellent worked examples with emphasis on 'real' engineering applications. These examples have clearly been thought though and have not been added as an afterthought. Without a doubt, they enhance the understanding of a reader.

Part C is concerned with mass transport in concentrated alloys and fluids. This section considers what happens when large concentration differences exist across a phase and how substantial changes in diffusion coefficients are accommodated. Attention is also given in this section to mass transport in fluids.

Parts A, B and C all made the assumption that only concentration gradients provide a driving force for diffusion. Part D generalises this by including all forms of free energy gradient. From this, a general theory of diffusion is well developed. This general theory is then applied to new problems, such as diffusion due to an electric field or a mechanical stress. This section also considers diffusion in multicomponent systems.

Overall, this book is written with the reader in mind. Each chapter leads the reader through the fundamentals and theories of mass transport in solids and fluids to an increasingly developed level by slowly introducing concepts and theories as required. Therefore, the early sections are quite basic and require little prior knowledge, whilst later sections are fairly advanced and extend the knowledge to a higher level.

There is something in this book for everybody, whether a novice student looking a beginners' guide or an expert looking for a reference text.

S.W. Kingman
School of Chemical Environmental and Mining Engineering, University of Nottingham
Nottingham NG7 2RD, UK

Aaccepted 27 March 2001

PII: S1385-8947(01)00156-5

The New Chemistry
Nina Hall (Ed.); Cambridge University Press, Cambridge, 2000, 493 pp. hardback, ISBN 0-521-45224-4, £30 ($49.95)

Overall, the book is well written and introduces a lot of new areas to the non-specialist. It covers an enormous range of subjects from new elements in the periodic table to pharmaceutical production. For this reason, the book will be relevant to a wide range of readers. Unfortunately, the fact that it covers so many different areas makes it almost impossible to review with any degree of certainty. As an example, I know that the figures for the contribution of nuclear power to electricity generation (p. 25) are exaggerated, but other stated facts, particularly in the area of biochemistry are difficult to question.

The initial introduction by Roald Hoffman made for tough reading which is perhaps not the best means of getting people's appetite whetted.

If the book is used as a reference source for information, it works well. If the book is reviewed as a whole, there are some inconsistencies between the chapters in terms of format. Occasionally, one is left with the feeling that the clarity of a chapter is not related to the complexity of the subject matter, but a reflection on the author's ability to explain things with concise clarity. Obviously some authors are going to be better at explaining concepts on an appropriate level than others, but one or two authors stop bothering to make their subjects accessible after the first or second paragraph (e.g. Chapter 9).

The other inconsistency, if the book is reviewed as a whole, relates to the amount of time spent explaining the history behind a subject. The history of a subject area may be important when looking at "new chemistry", but in some cases the history lesson was overly long and the author(s) did not justify the nostalgia convincingly enough to warrant its inclusion. In fact, with one or two chapters, you are left with the feeling that some of the topics are barely 'new chemistry' at all. As an example, Chapters 5 and 12 spend a very long time dealing with the 1900s up to 1950. Because of the overemphasis on certain areas, the length of the different chapters varies enormously. Perhaps the editor could have held the leash a little tighter to ensure consis-