be uncongenial. The author places great emphasis on the so-called "Law of Mass Action" treatment, in which transport phenomena are formally described as if they were chemical reactiohs. The implication is that coupled processes such as active transport are intrinsically stoichiometric, that is, completely coupled, and that any slippage must be attributed to internal or external leakage, or to "leakage" of the driving reaction in the case of a pump. This view does not comprehend the wider possibility that incomplete coupling may be a fundamental property of the system and even confer on it some regulatory advantages. Nevertheless, a serious attempt has been made to combine and integrate the kinetic and thermodynamic analyses. It might have succeeded better if certain lapses in rigour had been eliminated — for example, the present reader was surprised to find the standard affinity being put forward as the effective driving force in active transport, and to be informed that completeness of coupling implies an efficiency of 100%.

Although the author has certainly provided a unified and consistent exposition of his theme, lacunae occur which are troublesome. Some of these are to be anticipated from the preface, in which he states: "The simplifying assumptions may often be unreal. Hence the equations should not be applied uncritically . . . ," and later ". . . no attempt has been made to quote the underlying literature completely and according to priority". Indeed, the sparing use of references will undoubtedly make critical evaluation of the equations a hard task for the tyro. Perhaps the most important omission is the absence of experimental data which might have been used to illustrate the usefulness and range of applicability of the theory.

The book is marred by the usual sprinkling of misprints, but is handsomely bound, as behoves a manual to be thumbed through at frequent intervals. With some reservations I recommend its purchase, suspecting that its utility will be greatest for confirmed *afficionados*.

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Semiconductor systems

Problems of Linear Electron (Polaron) Transport Theory in Semiconductors. By M.I. Klinger. Pp. 931. (Pergamon: Oxford, 1979.) £62.50.

THIS is a very large and expensive addition to Pergamon's Natural Philosophy series, being some nine hundred pages in length. It covers the theory of linear transport and other properties of electrons in a range of semiconductor systems which become gradually more disordered as the book proceeds (reflecting the research trends of the past three decades). As one might expect in such a large book on a restricted topic, there is a vast amount of detail, with every major (and in some areas minor) theory described.

The first two chapters form an introduction to transport and solid-state theory. The interaction of an electron with the lattice vibrations to form polarons is then described in various mathematical and physical approximations. The dynamic and transport properties of the polaron in crystals are considered in the following three, very long, chapters. The final part of the book attempts to draw together the theories of electron conduction in disordered semiconductors.

The content of the book is, in one respect, excellent, in that almost everything one could wish for has been covered concerning the theoretical development of the subject up to the mid-1970s. It is not a textbook in the normal sense; however, there is a strong tendency to present the problems and the various solutions with little explanation. In some areas it was necessary to go back to the original papers to understand the author's over-concise version. Throughout, the emphasis is on the formalistic development of the subject where possible, experiment playing only a very minor role. Even with this omission, the treatment is very condensed and mathematical, especially in the first half of the book. In consequence, however, a large range of properties and physical models have been covered.

Very few concessions are made to the reader: a very high mathematical ability and a good background knowledge are assumed, making this a book for the theoretical specialist rather than the general research worker. In a field where experiment and simple physical models have played such a large part in aiding our understanding, especially in the disordered systems, this is unfortunate and gives a distorted view.

In conclusion this is a rather lopsided book; a more critical approach to the content could have reduced the size and still have allowed room for a more balanced treatment of the subject. What one has here is a very specialised reference book, undoubtedly very useful to a restricted number of people but not really fulfilling the need of the many experimental workers in this field.

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Materials science

Science of Materials. By W. Brostow. Pp. 436. (Wiley-Interscience: Chichester, UK, and New York, 1979.) £20.

THIS book is intended as an undergraduate text in materials science, but differs significantly from existing books in its approach. This difference can best be summarized by saying that Professor Brostow has given us a physicist's view of materials science rather than a materials scientist's! Thus the solid state is not introduced until the seventh chapter, the first six being devoted to mathematical techniques, statistical mechanics, intermolecular forces, gases, liquids and solutions.

This early portion of the book is excellent, especially the treatment of statistical mechanics which is rarely introduced in any depth in materials texts. The treatment of intermolecular forces is also refreshing, escaping as it does from the simplistic classification of chemical bonds usually presented in books for undergraduates.

The amount of space devoted to the physics of matter means that some essential topics such as phase equilibria, crystal structure and defects are treated in a very basic fashion, appropriate only to a first-year level. This tendency to touch on subjects without dealing with them adequately increases as the book proceeds. Thus, polymeric materials are covered completely in eight pages (although rubberlike elasticity provides a further six pages in a later chapter.) Composite materials have a separate chapter, but more than half of its twelve pages are devoted to wood, while fibre reinforcement is dismissed in less than a single page. The mechanical properties of all forms of solids and liquids occupy a single chapter and strengthening mechanisms in crystalline solids receive only a three-page coverage. Electrical and dielectric properties are treated at what seems to be a sub-degree level, and a final chapter on the testing of materials contains only four pages of text and no diagrams.

In a book of manageable size, of course, it is quite impossible to achieve both depth and breadth. Professor Brostow has settled for depth in the physics of matter and breadth in materials science, and this balance will no doubt appeal to teachers of physics. By the same token, however, it will not satisfy the needs of materials and engineering undergraduates. The high cost of the present hardcover edition will also discourage its use as an undergraduate text.

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