Notes and News

Announcements and other items of crystallographic interest will be published under this heading at the discretion of the Editorial Board. The notes (in duplicate) should be sent to the Executive Secretary of the International Union of Crystallography (J. N. King, International Union of Crystallography, 13 White Friars, Chester CH1 1NZ, England).

Delays in Dispatch of *Acta Crystallographica*

Messrs Munksgaard wish to apologize to subscribers for the delays, very considerable in some cases, in the despatch of the journals of the International Union of Crystallography. The delays arose during transfer of the subscription records to modern electronic data-processing equipment; after the initial troubles this should result in improved service.

Some adjustment will be made to the air-freight surcharge in 1975, in order to compensate regular subscribers in North America for the failure to provide the prompt delivery that they could expect from this service.

Direct Methods in Crystallography, York, England, 2–11 April 1975

This meeting, held at the University of York, will be in the form of a school. Activities will consist of lectures, practical classes and computer-program demonstrations. Some industrial sponsorship may enable limited grants to be given to participants to assist with travel or subsistence. For further information write to Professor M. M. Woolfson, Department of Physics, University of York, Heslington, York YO1 5DD, England.

Book Reviews

Works intended for notice in this column should be sent direct to the Book-Review Editor (M. M. Woolfson, Physics Department, University of York, Heslington, York YO1 5DD, England). As far as practicable books will be reviewed in a country different from that of publication.

Semiconductor physics By K. SEEGER. Pp.xv+514, Figs.364. Berlin: Springer Verlag, 1973. Price (Bound) S 430, DM 60.

Since the discovery of the transistor, many textbooks on transport phenomena in semiconductors have been produced. This 514 page volume by Professor Seeger in the Springer Study Edition series is designed primarily for a graduate course in semiconductor physics. In the preface, Seeger implies that this is not a solid-state textbook by stating the need for some supplementation by a solid-state physics course. After an introduction, a chapter follows on band theory at a reasonably elementary level dealing with the Kronig–Penney model and the Brillouin zone. Following an introduction to semiconductor statistics, chapters on standard electron-transport theory follow for the case of a non-degenerate gas, scatter processes in one- and many-valley models and the warped-sphere model. This section is completed by a chapter on quantum transport effects, tunnelling, magnetic freezeout and the magnetophonon effect. The last main section is devoted to optical effects covering optical absorption and reflection, the Franz–Keldysh effect, electro and magneto optical effects, and conducting amorphous and organic semiconductors complete this very thorough survey of semiconductor physics, a difficult task in just over 500 pages. Five useful appendices complete the volume. It is a very readable volume, well illustrated and with emphasis on the physical processes, each topic being introduced by a simple physical description.

However I consider it unfortunate that Professor Seeger has found it necessary to omit a number of topics necessary for an understanding of semiconductor physics, in particular the concept of the reciprocal lattice. Nevertheless, this is a very good, well reproduced book which could prove to be a useful standard text.

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The solid–liquid interface. By D. P. WOODRUFF. Pp. viii + 182, Figs. 79, Tables 7. Cambridge Univ. Press, 1973. Price £3·30.

In eight chapters, totalling less than 200 pages, this book provides a monographic treatment of contemporary solidification science as might be viewed today by the metallurgy/materials science community. Although the title implies the much broader area of technical coverage associated with solid–liquid interactions at interfaces, the text, in fact, deals exclusively with solid–liquid phenomena peculiar to certain phase transformations, *viz.* melting and freezing.

The title notwithstanding, the book admirably provides two chapters on the classical thermodynamics of surfaces, along with experimental approaches used to characterize the energetics of equilibrated and nascent (nucleated) solid–melt interphase interfaces; two chapters on statistical theories of interfacial structure; two chapters on morphological stability and instability (such as dendritic solidification); one chapter on polyphase solid–melt interfaces (eutectic solidification); and one chapter on the molecular and atomic mechanisms of crystal growth and dissolution. The author drew his material eclectically from the extensive research literature published on these topics over the past 15 years, including his personal research contributions. The author is commended for providing in a succinct monograph a reasonable topical balance between theory and experiment and between advanced research topics and well established subjects. He has also achieved a modicum of integration among some very diverse aspects of solid–liquid interfacial phenomena by virtue of the book's organization and cross references, which alone make the modest investment in money and time for this book worth while for both student and professional.

The editing and proof-reading of the text are unfortunately substandard. Almost 10% of the pages contain one or more mis-spellings and/or typographical errors. Several inconsistent applications of mathematical and physical symbols appear through carelessness in assembly (*e.g.* in Chapter 2 the consistent use of ΔH_f for the enthalpy of fusion is interrupted by the use, without explanation or warning, of

the substitute symbol L in a companion figure; also, improper labeling of figures occurs twice in Chapter 7, which could cause needless difficulty to a reader who is uncertain about the subject). Only a few outright technical errors exist in this book, such as propagation of the fallacy that antimony expands on freezing as do the other substances with 'anomalous' nucleation behavior such as water, gallium, and bismuth.

The author occasionally makes simplifying approximations in the course of deriving certain theoretical equations that he presents with ostensible general validity. For example, in his derivation in Chapter 5 of the steady-state form of the theory of constitutional supercooling, the author justifies elimination of certain terms by stating without restriction that, compared with typical chemical diffusivities (in liquids) which are of order 10^{-5} cm^2 s^{-1}, the thermal diffusivities will 'typically be of the order of unity in the same units', a statement which is true only approximately for the most conductive metallic materials, and which clearly should be qualified for the reader who might not be thinking of metals when using the results.

In summary, this book will make a useful addition to the reference shelf of scientists and students concerned with crystal growth and solidification processes. A well edited second edition should be published in the near future, since the field is undergoing rapid advances at present.

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Oxide semiconductors. By Z.M. JARZEBSKI; translation edited by B.R. PAMPLIN. Pp.xi+285, Figs. 195, Tables 39. Oxford: Pergamon Press, 1974. Price £6·00.

This book presents a useful and timely survey of the oxide metals and semiconductors, an important group of electrical materials which are becoming increasingly prominent in electronic and solid-state devices. Largely because of their more complex chemical and crystallographic structures in comparison with the more simple elemental and compound semiconductors, together with the relatively greater technical difficulties of the preparation of single crystals of oxide materials with the requisite high perfection and purity, their wider application in electronics and electrical devices has been somewhat restricted. As with the initial development of the elemental semiconductors, the theory and basic understanding of these materials appear to be somewhat ahead of their technology. However, with the more recent mastering of single-crystal growing techniques and thin-film preparation, the situation is rapidly changing and rapid progress is now being made in the technology of the oxides both in bulk-crystal and thin-film materials.

The book is divided into three main parts which in turn are subdivided into chapters and sections with a total of fifteen chapters. Many of the chapters, however, are very brief, some being only 5 or 6 pages long. This is perhaps a little unfortunate because it tends to leave the reader with the impression of a rather superficial treatment of the subject, a criticism which certainly does not apply to the book as a whole. Parts I and II present a comprehensive (though brief) summary of the theoretical and experimental aspects of the subject as the necessary groundwork essential to the understanding of Part III, which is not only the longest section but, from the point of view of the research worker and the serious reader, the most valuable and informative part of the book.

In Part I very brief thumb-nail sketches are given of most of the known methods of oxide material preparation, the various techniques for growing single crystals and for the preparation of oxide thin films. The more essential details of the experimental methods have been highlighted by means of some very helpful diagrams. As stated in the Introduction, to understand the electronic processes in crystals which are subject to deviations from stoichiometry and to be able to control their properties the roles of defects must be thoroughly understood, and in Part II these are discussed in some detail. After an elementary treatment of point defects and dislocations in crystals and the application of the law of mass action, a brief introduction to the electron band theory is presented. Various theoretical expressions are stated without derivation as, for example, the density of energy states and the charge-carrier concentration in a semiconductor. Although the arguments can be readily followed by the student with a background of solid-state theory, the general reader would be well advised to refer to the standard texts on the subjects. Although the problems of defect equilibria in pure crystals have been considered for only a limited number of selected situations, the conclusions are of a general character and can be confidently applied to other combinations of defects and the phenomena associated with them. The symbolisms used by the author in discussing defect equilibria may be a little confusing to some readers, mainly because of the necessity of having to search for the original definition of a specific symbol.

From the point of view of new material and information Part III is perhaps the most important section in the book. After a brief outline of the theory of electronic and atomic transport phenomena, the results of the research on a number of selected oxides of technological interest and importance, undertaken over the 15 years prior to 1972, are presented. As an example, NiO, as representative of the 3*d* transition metals, is discussed in some detail with the aid of numerous graphs and tables of experimental results. From the point of view of their technical application in solid-state electronics and other areas, the more promising metal and semiconductor oxide materials are reviewed and the current information on their properties and behaviour given.

This book emphasizes yet again what has been known since the discovery of the transistor in 1948, that the progress and future of electronics is essentially limited by the advances in understanding of materials and particularly materials technology, crystalline perfection and impurity control, rather than by our basic understanding of device principles. In compiling this survey over 600 references have been collected and these add considerably to the value of this book as a most useful reference for research workers and students in this very important and expanding field of oxide semiconductors.

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