

The articles report the following types of investigation into the properties of certain liquid crystal systems: optical analysis of texture, colour, polarization, dichroism, and of the effects of varying electric fields; nuclear magnetic resonance; dielectric relaxation; infrared spectroscopy; heat capacity and enthalpy; surface tension; ultrasonic absorption and dispersion; X-ray diffraction; effects of chemical variation on phase diagrams.

This is no book for the novice wanting to find out what liquid crystals and their general properties are. It is also unsuitable for use in finding out about the structures of liquid crystals in general. Though structure underlies all of the properties investigated, the basic problem of how the long-range order can co-exist with the short-range disorder is not tackled. The field of the structure of liquid crystals is still in its infancy, in what Rutherford may have called the 'stamp collecting' phase. In the four years since the conference in 1965 much research on liquid crystals has been done, but there has been no fundamental advance in the understanding of their structures. Thus, from the point of view of structure, this book suffers little from age. The clues to structure are liberally spread throughout the book, but the general reader without previous reading in the field would have considerable difficulty in interpreting them. The novice can learn more readily from Gray's book (see above). For the structures of lipid liquid crystals, where much recent activity has taken place, Luzzati's review (Chapter 3 in *Biological Membranes*, Ed. D. Chapman, 1968, Academic Press) is to be preferred.

In conclusion, it may be said that this book can be recommended only to those who are already well-read in the field and conversant with the varying terminologies. For those to whom the journal *Molecular Crystals* is readily available, this book will be a luxury for browsing convenience only, and a considerable luxury at £15.5.0d.

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The observation of atomic collisions in crystalline solids. By R. S. NELSON. Pp. x+281. Amsterdam: North-Holland Publishing Co., 1968. Price *f.* 50.

This volume, first in a series on defects in crystalline solids, is intended primarily for those interested in radiation damage and ion implantation. The emphasis is on the special effects that a crystalline structure imposes on atomic collisions within a solid – focusing and channelling. It has the distinction of being the first full length book to treat these relatively recent concepts.

In his coverage of the subject Dr Nelson manages to be both comprehensive and concise at the same time, an enviable combination. From the volumes of recently published results and theories, he has selected his material with care, and included the most noteworthy and essential contributions, including many of the most recent. His approach is as straightforward as the subject allows – complicated mathematical arguments are avoided, but copious references

are given. As a review of the subject and a source of information it is excellent.

However, one feels at times that while there is such an abundance of facts there is perhaps not enough in the way of underlying principles. As yet of course no single all-embracing approach to either focusing or channelling has emerged clearly, and a review book can only reflect this lack. No doubt as these concepts become firmly established – and let us also admit a little less exciting – then such an approach will become feasible.

Two minor points: the text in some places shows rather obvious signs of having been too rapidly compiled; there are also instances where the author has cut his arguments so far that the credibility of the results is seriously reduced.

On balance then, not a volume that is liable to endure, but one that will be frequently and profitably used and referred to during the next few years.

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Einführung in die Kristallphysik. By W. KLEBER, K. MEYER and W. SCHOENBORN. Pp. 209. Berlin: Akademie-Verlag, 1968. Price (soft cover) DM 17.

This book is written as an introduction to crystal physics for undergraduate and graduate students majoring in physics, chemistry and mineralogy.

The first chapter by Schoenborn on *Elemente der Kristallsymmetrie* deals with crystal classes including those of the magnetic type. In the second chapter *Phänomenologische Darstellung der Kristalleigenschaften* the same author, after a brief mathematical introduction, discusses certain crystal properties by means of tensors. This includes, for example, pyroelectricity, pyromagnetism, conductivities, optical activity, double refraction, piezoelectricity, elasticity, etc. Chapter 1 appears too brief and superficial but the second chapter gives a good discussion of the mentioned physical properties.

Kleber has written Chapter 3 *Gitterphysikalische Eigenschaften*. He discusses crystal bonding, potential and vibrations, and elastic, magnetic, dielectric and optical properties. This is a very brief and rather unproblematic account of the phenomena.

Finally, Meyer gives in Chapter 4, *Realstruktur und einige physikalische Eigenschaften*, a good and brief description of the geometry of crystal defects, their detection and some physical properties due to defects.

Although there is a strong need for a short textbook on crystal physics, I am not sure this book fulfils this purpose, particularly since the material included is not up-to-date. Also, since this book is very brief, it should include a more detailed reference section.

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