

A rather extensive chapter is dedicated to the dynamics of the linear diatomic chain, which includes a quantum-mechanical formulation. It may appear a good idea to introduce all the basic concepts and the quantum-mechanical formulation in one dimension. The formalism is, however, quite elaborate, and a not-so-experienced reader will easily get lost in the symbols. Creation and annihilation operators are introduced at this stage, and extensively used hereafter. Such operators are needed for a quantum-mechanical description of the phonon field. The physical picture of what is actually happening in the crystal is not always clear, though.

A rather complete discussion of three-dimensional lattice dynamics, interatomic forces and phonon dispersion curves is given in the following two chapters, with some discussion of the shell model and phonons in metals, and some specialized topics such as the bond charge and the valence force models, molecular crystals and screening. These two chapters have good informative value, except for some sections, like the one on the theory of elasticity, for example, in which many results are given without any attempt to provide derivations and physical insights. The same applies to the sections dedicated to the alkali halides and the shell model.

A full chapter is then dedicated to anharmonicity, with a description of the self-consistent harmonic approximation (SCHA), response functions and perturbations theory of phonon-phonon interactions. A nice and instructive description is given of the anharmonic properties of the diatomic molecule and the linear chain. These sections are probably among the best in the book.

A compact list of seventeen Appendices is given at the end, with short but useful derivations. Every chapter has a list of problems with hints and actual solutions given in some cases. These problems are well articulated and are not commonly found in books of this kind. They are one of the best parts of the book, along with the extensive and updated bibliography given at the end.

The book is written with great competence. The problem is, however, that many results are given without derivation, which makes the reader feel uncomfortable and slightly irritated at times. The inexperienced reader will feel the need for a more elementary level, whereas the professional lattice dynamicist will not use this book to learn new material.

It is true that one cannot give all the derivations in a book of reasonable size. There is, however, a way of conveying the truth, in science, 'by telling little lies', in other words, by using persuasive and oversimplified reasons that may not be rigorous but convey the gist of the argument in a simple and direct way. The reader is fooled into believing that he really understands and masters the material. This is not true, of course. He is, however, happy with this feeling, develops an enthusiastic attitude toward the topic, and feels motivated to go further.

This virtue, of 'telling little lies', is not present in this book. The derivations are either skipped altogether, or given semi-rigorously with heavy emphasis on formalism, to a point at which the physical significance of the results slips out of the way.

The book may be used as an excellent source for lectures in a graduate course at an advanced level on lattice dynamics. This is, in fact, the genesis of the book – it was developed by the author for a course he gave at the Ecole Polytechnique Fédérale de Lausanne – and most shortcomings actually stem from this original format.

In conclusion, Brüesch's book is a competently written compendium on lattice dynamics, which may not be ideal for all kinds of readers, but fills certain needs and should not be missing from institutional libraries and our office bookshelves.

The author has promised us a second volume on the same topic, centered on the experimental aspects of lattice dynamics. We are all waiting for it.

R. COLELLA

*Physics Department  
Purdue University  
West Lafayette  
IN 47907  
USA*

*Acta Cryst.* (1983). A39, 600

### Books Received

*The following books have been received by the Editor. Brief and generally uncritical notices are given of works of marginal crystallographic interest; occasionally a book of fundamental interest is included under this heading because of difficulty in finding a suitable reviewer without great delay.*

**Advances in physical geochemistry.** Vol. 2. Edited by S. K. SAXENA. Pp. x + 353. Springer, 1982. Price DM 94.00, US \$41.80.

**Semiconductor physics.** By K. SEEGER. Pp. xii + 462. Springer, 1982. Price DM 88.00, US \$39.00.

**An introduction to crystal optics.** By P. GAY. Pp. ix + 262. Longman, 1982. Price £6.95. This is the paperback edition of the book originally published in 1967. The bibliography has been updated but the book is otherwise unchanged.

**Light scattering in solids. I.** 2nd ed. Edited by M. CARDONA. Pp. xv + 363. Springer, 1983. Price DM 70.00, US \$29.00. This book is the up-dated version of the first of a four-volumes series (*Light scattering in solids*, Vols. I–IV), already published by Springer (1975–1981). It contains numerous references to, as well as a detailed summary of, the contents of the other three volumes.