**SOLID STATE
PHYSICS**

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PREFACE

THE purpose of this book is to introduce the reader to the study of the physical properties of crystalline solids. It is based on notes which I used for lectures in the Physics Department of the University of British Columbia, Canada, and in the Electrical Engineering Department of the University of Minnesota.

My aim has been to write an introductory text suitable for senior undergraduate and beginning graduate courses on the solid state in physics, engineering, chemistry, and metallurgy. Also, I have attempted to make it suitable for self study by scientists in industrial laboratories interested in the physical properties of solids. The widely varying background of the anticipated groups of readers has affected the organization and presentation of the subject matter. The general level of presentation has been kept elementary, with emphasis on the physical reasoning underlying the interpretation of the physical properties of solids. I have made an effort, however, to remain as rigorous and up-to-date as possible within the limits imposed by the level of presentation. The first eight chapters deal with subjects which, at least in an introductory text, can be discussed without reference to the details of the electronic structure of solids. Prerequisite for understanding this part of the book is an elementary knowledge of statistical thermodynamics and of the quantized harmonic oscillator. Chapters 9 through 20 deal with the electronic properties of solids and require familiarity with the elements of wave mechanics, although in a number of chapters no explicit use of wave mechanics is made. As a consequence of the organization of the material outlined above, the degree of difficulty tends to increase as one progresses through the book. This in itself does not compel the reader to follow the order in which the various subjects are discussed. In fact, the chapters are organized in groups which could be taken up in any order suitable to serve the particular needs of the instructor or reader.

To some extent, my own interest and taste have determined the choice of

material; however, with the possible exception of Chapter 17, the material is basic to a great variety of subjects in the field of solid state.

I am indebted to W. Opechowski for constructive criticism during the preparation of Chapters 10 and 11, and to A. H. Morrish for his comments on other parts of the manuscript. I also wish to acknowledge the cooperation of numerous publishers who kindly permitted me to reproduce illustrations. I am grateful to F. L. Vogel, W. G. Pfann, H. E. Corey, and E. E. Thomas for a micrograph of a lineage boundary in germanium. Finally, I wish to thank my wife for typing the manuscript and for her encouragement.

A. J. Dekker

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