Preface

Given the increasing quantity of knowledge in all areas of science, the imparting of this knowledge must necessarily concentrate on general principles and laws while details must be restricted to important examples. A textbook should be reasonably small, but essential aspects of the subject may not be neglected, traditional foundations must be considered, and modern developments should be included. This introductory text is an attempt to present inorganic structural chemistry in this way. Compromises cannot be avoided; some sections may be shorter, while others may be longer than some experts in this area may deem appropriate.

Chemists predominantly think in illustrative models: they like to "see" structures and bonds. Modern bond theory has won its place in chemistry, and is given proper attention in Chapter 10. However, with its extensive calculations it corresponds more to the way of thinking of physicists. Furthermore, albeit the computational results have become quite reliable, it often remains difficult to understand structural details. For everyday use, simple models such as those treated in Chapters 8, 9 and 13 are usually more useful to a chemist: "The peasant who wants to harvest in his lifetime cannot wait for the *ab initio* theory of weather. Chemists, like peasants, believe in rules, but cunningly manage to interpret them as occasion demands" (H.G. VON SCHNERING [112]).

This book is mainly addressed to advanced students of chemistry. Basic chemical knowledge concerning atomic structure, chemical bond theory and structural aspects is required. Parts of the text are based on a course on inorganic crystal chemistry by Prof. H. Bärnighausen at the University of Karlsruhe. I am grateful to him for permission to use the manuscript of his course, for numerous suggestions, and for his encouragement. For discussions and suggestions I also thank Prof. D. Babel, Prof. K. Dehnicke, Prof. C. Elschenbroich, Prof. D. Reinen and Prof. G. Weiser. I thank Prof. T. Fässler for supplying figures of the electron localization function and for reviewing the corresponding section. I thank Prof. S. Schlecht for providing figures and for reviewing the chapter on nanostructures. I thank Ms. J. Gregory and Mr. P. C. Weston for reviewing and correcting the English version of the manuscript.

In this second edition the text has been revised and new scientific findings have been taken into consideration. For example, many recently discovered modifications of the elements have been included, most of which occur at high pressures. The treatment of symmetry has been shifted to the third chapter and the aspect of symmetry is given more attention in the following chapters. New sections deal with quasicrystals and other not strictly crystalline solids, with phase transitions and with the electron localization function. There is a new chapter on nanostructures. Nearly all figures have been redrawn.

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