Book Reviews

Bonding and Structure. Structural Principles in Inorganic and Organic Chemistry

Edited by N. W. Alcock (University of Warwick), published by Ellis Horwood, New York, 1990, 321 pp., US$ 50.95.

This book is part of the 'Ellis Horwood Series in Inorganic Chemistry' and, like the other excellent volumes of this series, is principally dedicated to undergraduate chemistry students.

In the first two chapters, N. W. Alcock, who has had considerable teaching experience, tries to explain, in a simple manner, many aspects of the chemical bond that his students have had difficulty grasping. In particular, the author discusses at length the concept that the different species of chemical bonds should be considered, as far as is possible, a unity.

He is firmly convinced that the most important property of bonded atoms in determining their bond is electronegativity; great importance is therefore given to the so-called bond triangle. To give more strength to this concept, after some discussion of ideal bonds, the dependence of the real bonds on the electronegativity of the constituent atoms is examined and discussed for a large array of compounds.

Because many types of bonds exist only in solids, bonding in the solid state dominates the third part of this book. The bond is examined with particular regard to its relationship to chemical character, structure and properties. This section gives a comprehensive treatment of metallic bonding (including metal alloys and interstitial carbides), the hydrogen bond, complex covalent bonds (including aromatic systems and xenon halides), transition metal complexes and compounds with intermediate-type bonding (e.g. layered compounds, zeolites and other silicates).

Furthermore, many solids of great technological interest (e.g. semiconductors, solid electrolytes, ferroelectrics and non-linear optical materials) are also included. Even the most recent materials such as Zintl phases and superconducting metal oxides are examined in the last part of the book. Predictions of the chemical bond from the constituent atoms, and then of the chemical structure from the chemical bond and finally of the chemical reactivity from the structure, although still a dream, remain a prime goal in chemistry.

Although too much importance may have been given to the electronegativity of the atoms as the main property in determining their bonding, this book provides a simple yet broad overview of the bond of an obviously broad area of compounds.

This volume, as the author himself says, has to be considered principally a book on inorganic chemistry simply because inorganic compounds have a wider range of bonding than most organic compounds. Therefore, the book may be very useful to the organic chemists as well.

In order to maintain the simple and qualitative character of the book, a non-mathematical approach was used, some derivations are given in chapter appendices. For the same reason, certain fundamental topics that should be well-known to many readers are described only in self-contained boxed units, so that they are easily seen during reading. This makes the book simpler and more unified.

The book is well-written, well-organised, and the terminology is well-defined.

In conclusion this is a readable book and although dedicated mainly to students, it should find its place in the libraries of most Chemistry Departments or on the bookshelves of young researchers and lecturers devoted to undergraduate teaching in chemistry.

Giulio Alberti
Dipartimento di Chimica
Università di Perugia, Italy

Guidelines for Mastering the Properties of Molecular Sieves. Relationship between the Physicochemical Properties of Zeolitic Systems and their Low Dimensionality

Edited by D. Barthomeuf, E. G. Derouane and W. Hölderich, NATO ASI Series B: Physics, Vol. 221, published by Plenum, New York, 1990, 426 pp., bound, US$ 95.00.

The book is a collection of papers presented at the NATO Advanced Study Institute Workshop held in Chantilly, France, in 1990 on the title topic.

Chantilly was the 21st meeting of the special program on condensed systems of low dimensionality sponsored by NATO Scientific Affair Division which