
BOOK REVIEW

CHEMISTRY

CHEM ONE

JURG WASER, K. N. TRUEBLOOD AND C. M. KNOBLER

McGraw-Hill International Book, 1976, xviii + 810 pp, \$15.95.

In comparison to the other well-known freshmen chemistry texts,¹ this book covers far more materials on new concepts, phenomena, and techniques, which are commonly employed in research laboratories. The concept of dispersion forces is introduced early in Chapter 3 where phase change and intermolecular forces are discussed. In Chapter 4, the students will learn about covalent solids, high polymers, and clathrates, as well as ordinary covalent and ionic compounds. Chapters 5 through 7 are on gases, liquids and solutions; the topics are common ones except for proton-transfer reactions and the use of chromatography as a separation technique. The atomic structure and bonding theories are presented in the following five chapters. The experiments and hypotheses of Planck, Einstein, Rutherford, and Bohr are rather briefly discussed, but sufficient. The Uncertainty Principle, which is usually hard to grasp, is quite well explained here. The Schrödinger wave functions for hydrogen atom is broken down to radial and angular parts, and briefly discussed before introducing the four quantum numbers, which I think will help the students understand these difficult concepts better. The authors do a very good job comparing molecular-orbital and valence-bond theories. The section on hybridization is well presented, together with a table of possible types of hybrids and examples. However, the molecular-orbital theory section lacks pictures and diagrams to help the visualization of the students. The three chapters on equilibria cover also the polyprotic acids and the family of titration curves, as well as complexions.

I do not think the presentation on thermodynamics is as good as in some other text (eg. 1 a). However, the authors introduce briefly the concept of chemical potential before going on to relating free energy to chemical equilibrium. Electrochemistry is discussed in an ordinary manner except for the section on ion-selective electrodes which I find quite different and new. Chapter 20 is devoted to chemical kinetics. I would rather see the integrated rate law discussed in more details. The collision and transition state theories are poorly and too shortly treated.

I have the feeling that people will find the treatments on inorganic chemistry too concise. However, the topics of current interest such as water and air pollution

are mentioned. In the chapter on electronic structure of metals, the authors introduce the concepts of dislocations and whisker in crystals, as well as those on semiconductors and insulators. Crystal Field Theory is thoroughly discussed and quite well done.

The last two chapters are on organic chemistry and biochemistry. I find the chapter on organic chemistry ordinary, but the materials on biochemistry include interesting topics such as bioenergetics and metabolic pathways.

The authors mention the reshuffling of the chapters as the instructor may find suitable. They realize the materials covered in the book are probably too much to be covered in lectures, and suggest that some of the advanced topics should probably be left to the students or abridged by the instructor. It is interesting to see besides the "Preface" to instructors, a soothing "To the Student", where the authors sympathize with the students for having to have to struggle through many parts in the text.

As a physical chemist, I think this text is a very good one as far as modern concepts in chemistry are needed to be introduced to freshmen. This book may be a little too difficult and is appropriate especially for students who will go on in the fields of pure science and engineering only. As for Thai students, if they can overcome the language problem in reading, I am sure they will find this "Chem One" interesting as well as stimulating.

1. For example,

- 1a. Mahan, Bruce (1965, 1969, 1976) *University Chemistry*, Addison-Wesley, Reading, Mass.
- 1b. Dickerson, R.E., Gray, H.B. and Haight, Jr., G.P. (1970, 1974) *Chemical Principles*, Benjamin, New York.

Saon Patumtevapibal