Book Reviews

Chemical Kinetics. Volume 2. The Theory of Kinetics. Edited by C. H. BAMFORD, M.A., Ph.D., Sc.D. (Cantab.), F.R.I.C., F.R.S., Campbell-Brown Professor of Industrial Chemistry, University of Liverpool, and C.F.H. TIPPER, Ph.D. (Bristol), D.Sc. (Edinburgh), Senior Lecturer in Physical Chemistry, University of Liverpool. American Elsevier Publishing Co., Inc., 52 Vanderbilt Ave., New York, N. Y. 1969. xiii + 486 pp. 17 × 25 cm. $36.00.

This is the second of three volumes in the first of at least ten intended sections that are expected to become a compendium entitled "Comprehensive Chemical Kinetics." The monumental undertaking is extremely ambitious, and it will be too much to hope that the first volumes are still current by the time the last ones appear.

As might be expected for a book consisting of chapters by five different authors, the contributions differ in scope and philosophy. The basic material one would expect in a book on the theory of kinetics is contained in two chapters on elementary reactions in gas phase and solution by I. D. Clark and R. P. Wayne of Oxford University. The fundamental theories are well presented in a form useful for reference, although it is discouraging to note how much of the material was well developed by Kassel[1] or by Glasstone, Laidler, and Eyring[2] over thirty years ago. The foundations were well laid then, but the paucity of subsequent construction should not lull us into thinking the edifice is complete. It is a personal opinion that the Slater theory of unimolecular reactions no longer needs as much discussion as it receives here and that a discussion of applications of theory should include the very useful empirical computational techniques developed by S. W. Benson, the reactions of species with epithermal velocities recoiling from nuclear events, and elucidation by A. J. Parker of the very different behaviors of protic and aprotic solvents. However, everybody will have his own opinions as to what should or should not be in such a book, and the generally accepted theoretical foundation is presented in accessible form.

The chapter on chain reactions by V. N. Kondratiev of Moscow is a useful presentation of methods developed by Russian workers for treating these complicated systems, although it devotes more space to discussion of specific reactions than it does to formal theory. By contrast, the chapter by Z. G. Szabo of Budapest is a presentation of integrated rate equations with little mention of the chemical systems to which they have been applied. The collection is useful for reference, but it would be helpful if the general expressions had been more clearly distinguished from what are often special cases of the same situation.

The final chapter by L. G. Harrison of the University of British Columbia deals with solid-phase kinetics and is primarily concerned with mechanisms of diffusion in what are often nonisotropic systems. The problems encountered are quite different from those in the spatially homogeneous systems discussed in the other chapters.

Since this book is only one of a series, the person who wants a single volume for study and reference would probably prefer one like Benson.[3] Individuals will hesitate to make the investment required to obtain the entire series, but it should be available in the library of any institution where chemists are doing research in kinetics.

(1) L. S. Kassel, "The Kinetics of Homogeneous Gas Reactions," Chemical Catalog Co., New York, N. Y., 1932.

(2) S. Glasstone, K. J. Laidler, and H. Eyring, "The Theory of Rate Processes," McGraw-Hill Book Co., New York, N. Y., 1941.

(3) S. W. Benson, "The Foundations of Chemical Kinetics," McGraw-Hill Book Co., New York, N. Y., 1960.

Richard M. Noyes
Department of Chemistry, University of Oregon
Eugene, Oregon 97403