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Book Review

Principles of Reaction Kinetics by P. G. Ashmore

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Principles of Reaction Kinetics, by P. G. Ashmore. Royal Society of Chemistry, 1993. 80 pages. Revised second edition. 9.95 pounds sterling. ISBN 0 85404 024-2.

Principles of Reaction Kinetics, by P. G. Ashmore, is one of a series of *Monographs for Teachers* published by the Royal Society for Chemistry. The stated purpose of this series is to provide concise authoritative accounts of well defined topics. This textbook certainly provides such an account of basic reaction kinetics.

It is in fact refreshing, in this age of the multiple-topic text, to find a work that provides a complete and detailed account of the fundamental elements of a topic. There are no sections on laser methods, RRKM theory, potential-energy surfaces, nor temperature-jump experiments. Rather, the work begins with an introductory survey that includes fundamental definitions, simple reaction theories (based largely on collision-theory arguments), and some explanations of transition state theory, bundled with a treatment of temperature dependence and the Arrhenius equation.

The textbook proceeds to the practical details of the study of reaction kinetics, providing a well thought out, detailed treatment of various types of reactions. The scope of this presentation is fairly broad, encompassing examples of most common types of elementary reactions. What I found unique in this case was the incorporation of reaction theory, treatment of data, and experimental results. Examples of various reaction types are looked at in detail, with descriptions that include possible transition states, explanations of the magnitude of different reaction rates, and the temperature dependencies of the reactions.

The textbook then moves on to complex reactions and chain reactions, providing similar treatment of this topic. There are many detailed examples, with comparisons of experimental results to give the reader an indication of what chemical considerations are important in defining the rates of those reactions. The treatment here is mindful of certain chapters in *Kinetics and Mechanism* by Moore and Pearson (Wiley: New York, 1981), though Ashmore's work does not provide the same level of rigor. For example, Ashmore just occasionally addresses the application of statistical mechanics to the study of reaction rates. This is, of course, in line with the goals of text.

Finally, the last section of the book provides a summary of aims and goals, which identifies underlying themes in the treatment of kinetics, and summarizes the essential pieces of information. The summary is excellent and I would recommend it to any student in a beginning physical chemistry course, or to the faculty teaching this course.

This textbook is clearly not designed to be used as a classroom text; there are no chapter reviews nor exercises for students. However, it will be of great utility to the instructor or student of undergraduate physical chemistry, advanced general chemistry, or biophysical chemistry. The textbook would also be useful for the student entering graduate study, as a resource for review and reference. The areas addressed in the work are well chosen to provide the fundamentals that students should need, in a detail that is seldom available in typical texts. In fact, if an instructor is more interested in the depth of coverage of kinetics, rather than surveying the material, I would recommend this as an ancillary text in a typical physical chemistry course.