

Principles of Chemical Kinetics

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Second Edition

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and

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Preface

Chemical kinetics is an enormous field that has been the subject of many books, including a series that consists of numerous large volumes. To try to cover even a small part of the field in a single volume of portable size is a difficult task. As is the case with every writer, I have been forced to make decisions on what to include, and like other books, this volume reflects the interests and teaching experience of the author.

As with the first edition, the objective has been to provide an introduction to most of the major areas of chemical kinetics. The extent to which this has been done successfully will depend on the viewpoint of the reader. Those who study only gas phase reactions will argue that not enough material has been presented on that topic. A biochemist who specializes in enzyme-catalyzed reactions may find that research in that area requires additional material on the topic. A chemist who specializes in assessing the influence of substituent groups or solvent on rates and mechanisms of organic reactions may need other tools in addition to those presented. In fact, it is fair to say that this book is not written for a *specialist* in any area of chemical kinetics. Rather, it is intended to provide readers an introduction to the major areas of kinetics and to provide a basis for further study. In keeping with the intended audience and purposes, derivations are shown in considerable detail to make the results readily available to students with limited background in mathematics.

In addition to the significant editing of the entire manuscript, new sections have been included in several chapters. Also, Chapter 9 “Additional Applications of Kinetics,” has been added to deal with some topics that do not fit conveniently in other chapters. Consequently, this edition contains substantially more material, including problems and references, than the first edition. Unlike the first edition, a solution manual is also available.

As in the case of the first edition, the present volume allows for variations in the order of taking up the material. After the first three chapters, the

remaining chapters can be studied in any order. In numerous places in the text, attention is drawn to the fact that similar kinetic equations result for different types of processes. As a result, it is hoped that the reader will see that the assumptions made regarding interaction of an enzyme with a substrate are not that different from those regarding the adsorption of a gas on the surface of a solid when rate laws are derived. The topics dealing with solid state processes and nonisothermal kinetics are covered in more detail than in some other texts in keeping with the growing importance of these topics in many areas of chemistry. These areas are especially important in industrial laboratories working on processes involving the drying, crystallizing, or characterizing of solid products.

It is hoped that the present volume will provide a succinct and clear introduction to chemical kinetics that meets the needs of students at a variety of levels in several disciplines. It is also hoped that the principles set forth will prove useful to researchers in many areas of chemistry and provide insight into how to interpret and correlate their kinetic data.

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