
MECHANISMS OF INORGANIC REACTIONS

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PREFACE

This text is directed to helping students understand the details of the mechanisms of various types of common inorganic reactions. It is not intended as a comprehensive review of the current literature; instead, it stresses the underlying principles and gives examples (along with additional "homework" problems) in each category.

Most of the examples given are from homogeneous solution chemistry. For special mechanistic features of gas-phase chemistry, solid-state chemistry, or heterogeneous reactions, more specialized texts should be consulted. Our purpose is to use solution chemistry to illustrate the fundamental principles of various reaction mechanisms.

We avoided burdening the book with many references, but a brief list of relevant books and review articles for further study is given at the end of each chapter.

This book was written to serve as a basis for a one-semester course. Knowledge of inorganic chemistry, thermodynamics, kinetics, atomic and molecular structure, analytical chemistry, and calculus is important as general background. The student should, in particular, have some knowledge related to mechanisms, such as what a simple rate law is, what the kinetic order of a reaction is, how temperature affects reactions, and so forth.

At the end of the semester the student should know

1. The concepts that have been developed in mechanistic studies, how to correlate them, and how to distinguish them from similar but different concepts. For example: What is an elementary reaction, and how is an elementary reaction distinguished from a nonelementary process?
2. How mechanisms are classified.
3. The methods, both theoretical and experimental, used in the study of mechanisms, the possibilities each technique offers, the kind of information that can be obtained, and the limitations.

4. How the information for the clarification of a mechanism is organized and treated.
5. How to solve theoretical and practical problems and, even better, how to conceive such problems and express them clearly.

In other words, the reader should be able to apply this knowledge.

Many excellent books are available that describe the basic principles of chemical kinetics both in the gas phase and in solution. More and more often, chapters on inorganic mechanisms are included in advanced texts in inorganic chemistry, and chapters (or portions of chapters) are even included in texts at the beginning level of chemistry. Also, more and more papers involving mechanistic detail are appearing in current inorganic chemical literature and at related conferences. Synthetic chemists (inorganic, organometallic, polymer, bioinorganic) are turning to mechanistic detail to gain a better understanding of the role (and properties) of the intermediates. It is our hope that this systematic text will help its readers (especially advanced level undergraduates and beginning graduate students) to gain a better understanding of these mechanisms.

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*D.K.
G.G.*

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