Chemical Kinetics Fundamentals And Recent Developments

Chemical Kinetics: Fundamentals and Recent Developments

An introduction to kinetics' underlying principles, without rigorous math to distract from understanding. Understand universally important kinetic concepts like diffusion and reaction rate. Model common kinetic processes.

Contents:
1. Introduction to chemical kinetics
2. Kinetic parameter determination
3. Reaction orders and rate laws
4. The Arrhenius equation and activation energies
5. The law of mass action and the collision theory
6. The kinetic-mechanistic approach to reaction mechanisms
7. Kinetic models and rate equations
8. The concept of the rate-determining step
9. The interpretation of reaction kinetics
10. The significance of reaction kinetics in chemical process engineering

This book provides a concise, clear, and modern introduction to chemical kinetics, both classical and modern. It covers fundamentals and recent developments in homogeneous catalysis and its modeling, including:
- Adequate coverage given to topics not covered sufficiently by other works.
- Covers fundamentals and recent developments in homogeneous catalysis and its modeling.
- New chapters on heterogeneous catalysis and periodic and chaotic reactions.
- New sections on statistical methods, lumping adsorption, and software and databases.
- Provides a better understanding of complex reaction kinetics and reaction mechanisms.

The book is designed for students and professionals interested in kinetic modeling, parameter estimation, catalyst evaluation, process development, reactor modeling, and process simulation. It is also an ideal textbook for undergraduate and graduate-level courses in chemical kinetics, homogeneous catalysis, and petrochemical engineering. Biotechnology, chemical engineering, chemistry, and physics.

Introduction to chemical kinetics:
- The foundation of chemical kinetics
- The study of rates of chemical reactions
- The relationship between reaction rates and chemical properties

Reaction mechanisms:
- The steps involved in a reaction
- The rate-determining step
- The significance of reaction kinetics in chemical process engineering

Chemical Kinetics Fundamentals And Recent Developments is an accessible and interesting introduction to kinetics processes, with a focus on materials and modern chemistry. It provides the basics: the simplest concepts, the fundamental experiments, and the underlying theories. For the specialist shows where sophisticated experimental and theoretical methods combine to offer a panorama of modern chemical kinetics, with the guidance of theory, the path becomes a reaction path that can actually be followed.

This book is a progressive presentation of kinetics of the chemical reactions. It provides complete coverage of the domain of chemical kinetics, which is important to materials science. It is intended for students who have completed a standard undergraduate course in physical chemistry, modern thermodynamics, and classical mechanics. The book forges fundamental kinetics into a practical tool by presenting new, effective methods for elucidation of mechanisms and reduction of the number of parameters in describing the rate of a chemical reaction. The book contains new chapters on heterogeneous catalysis, oscillations and chaos, and includes new sections on statistical methods, lumping adsorption, and software and databases. It provides a better understanding of complex reaction kinetics and reaction mechanisms.
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