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Autore	Italia
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Autore	Coker A. Kayode
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Soggetti	Chemical processes - Mathematical models Chemical reactors - Mathematical models Electronic books.
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Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Front Cover; Modeling of Chemical Kinetics and Reactor Design; Copyright Page; Contents; Preface; Introduction; Chapter 1. Reaction Mechanisms and Rate Expressions; Introduction; Typical Reaction Mechanisms; Reaction Mechanisms; Elementary and Non-Elementary Reactions; Types of Intermediate; The Arrhenius Equation and the Collision Theory; Transition State Theory; Chain Reactions; Catalytic Reactions; Guidelines to Formulating Reaction Mechanism; Testing Kinetic Models; Chain Length; References; Chapter 2. Thermodynamics of Chemical Reactions; Introduction; Chemical Equilibrium Criteria for EquilibriumReaction Equilibrium; Ideal Gas Mixtures; Real Gases-Ideal Gaseous Solutions; Real Gases; Liquid State; Determining the Fugacity and the Fugacity Coefficient; Partial Molar Quantities; Effect of Temperature on the Equilibrium Constant; Heats of Reaction; Heat Capacities of Gases; Heats of Formation; References; Appendix; Chapter 3. Reaction Rate Expression; Introduction; Reaction Rate Equation; Reaction Orders; Determining the Order of Reactions; Empirical Rate Equations of the nth Order; Method of Half-Life t1/2; Parallel Reactions; Homogeneous Catalyzed Reactions Autocatalytic ReactionsIrreversible Reactions in Series; First Order Reversible Reactions; Second Order Reversible Reactions; General Reversible Reactions; Simultaneous Irreversible Side Reaction; Pseudo-Order Reaction; Practical Measurements of Reaction Rates; Regression Analysis; Weighted Least Squares Analysis; Problems and Errors in Fitting Rate Models; References; Chapter 4. Industrial and Laboratory Reactors; Introduction; Batch Isothermal Perfectly Stirred Reactor; Semi-Batch Reactors; Continuous Flow Isothermal Perfectly Stirred Tank Reactor Continuous Isothermal Plug Flow Tubular ReactorContinuous Multiphase Reactors; Fluidized Bed System; Fluid Catalytic Cracking (FCC) Unit; Deep Catalytic Cracking Unit; Determining Laboratory Reactors; Guidelines for Selecting Batch Processes; Guidelines for Selecting Batch Processes; References; Chapter 5. Introduction to Reactor Design Fundamentals for Ideal Systems; Introduction; A General Approach; Ideal Isothermal Reactors; Numerical Methods for Reactor Systems Design; Reversible Series Reactions; The Semibatch Reactor; Continuous Flow Stirred Tank Reactor (CFSTR) Multi-Stage Continuous Flow Stirred Tank ReactorEqual Size CFSTR In Series; Space Time (ST) and Space Velocity (SV); Fractional Conversion, Yield, and Selectivity in Reactors; Relationship Between Conversion, Selectivity, and Yield; Plug Flow Reactor; Heterogeneous Tubular Reactor; Design Equation for Systems of Variable Density; Design Equations for Heterogeneous Reactions; Comparison of Ideal Reactors; CFSTR and Plug Flow Systems; Dynamic Behavior of Ideal Systems; Flow Recycle Reactor; References; Chapter 6. Non-Isothermal Reactors; Introduction Operating Temperature, Reaction Types, and Temperature
Sommario/riassunto	Selecting the best type of reactor for any particular chemical reaction, taking into consideration safety, hazard analysis, scale-up, and many other factors is essential to any industrial problem. An understanding of chemical reaction kinetics and the design of chemical reactors is key to the success of the of the chemist and the chemical engineer in such an endeavor. This valuable reference volume conveys a basic understanding of chemical reactor design methodologies, incorporating control, hazard analysis, and other topics not covered in similar texts. In addition to covering fluid mixing