

1. Record Nr.	UNINA9911019702803321
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Titolo	Transport phenomena for chemical reactor design // Laurence A. Belfiore
Pubbl/distr/stampa	New York, : J. Wiley, c2003
ISBN	9780471471622 (electronic book) 9786610343263 9781280343261 1280343265 9780470303030 0470303034 9780471265580 0471265586 9780471471622 0471471623
Descrizione fisica	1 online resource (912 pages)
Disciplina	660/.2832
Soggetti	Transport theory Chemical reactors - Fluid dynamics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references (p. 861-864) and index.
Nota di contenuto	TRANSPORT PHENOMENA FOR CHEMICAL REACTOR DESIGN; CONTENTS; PREFACE; PART I ELEMENTARY TOPICS IN CHEMICAL REACTOR DESIGN; 1 Multiple Chemical Reactions in Plug Flow Tubular Reactors and Continuous Stirred Tank Reactors; 1-1 Gas-Phase Plug-Flow Tubular Reactors That Produce Triethanolamine from Ethylene Oxide and Ammonia; 1-2 Multiple Chemical Reactions in a Liquid-Phase CSTR; 1-3 Multiple Chemical Reactions in a CSTR Train; Problems; 2 Start Up Behavior of a Series Configuration of Continuous Stirred Tank Reactors; 2-1 Analysis of Multiple Reactions in Two CSTRs: Illustrative Problem 2-2 Analysis of a Train of Five CSTRs: Illustrative Problem Problems; 3 Adiabatic Plug-Flow Tubular Reactor That Produces Methanol Reversibly in the Gas Phase from Carbon Monoxide and Hydrogen; 3-1

Temperature-Averaged Specific Heats; 3-2 Conversion Dependence of Mass Fraction and Heat Capacity of the Mixture; 3-3 Plug-Flow Mass Balance in Terms of CO Conversion; 3-4 Thermal Energy Balance for a Differential Reactor; 3-5 Thermodynamics of Multicomponent Mixtures; 3-6 Coupled Heat and Mass Transfer; 3-7 Kinetics and Thermodynamics of Elementary Reversible Reactions in the Gas Phase 3-8 Integration of the Nonisothermal PFR Design EquationProblems; 4 Coupled Heat and Mass Transfer in Nonisothermal Liquid-Phase Tubular Reactors with Strongly Exothermic Chemical Reactions; 4-1 Strategies to Control Thermal Runaway; 4-2 Parametric Sensitivity Analysis; 4-3 Endothermic Reactions in a Cocurrent Cooling Fluid; 4-4 Countercurrent Cooling in Tubular Reactors with Exothermic Chemical Reactions; 4-5 Manipulating the Inlet/Outlet Temperature of a Countercurrent Cooling Fluid: Multiple Stationary-State Behavior in Exothermic PFRs; Problems

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7-1 Elementary Reversible Gas-Phase Reactions in a Constant-Volume Flask7-2 Generalized Linear Least-Squares Analysis for a Second-Order Polynomial with One Independent Variable; Problems; PART II TRANSPORT PHENOMENA: FUNDAMENTALS AND APPLICATIONS; 8 Applications of the Equations of Change in Fluid Dynamics; 8-1 Important Variables; 8-2 Physical Properties in Fluid Dynamics; 8-3 Fundamental Balance in Momentum Transport; 8-4 Equation of Motion; 8-5 Exact Differentials; 8-6 Low-Reynolds-Number Hydrodynamics; 8-7 Potential Flow Theory; Problems; 9 Derivation of the Mass Transfer Equation

9-1 Accumulation Rate Process

Sommario/riassunto

Laurence Belfiore's unique treatment meshes two mainstream subject areas in chemical engineering: transport phenomena and chemical reactor design. Expressly intended as an extension of Bird, Stewart, and Lightfoot's classic Transport Phenomena, and Froment and Bischoff's Chemical Reactor Analysis and Design, Second Edition, Belfiore's unprecedented text explores the synthesis of these two disciplines in a manner the upper undergraduate or graduate reader can readily grasp. Transport Phenomena for Chemical Reactor Design approaches the design of chemical reactors from microscopi
