



Chemical Technology [An Integral Textbook

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Electronic books

Monografía

This textbook provides an integral and integrated treatment of industrial-relevant problems for students of both chemistry and chemical engineering. As such, this work combines the four disciplines of chemical technology - chemistry, thermal and mechanical unit operations, chemical reaction engineering and general chemical technology - and is organized into two main parts. The first covers the fundamentals, as well as the analysis and design of industrial processes, while the second section presents 20 concrete processes, exemplifying the inherent applied nature of chemical technology

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Título: Chemical Technology electronic resource] An Integral Textbook

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Variantes del título: CourseSmart Chemical Technology

Mención de serie: CourseSmart

Nota general: Description based upon print version of record

Contenido: Chemical Technology: An Integral Textbook; Contents; Preface; Notation; 1 Introduction; 1.1 What is Chemical Technology?; 1.2 The Chemical Industry; 2 Chemical Aspects of Industrial Chemistry; 2.1 Stability and Reactivity of Chemical Bonds; 2.1.1 Factors that Influence the Electronic Nature of Bonds and Atoms; 2.1.2 Steric Effects; 2.1.3 Classification of Reagents; 2.2 General Classification of Reactions; 2.2.1 Acid-Base Catalyzed Reactions; 2.2.2 Reactions via Free Radicals; 2.2.3 Nucleophilic Substitution Reactions; 2.2.4 Reactions via Carbocations 2.2.5 Electrophilic Substitution Reactions at Aromatic Compounds 2.2.6 Electrophilic Addition Reactions; 2.2.7 Nucleophilic Addition Reactions; 2.2.8 Asymmetric Synthesis; 2.3 Catalysis; 2.3.1 Introduction and General Aspects; 2.3.2 Homogeneous, Heterogeneous, and Biocatalysis; 2.3.3 Production and Characterization of Heterogeneous Catalysts; 2.3.4 Deactivation of Catalysts; 2.3.5 Future Trends in Catalysis Research; 3 Thermal and Mechanical Unit Operations; 3.1 Properties of Gases, Liquids, and Solids; 3.1.1 Ideal and Real Gas; 3.1.2 Heat Capacities and the Joule-Thomson Effect 3.1.3 Physical Transformations of Pure Substances: Vaporization and Melting 3.1.4 Transport Properties (Diffusivity, Viscosity, Heat Conduction); 3.1.4.1 Basic Equations for Transfer of Heat, Mass, and Momentum; 3.1.4.2 Transport Coefficients of Gases; 3.1.4.3 Transport Coefficients of Liquids;

3.2 Heat and Mass Transfer in Chemical Engineering; 3.2.1 Heat Transport; 3.2.1.1 Heat Conduction; 3.2.1.2 Heat Transfer by Convection (Heat Transfer Coefficients); 3.2.1.3 Boiling Heat Transfer; 3.2.1.4 Heat Transfer by Radiation; 3.2.1.5 Transient Heat Transfer by Conduction and Convection 3.2.2 Mass Transport 3.2.2.1 Forced Flow in Empty Tubes and Hydrodynamic Entrance Region; 3.2.2.2 Steady-State and Transient Diffusive Mass Transfer; 3.2.2.3 Diffusion in Porous Solids; 3.3 Thermal Unit Operations; 3.3.1 Heat Exchangers (Recuperators and Regenerators); 3.3.2 Distillation; 3.3.2.1 Distillation Principles; 3.3.2.2 Design of Distillation Columns (Ideal Mixtures); 3.3.2.3 Azeotropic, Extractive, and Pressure Swing Distillation; 3.3.2.4 Reactive Distillation; 3.3.3 Absorption (Gas Scrubbing); 3.3.3.1 Absorption Principles; 3.3.3.2 Design of Absorption Columns 3.3.4 Liquid-Liquid Extraction 3.3.4.1 Extraction Principles; 3.3.4.2 Design of Extraction Processes; 3.3.5 Adsorption; 3.3.5.1 Adsorption Principles; 3.3.5.2 Design of Adsorption Processes; 3.3.6 Fluid-Solid Extraction; 3.3.6.1 Principles of Fluid-Solid Extraction; 3.3.6.2 Design of Fluid-Solid Extractions; 3.3.7 Crystallization; 3.3.7.1 Ideal Binary Eutectic Phase System; 3.3.7.2 Ideal Binary Phase System with Both Solids Completely Soluble in One Another; 3.3.8 Separation by Membranes; 3.3.8.1 Principles of Membrane Separation; 3.3.8.2 Applications of Membrane Separation Processes 3.4 Mechanical Unit Operations

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