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Chemical Equilibrium; 2.3.3 Reaction Engineering Data
2.3.4 Thermodynamic Analysis2.4 Input/Output Analysis; 2.4.1 Input/Output Structure; 2.4.1.1 Number of Outlet Streams; 2.4.1.2 Design Variables; 2.4.2 Overall Material Balance; 2.4.3 Economic Potential; 2.5 Reactor/Separation/Recycle Structure; 2.5.1 Material-Balance Envelope; 2.5.1.1 Excess of Reactant; 2.5.2 Nonlinear Behavior of Recycle Systems; 2.5.2.1 Inventory of Reactants and Make-up Strategies; 2.5.2.2 Snowball Effects; 2.5.2.3 Multiple Steady States; 2.5.2.4 Minimum Reactor Volume; 2.5.2.5 Control of Selectivity; 2.5.3 Reactor Selection; 2.5.3.1 Reactors for Homogeneous Systems
2.5.3.2 Reactors for Heterogeneous Systems2.5.4 Reactor-Design Issues; 2.5.4.1 Heat Effects; 2.5.4.2 Equilibrium Limitations; 2.5.4.3 Heat-Integrated Reactors; 2.5.4.4 Economic Aspects; 2.6 Separation System Design; 2.6.1 First Separation Step; 2.6.1.1 Gas/Liquid Systems; 2.6.1.2 Gas/Liquid/Solid Systems; 2.6.2 Superstructure of the Separation System; 2.7 Optimization of Material Balance; 2.8 Process Integration; 2.8.1 Pinch-Point Analysis; 2.8.1.1 The Overall Approach; 2.8.2 Optimal Use of Resources; 2.9 Integration of Design and Control; 2.10 Summary; References
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3.7.1 Residue Curve Maps

Sommario/riassunto

This practical how-to-do book deals with the design of sustainable chemical processes by means of systematic methods aided by computer simulation. Ample case studies illustrate generic creative issues, as well as the efficient use of simulation techniques, with each one standing for an important issue taken from practice.The didactic approach guides readers from basic knowledge to mastering complex flow-sheets, starting with chemistry and thermodynamics, via process synthesis, efficient use of energy and waste minimization, right up to plant-wide control and process dynamics. The simul