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Behavior; 3.1.3 Safety Features of a Reaction; 3.1.4 Stages of Safety Assessment; 3.2 Pre-Laboratory Safety Studies; 3.2.1 Predicting Reaction Safety Characteristics
3.2.2 Selecting Inherently Safer Processing Conditions
3.3 The Synergies of Safety and Optimization - Together; 3.3.1 Testing of Potentially Explosive Compounds; 3.3.2 Thermal Stability Assessment; 3.3.3 Reaction Thermodynamic, Kinetic, and Gas-Generation Quantification; 3.3.4 Developing Fault-Tolerant Processes - by Design; 3.4 Establishing a Reliable Basis of Safety for Scale-Up; 3.4.1 Hazardous Scenario Identification; 3.4.2 Determining the Consequences of Hazardous Scenarios; 3.4.3 Experimental Simulation - Adiabatic Calorimetry; 3.4.4 Specify and Implement Safety Measures
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3.5 Flammability Hazards; 3.5.1 Assessing Pilot-Scale Flammability Hazards; 3.6 Summary; References; 4 Understanding the Reaction; 4.1 Introduction; 4.2 Process Complexity; 4.2.1 Number of Phases; 4.2.2 Physical and Dynamic Complexity; 4.2.2.1 Length Scales; 4.2.2.2 Time; 4.2.2.3 Solubility; 4.2.2.4 Density; 4.2.2.5 Rheology; 4.2.2.6 Heat Transfer; 4.2.2.7 Mass Transfer/Interfacial Area; 4.2.2.8 Mixing Time; 4.2.3 Chemical Complexity; 4.3 Topics for Data Acquisition; 4.4 Reaction Profiles; 4.5 Reaction Pictures; 4.6 Ionic Equilibria and Reaction Selectivity
4.6.1 Nitration
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4.13.1.2 Mass Transfer Rate-Limited Reaction

Sommario/riassunto

Process Understanding is the underpinning knowledge that allows the manufacture of chemical entities to be carried out routinely, robustly and to the required standard of quality. This area has gained in importance over the last few years, particularly due to the recent impetus from the USA's Food and Drug Administration. This book covers the multidisciplinary aspects required for successful process design, safety, modeling, scale-up, PAT, pilot plant implementation, plant design as well the rapidly expanding area of outsourcing. In discussing what process understanding means to differ
