Record Nr.	UNINA9910141014303321
Autore	Ancheyta Jorge
Titolo	Modeling and simulation of catalytic reactors for petroleum refining [[electronic resource] /] / Jorge Ancheyta
Pubbl/distr/stampa	Hoboken, NJ, : Wiley, c2011
ISBN	1-118-00216-4 1-283-05233-4 9786613052339 0-470-93356-9 0-470-93355-0
Descrizione fisica	1 online resource (525 p.)
Disciplina	665.5/3
Soggetti	Catalytic reforming - Simulation methods Petroleum - Refining
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 and index.
Nota di contenuto	 MODELING AND SIMULATION OF CATALYTIC REACTORS FOR PETROLEUM REFINING; CONTENTS; PREFACE; ABOUT THE AUTHOR; 1: PETROLEUM REFINING; 1.1 PROPERTIES OF PETROLEUM; 1.2 ASSAY OF CRUDE OILS; 1.3 SEPARATION PROCESSES; 1.3.1 Crude Oil Pretreatment: Desalting; 1.3.2 Atmospheric Distillation; 1.3.3 Vacuum Distillation; 1.3.4 Solvent Extraction and Dewaxing; 1.3.5 Deasphalting; 1.3.6 Other Separation Processes; 1.4 UPGRADING OF DISTILLATES; 1.4.1 Catalytic Reforming; 1.4.2 Isomerization; 1.4.3 Alkylation; 1.4.4 Polymerization; 1.4.5 Catalytic Hydrotreating; 1.4.6 Fluid Catalytic Cracking 1.5 UPGRADING OF HEAVY FEEDS1.5.1 Properties of Heavy Oils; 1.5.2 Process Options for Upgrading Heavy Feeds; 2: REACTOR MODELING IN THE PETROLEUM REFINING INDUSTRY; 2.1 DESCRIPTION OF REACTORS; 2.1.1 Fixed-Bed Reactors; 2.1.2 Slurry-Bed Reactors; 2.2 DEVIATION FROM AN IDEAL FLOW PATTERN; 2.2.1 Ideal Flow Reactors; 2.2.2 Intrareactor Temperature Gradients; 2.2.3 Intrareactor Mass Gradients; 2.2.4 Wetting Effects; 2.2.5 Wall Effects; 2.3 KINETIC MODELING APPROACHES; 2.3.1 Traditional Lumping; 2.3.2 Models Based on

1.

	Continuous Mixtures; 2.3.3 Structure-Oriented Lumping and Single- Event Models 2.4 REACTOR MODELING2.4.1 Classification and Selection of Reactor Models; 2.4.2 Description of Reactor Models; 2.4.3 Generalized Reactor Model; 2.4.4 Estimation of Model Parameters; REFERENCES; NOMENCLATURE; 3: MODELING OF CATALYTIC HYDROTREATING; 3.1 THE HYDROTREATING PROCESS; 3.1.1 Characteristics of HDT Reactors; 3.1.2 Process Variables; 3.1.3 Other Process Aspects; 3.2 FUNDAMENTALS OF HYDROTREATING; 3.2.1 Chemistry; 3.2.2 Thermodynamics; 3.2.3 Kinetics; 3.2.4 Catalysts; 3.3 REACTOR MODELING; 3.3.1 Effect of Catalyst Particle Shape; 3.3.2 Steady-State Simulation 3.3.3 Simulation of a Commercial HDT Reactor with Quenching3.3.4 Dynamic Simulation; 3.3.5 Simulation of Countercurrent Operation; REFERENCES; NOMENCLATURE; 4: MODELING OF CATALYTIC REFORMING; 4.1 THE CATALYTIC REFORMING PROCESS; 4.1.1 Description; 4.1.2 Types of Catalytic Reforming Processes; 4.1.3 Process Variables; 4.2 FUNDAMENTALS OF CATALYTIC REFORMING; 4.2.1 Chemistry; 4.2.2 Thermodynamics; 4.2.3 Kinetics; 4.2.4 Catalysts; 4.3 REACTOR MODELING; 4.3.1 Development of the Kinetic Model; 4.3.2 Validation of the Kinetic Model with Bench-Scale Reactor Experiments 4.3.3 Simulation of Commercial Semiregenerative Reforming Reactors4. 3.4 Simulation of the Effect of Benzene Precursors in the Feed; 4.3.5 Use of the Model to Predict Other Process Parameters; REFERENCES; NOMENCLATURE; 5: MODELING AND SIMULATION OF FLUIDIZED-BED CATALYTIC CRACKING CONVERTERS; 5.1 INTRODUCTION; 5.1.1 Description of the Process; 5.1.2 Place of the FCC Unit Inside the Refinery; 5.1.3 Fractionation of Products and Gas Recovery; 5.1.4 Common Yields and Product Quality; 5.2 REACTION MECHANISM OF CATALYTIC CRACKING 5.2.1 Transport Phenomena, Thermodynamic Aspects, and Reaction Patterns
Sommario/riassunto	Modeling and Simulation of Catalytic Reactors for Petroleum Refining deals with fundamental descriptions of the main conversion processes employed in the petroleum refining industry: catalytic hydrotreating, catalytic reforming, and fluid catalytic cracking. Common approaches for modeling of catalytic reactors for steady-state and dynamic simulations are also described and analyzed. Aspects such as thermodynamics, reaction kinetics, process variables, process scheme, and reactor design are discussed in detail from both research and commercial points of view. Results of simulation with t