CONTENTS

Prefa	ce		v
1.	Introduc	tion	1
	1.1	Composition and Characterization of Crude Oils	1
	1.2	Processing of Crude Oils	4
	1.3	Role of Hydrocracking in Refining	7
	Referen	ces	8
2.	Historical Aspects		9
	Referen	ces	11
3.	Hydrocracking Catalysts		13
	3.1	Zeolite Component	15
	3.2	Nonzeolitic Components	25
	3.3	Metal Component	32
	References		36
4.	Catalyst	Preparation and Manufacturing	41
	4.1	General Methods and concepts	41
	4.2	Preparation of Hydrocracking Catalysts	47
	4.3	Manufacturing Processes of Hydrocracking Catalysts	52
	References		
5.	Catalyst	Activation	63
	5.1	General concepts	63
	5.2	Activation of Noble Metal-Zeolite Catalysts	64
	5.3	Activation of Nonnoble Metal Catalysts	66
	5.4	Composition and Structure of Sulfided Catalysts	69
	Referen	ces	71
6.	Reaction	ns and Reaction Pathways	73
	6.1	Reactions	73
	6.2	Reaction Mechanism and Reaction Pathways	75
	6.3	Comparison between Catalytic Cracking and Hydrocracking	91
	References		
7.	Correlat	ions Between Catalyst Composition and Catalyst Performance	96
	7.1	Amorphous vs. Zeolite Catalysts	96
	7.2	Gasoline Catalysts	98
	7.3	Middle-distillate Catalysts	99
	7.4	Relation Between Hydrogenation and Cracking Function	103
	7.5	Relation Between Zeolite Framework Composition and Catalyst Performance	105
	7.6	Shape Selectivity Effect	107
	/./ D.f.	Effect of Nonzeolitic Component in zeilite-Containing Supports	108
	Kelerences		110
8.	Catalyst	Deactivation and Reactivation	112
	8.1	Basic Concepts	112
	8.2	Coke Formation and Composition	114
	8.5	Coke Deactivation of Bifunctional Catalysts	110
	8.4 9.5	Cote Distribution in Porous Catalysts	119
	8.5	Catalyst Poisoning	120

	 8.6 Catalyst Regeneration 8.7 Regeneration of Commercial Hydrocracking Catalysts 8.8 Sintering and Redispersion of Metals 	123 125 126
	References	130
9.	Catalyst Characterization and Testing9.1Characterization of Catalyst Acidity9.2Measurement Methods of Metal dispersion9.3Selected Instrumental methods9.4Catalytic EvaluationReferences	135 141 147 151 163 169
10.	Hydrocracking Processes10.1Single-Stage Recycle Hydrocracking10.2Once-Through Hydrocracking10.3Two-Stage Recycle Hydrocracking10.4Separate hydrotreat Hydrocracking10.5Hydrocracking Reactions : Design and Operation10.6Kinetic AspectsReferences	174 175 179 179 181 183 188 198
11.	Factors Affecting Product Yields and Quality11.1Effect of Feedstock11.2Effect of Process Configuration11.3Effect of Operating Variables11.4Effect of Polynuclear Aromatics11.5Effect of Catalyst Design11.6Process FlexibilityReferences	200 200 203 204 208 212 213 214
12.	Mild Hydrocracking 12.1 Conversion of VGO 12.2 Conversion of Residue References	215 215 221 221
13.	Catalytic Dewaxing13.1Reactions13.2Distillate Dewaxing13.3Integration with Other Processes13.4Lube Oil Dewaxing13.5Other ApplicationsReferences	223 224 226 229 232 235 236
14.	Other Applications of Hydrocracking14.1Hydrocracking/ Catalytic Cracking Integration14.2Production of Ethylene Cracker Feedstocks14.3Production of Petrochemical Feedstocks14.4Production of Lube Oil Base Stock14.5Petroleum Residue UpgradingReferences	237 237 238 242 244 246 254
15.	Reclamation of Spent Catalysts15.1Composition of Spent Catalysts15.2Reclamation TechnologiesReferences	256 256 257 264
16.	Conclusion	266
Glossary Index		