

TABLE OF CONTENTS

Part I. General introduction to chemical engineering	1
J.R. Katzer Chemical kinetics. The first step to reaction modeling and reaction engineering	3
J.R. Katzer Mass transfer in reacting systems	49
G.F. Froment Fixed bed catalytic reactors	115
Part II. Catalytic cracking	135
D.M. Brouwer Reactions of alkylcarbenium ions in relation to isomerization and cracking of hydrocarbons	137
J.H.C. van Hooff Cracking catalysts	161
P.N. Rowe Basic fluidisation	181
P.N. Rowe Fluidisation of fine powders such as fcc	203
H.S. van der Baan Catcracker operations. Reaction network and kinetics	217
Part III. Reforming of hydrocarbons on metals and alloys	235
R. Prins Chemical bonding	237
V. Ponec Bonding in and on metals	257

G. Ertl	
Surface science and catalysis on metals	271
R.F. Willis	
Surface electron spectroscopy	281
W.M.H. Sachtler	
Surface composition of binary alloys	317
H.C. de Jongste and V. Ponec	
Catalysis by metals and alloys	
Reforming of hydrocarbons and some other reactions	337
F. Garin and F.G. Gault	
Skeletal isomerization of hydrocarbons on metals	351
H.S. van der Baan	
Catalytic reforming, the reaction network	381
R. Prins	
Modern processes for the catalytic reforming of hydrocarbons	389
Part IV. Homogeneous catalysis	405
R. Prins	
Reaction mechanisms in homogeneous catalysis	407
B.C. Gates	
Catalysis by metal clusters	427
B.C. Gates	
Polymer supported catalysts	437
Part V. Partial oxidation of hydrocarbons and the acrylonitrile process	459
G.C.A. Schuit and B.C. Gates	
Catalytic oxidation, an introduction	461
F.S. Stone	
Oxide crystal chemistry and catalysis	477
J.H.C. van Hooff	
Industrial catalytic partial oxidation processes	507
H.S. van der Baan	
The acrylonitrile process	523

G.F. Froment	
Hot spots and runaway in fixed bed tubular	535
Part VI. Coal conversion	561
J.R. Katzer	
Catalysis in coal gasification	563
W.M.H. Sachtler	
Mechanism of hydrocarbon synthesis over Fischer-Tropsch catalysts	583
J.H.C. van Hooff	
The conversion of methanol to hydrocarbons using a new type of zeolite as catalyst (Mobil process)	599
B.C. Gates	
Liquefied coal by hydrogenation	621
J.R. Katzer and R. Sivasubramanian	
Process and catalyst needs for hydrodenitrogenation	635