# Cumulative Subject Index for Volumes 151-1571

#### A

#### Absorption

by Pd/C catalysts, effect of support pretreatment, **155**, 312 Acetaldehyde

and acetone, condensation chemistry at Brønsted acid sites in H-ZSM-5, <sup>13</sup>C NMR study, **151**, 373

reactions over CeO<sub>2</sub> and CeO<sub>2</sub>-supported catalysts, **155**, 219 Acetate

ketonization on CeO<sub>2</sub> and CeO<sub>2</sub>-supported catalysts, **155**, 219 Acetic acid

solution, heteropolyacid hydrate acidity in, measurement: independent ionization of hydrons, **152**, 198

#### Acetone

and acetaldehyde, condensation chemistry at Brønsted acid sites in H-ZSM-5, <sup>13</sup>C NMR study, **151**, 373

and benzaldehyde, condensation over hydrotalcite catalysts, sensitivity to catalyst basicity, **151**, 50

#### hydrogenation on

SiO<sub>2</sub>-supported Ni and Co catalysts at high temperature, selectivity, **157**, 461

undoped and Cr-doped Raney nickel catalysts, associated electrode potential: solution effects and reaction kinetics, **155**, 12

#### Acetophenones

substituted, and benzaldehyde. Claisen-Schmidt condensation over zeolite and hydrotalcite catalysts in production of chalcones and flavanones of pharmaceutical interest, **151**, 60

#### Acetylene

production from methane by high-power pulsed radiofrequency and microwave catalytic processes over carbon catalysts, **151**, 349 Acetyl species

reaction with methyl species on CeO<sub>2</sub> and CeO<sub>2</sub>-supported catalysts, **155**, 219

#### Acidity

Brønsted-Lewis, SiO<sub>2</sub>-Al<sub>2</sub>O<sub>3</sub>-supported MoO<sub>3</sub> catalysts, effect of catalyst composition, **151**, 192

generation by Au(I) incorporation into NaY zeolite, 152, 322

heteropolyacid hydrate in acetic acid solution, measurement: independent ionization of hydrons, **152**, 198

H-ZSM-5 zeolites, alteration by Ga and Pt, 157, 283

industrial hydrocracking catalysts, *in situ* characterization: model reaction, **151**, 102

Rh-Mo/γ-Al<sub>2</sub>O<sub>3</sub> catalyst surface, **156**, 96

SiO<sub>2</sub>-Ta<sub>2</sub>O<sub>5</sub> mixed oxides prepared by sol-gel method, **156**, 132 sulfated zirconia, IR spectroscopic study, **152**, 341

supported MoO<sub>3</sub> catalysts, effects in propylene oxidation, **157**, 740 supported vanadium catalysts, effects on oxidative dehydrogenation of *n*-butane, **157**, 271

 $V_2O_5/TiO_2$ -Al<sub>2</sub>O<sub>3</sub> catalysts, effect of composition, **157**, 368 Acid sites

# Brønsted

in H–ZSM-5, condensation chemistry of acetaldehyde and acetone adsorbed at. <sup>13</sup>C NMR study, **151,** 373

in zeolite catalysts, C-C single bond cracking over, theoretical description, **153**, 94

metal oxide surfaces, energy distribution during NH<sub>3</sub> adsorption, evaluation, **150**, 274; errata, **152**, 215, **157**, 270

in sulfated and metal-promoted  $\rm ZrO_2$  catalysts, analysis, 151, 364 sulfated  $\rm ZrO_2$ , structure, role of penta-coordinated sulfur, 157, 755 Acid treatment

effects on pillared clay and pillared acid-activated clay catalysts, comparative study, **153**, 76

#### Acrolein

adsorption geometries on Pt and Pd surfaces, analysis in terms of selective hydrogenation, **152**, 217

formation by propylene oxidation, transient kinetics: TAP reactor system application, 154, 151

hydrogenation on Pt catalysts, selectivity: model for hydrogenation of  $\alpha$ , $\beta$ -unsaturated aldehydes, **156**, 51

reactions on Pt/SiO<sub>2</sub> catalysts, activity and selectivity, **151**, 431 Activation energy

falsification by pore diffusion in parallel reaction networks. **154**, 364 Active sites

in gas-phase hydroformylation of olefins by Rh<sub>4</sub> carbonyl clusters attached on tris(hydroxymethyl)phosphine-modified SiO<sub>2</sub>, structural control, **157**, 436

La<sub>2</sub>O<sub>3</sub> catalysts for oxidative coupling of methane, identification and role, **151**, 439

V<sub>2</sub>O<sub>5</sub>/TiO<sub>2</sub> catalysts for selective reduction of NO by NH<sub>3</sub>, analysis, **151**, 241

## Addition reactions

propene-deuterium, over dispersed ZrO<sub>2</sub> catalysts, support effects, 154, 306

Adsorption, see also Readsorption

Ag and S on Pt(111) surfaces, 154, 355

aliphatic alcohols on TiO<sub>2</sub> catalysts, effects of bulk titania crystal structure, 153, 41

1,3-butadiene and *n*-butane on vanadium carbide films on V(110), comparison, **154**, 80

CH<sub>4</sub>, Kr, and Xe: direct determination of effective BET-area, **155**, 163 CO

and O<sub>2</sub> and CO + O<sub>2</sub>, on Pd metal and Pd/SnO<sub>2</sub> catalysts, enthalpy changes during, effect of catalyst pretreatment, **153**, 208

on Pt(111) electrodes modified by irreversibly adsorbed Bi in sulfuric acid medium, analysis, **152**, 264

competitive. C-C and C-O double bonds in  $\alpha$ - $\beta$  unsaturated aldehydes on Pt and Pd surfaces in relation to selectivity of hydrogenation, theoretical analysis, **152**, 217

on Cu-Y and Cu-ZSM-5 zeolites, comparison, 153, 190

and dissociation, CH<sub>2</sub>Cl<sub>2</sub> on Pd/SiO<sub>2</sub> catalysts, IR spectroscopic study: generation of CH<sub>2</sub> species, **155**, 74

formaldehyde and formic acid on K-promoted Cu/SiO<sub>2</sub> catalysts, FTIR study, **155**, 52

isobutene and methanol on Amberlyst-15, HY, and HZSM-5 zeolites, effect on MTBE synthesis, **152**, 122

<sup>&</sup>lt;sup>1</sup> Boldface numbers indicate appropriate volume; lightface numbers indicate pagination.

methanol on NiAl(100) and NiAl(110) surfaces, comparison, 154, 379 NH<sub>3</sub> on

metal oxides, energy distribution of surface acid sites during, evaluation, 150, 274; errata, 152, 215, 157, 270

RuS<sub>2</sub>, characterization: identification of amino species by inelastic neutron scattering, **157**, 414

SCR catalysts, 157, 523

nitrogen oxides on 12-molybdophosphoric, 12-tungstophosphoric, and 12-tungstosilicic acids, comparison, **152**, 179

NO on

Co-Mo/y-Al<sub>2</sub>O<sub>3</sub> sulfided catalysts, 156, 243

copper-on-alumina catalysts

adsorbed species and competitive pathways in NO reaction with NH<sub>3</sub> and O<sub>2</sub>, **152**, 93

nitrate species formation and effects of reactivity in NO and NH<sub>3</sub> conversion, 152, 75

Pd/Al<sub>2</sub>O<sub>3</sub> catalysts, FTIR study: evidence for metal-support interaction, 155, 303

rare earth oxide catalysts, 155, 290

n-octane on PtSn/SiO<sub>2</sub> catalysts, reversibility in dehydrocyclization reactions, 157, 626

on Pd/C catalysts, effect of support pretreatment, 155, 312 propanal and 2-propen-1-ol in H-ZSM-5, 154, 208

Aerogels

TiO<sub>2</sub>-SiO<sub>2</sub>

catalytic behavior in olefin epoxidation, 153, 177

structural properties, effect of sol-gel and drying conditions, **153**, 165 ZrO<sub>2</sub>-SiO<sub>2</sub>, homogeneity, effects of prehydrolysis ratio variation, **153**, 194

Aging

steam, see Steam aging

Alcohols

aliphatic, adsorption and reaction on TiO<sub>2</sub> catalysts, effects of bulk titania crystal structure, **153**, 41

higher, synthesis over CuO-ZnO-Cr<sub>2</sub>O<sub>3</sub> catalysts, selectivity in, relationship to catalyst structural and surface properties, **156**, 208

α-methylated, conversion on AlPO<sub>4</sub> catalysts, **151**, 307 secondary, dehydration on Al<sub>2</sub>O<sub>3</sub> catalysts: mechanism of ether formation, **157**, 359

synthesis from CO/H<sub>2</sub> over Co-Cu/ZnO-Al<sub>2</sub>O<sub>3</sub> catalysts, effects of *in situ* addition of CH<sub>3</sub>NO<sub>2</sub>, **153**, 100

Aldehydes

 $\alpha,\beta$ -unsaturated

C-C and C-O double bonds in, competitive adsorption on Pt and Pd surfaces in relation to selectivity of hydrogenation, theoretical analysis, 152, 217

hydrogenation on Pt catalysts, selectivity: acrolein hydrogenation as model reaction, 156, 51

substituted, reactions on Pt/SiO<sub>2</sub> catalysts, activity and selectivity, 151, 431

β-Aldolization

acetaldehyde on CeO<sub>2</sub> and CeO<sub>2</sub>-supported catalysts, 155, 219

Alkali carbonates

molten, supported catalysts, oxidative dimerization of methane, 152, 204

Alkali metals

exchanged X zeolites, basicity, microcalorimetric characterization, 157, 266

ions, titanium silicates synthesized in presence of, catalytic activity, 151. 77

promoters, effect on Cu-Na-ZSM-5 catalysts in benzyl alcohol oxidation, 153, 254

Alkaline earth metals

ions, titanium silicates synthesized in presence of, catalytic activity, 151. 77

Alkanes

acyclic, selective catalytic reactions with O<sub>2</sub> on halogenated metalloporphyrin complexes, **155**, 59

cracking over acidic zeolite catalysts, theoretical description, 153, 94 light, monomolecular conversion over H-ZSM-5 zeolites, 157, 388 oxidation

in fluidized bed reactors: olefin production, 155, 403

selective reactions over titanium silicate catalysts synthesized in presence of alkali metal and alkaline earth ions, 151, 77

reforming, bulk tungsten catalysts for, characterization and catalytic activity, 153, 9

Alkenes, see also Olefins

selective oxidation over titanium silicate catalysts synthesized in presence of alkali metal and alkaline earth ions, 151, 77

Alkylaromatics

oxidation over chemical vapor deposition Fe/Mo/DBH molecular sieve catalysts, 151, 338

Alkylation

ethylbenzene over silylated ZSM-5 catalysts: coke-induced stabilization of catalytic activity, 155, 154

liquid-phase, benzene with light olefins over  $\beta$  zeolites, 157, 227 O-Alkylation

selective, phenol with methanol over sulfate catalysts supported on  $\gamma$ -Al<sub>2</sub>O<sub>3</sub>, **152**, 52

Alloys

Cu-Ti and Cu-Zr, dehydrogenation of 2-propanol, catalyst activation and surface characterization in, comparison, **153**, 333

Pt-Sn, SiO<sub>2</sub>-supported catalysts, preparation, effect of metallic precursors: characterization and reactivity in catalytic activation of CO<sub>2</sub>. 156, 139

Alumina, see Aluminum oxide

Alumination

sepiolite by secondary isomorphic substitution reactions, effect on surface properties, 151, 420

Aluminum

Al(III)-Zn(II) layered double hydroxide, Mo(VI)O<sub>2</sub> complex center intercalated at, mediation of catalytic air oxidation of thiols, **152**, 237

extraframework, extraction from HY catalyst, effects on 2-methylpentane cracking over steamed catalyst, 157, 209

NiAl(100) and NiAl(110) surfaces, methanol adsorption, comparison, 154, 379

Aluminum lanthanum oxide

surfaces, methane chemisorption, ab initio SCF MO study, 156, 273 Aluminum oxide

catalysis of

ether formation by dehydration of secondary alcohols, mechanism, 157, 359

reactions of isobutane, effect of catalyst fluoridation, 157, 721

pillared acid-activated clays, and pillared clays, physical, acidic, and catalytic properties, comparative study, **153**, 76

PO<sub>4</sub>-doped, surface characterization, 152, 384

-SiO<sub>2</sub>, support of

MoO<sub>3</sub> catalysts

Brønsted-Lewis acidity, effect of catalyst composition, 151, 192 pyridine hydrodenitrogenation, bifunctional mechanism, 156, 255 Pr photocatalysts, decomposition of N<sub>2</sub>O, 157, 262

support of

Bi-Pt catalysts, selective oxidation of cinnamyl alcohol to cinnamaldehyde, **153**, 131

Co catalysts

CO hydrogenation, effect of Pt promoter, 156, 85

La promotion for CO hydrogenation, isotopic transient study, 153, 224

CoMo catalysts

hydrodeoxygenation of carbonyl, carboxyl, and guaiacol-type molecules on sulfided catalysts, effects of support and addition of K and Pt. 154, 288

for hydrotreatment and hydroconversion of petroleum fractions, nuclear microprobe analysis, **152**, 103

CuCl<sub>2</sub> catalysts, for low-temperature ethylene oxyhydrochlorination, mobilities of active species in, effects of support and promoters, **157.** 380

dispersed ZrO<sub>2</sub> catalysts, propene-deuterium addition and exchange reactions, mechanism, **154**, 306

molybdenum oxide catalysts, UV-visible absorption edges, effect of local structure, **151**, 470

MoO<sub>3</sub> catalysts, acid-base properties, effect on propylene oxidation, **157.** 740

Ni catalysts, oxidative methane-to-syngas conversion, effects of noble metal addition, 157, 752

niobium sulfide catalysts, preparation for hydrodesulfurization reactions. **156.** 279

Pd catalysts, NO adsorption, FTIR study: metal-support interaction, 155, 303

Pr photocatalysts, decomposition of N<sub>2</sub>O, 157, 262

Pt catalysts

enantioselective hydrogenation of ethyl pyruvate, effect of (R)-2-(1-pyrrolidinyl)-1-(1-naphthyl) ethanol, **154,** 371

ethyl chloride decomposition, 157, 730

mechanical mixtures with SO<sub>4</sub><sup>2</sup> -ZrO<sub>2</sub>, *n*-butane isomerization, **153**, 218

Pt-Rh catalysts

kinetic characterization and synergistic effects, **154**, 276 microstructural characterization, **154**, 261

Rh catalysts

CO oxidation, kinetics and oscillatory behavior, **156**, 265 dispersion, effect of Al<sub>2</sub>O<sub>3</sub> phase structure, **151**, 385

sulfided transition metal catalysts, temperature-programmed reduction and hydrodesulfurization activity: formation of nonstoichiometric sulfur, **151**, 178

vanadium catalysts, acid-base character, effect on catalysis of oxidative dehydrogenation of *n*-butane, **157**, 271

vanadium oxide catalysts, temperature-programmed sulfiding, analysis, **154**, 115

 $-TiO_2, support of \,V_2O_5\, catalysts, structure and acidity, effect of composition, 157, 368$ 

 $TiO_x$ -modified, support of  $V_2O_5$ -WO $_3$  catalysts, solid-state  $^1H$ ,  $^{15}N$ , and  $^{51}V$  NMR studies, **156**, 1

-ZnO, support of

Co-Cu catalysts, alcohol synthesis from CO/H<sub>2</sub>, effects of in situ addition of CH<sub>3</sub>NO<sub>2</sub>, **153**, 100

Cu polycrystalline catalysts, CO<sub>2</sub> decomposition, inverted temperature dependence, **157**, 153

α-Aluminum oxide

support of

Ag catalysts

formaldehyde oxidation, 154, 230

real structure for Ag particles of different dispersity, 154, 194

CuCl<sub>2</sub> catalysts, for low-temperature ethylene oxyhydrochlorination, mobilities of active species in, effects of support and promoters, **157**, 380

Ir catalysts,  $CO_2$  reforming reactions, molecular aspects, 157, 162 Ni catalysts, NiAl<sub>2</sub>O<sub>4</sub> intermediate layer in, effect on sintering of catalyst Ni, 151, 300

noble metal catalysts, alkane oxidation in fluidized bed reactors: olefin production, 155, 403

Pd catalysts, characterization by chemisorption, electron microscopy, and photoelectron spectroscopy, **153**, 86

Rh and Ru catalysts, CO<sub>2</sub> reforming reactions, molecular aspects, **157**, 162

B"-Aluminum oxide

support of Pt catalysts, NO reaction with ethylene, electrochemical promotion, 152, 211

y-Aluminum oxide

catalysis of selective oxidation of nitrosobenzene and deoxygenation of nitrobenzene, role of Mars and van Krevelen mechanism, **157**, 706 support of

Co-Mo sulfided catalysts, XPS and NO adsorption studies, **156**, 243 CuCl<sub>2</sub> catalysts, for low-temperature ethylene oxyhydrochlorination, mobilities of active species in, effects of support and promoters, **157**, 380

CuO catalysts, NO adsorption

adsorbed species and competitive pathways in NO reaction with NH<sub>3</sub> and O<sub>2</sub>, **152**, 93

nitrate species formation and effects of reactivity in NO and NH<sub>3</sub> conversion, **152**, 75

La<sub>2</sub>O<sub>3</sub>, methane chemisorption, ab initio SCF MO study, **156**, 273 MoO<sub>3</sub> catalysts, pyridine hydrodenitrogenation, bifunctional mechanism, **156**, 255

Pt catalysts

acrolein hydrogenation, selectivity: model for hydrogenation of α,β-unsaturated aldehydes, **156**, 51

coking and activity in supercritical reaction mixtures, olefinic oligomer and cosolvent effects, **152**, 31

methylcyclopentane ring opening, effect of hydrogen partial pressure, **151**, 330

Pt-Re reforming catalysts, Re reducibility in, TPR-XANES study, 154, 222

Rh-Mo catalysts, surface acidity, 156, 96

sulfate catalysts, selective O-alkylation of phenol with methanol, **152**, 52

V<sub>2</sub>O<sub>5</sub> monolayers, characterization, 152, 130

WO<sub>3</sub> catalysts, skeletal isomerization of butene analysis for 1-butene, **154**, 201

IR study, 156, 147

surfaces

acid sites, energy distribution during NH<sub>3</sub> adsorption, evaluation, 150, 274; errata, 152, 215, 157, 270

methane chemisorption, ab initio SCF MO study, 156, 273

η-Aluminum oxide

catalysts, and Mo/Al $_2O_3$  catalysts, structurally different OH surface groups on, quantitative  $^3H$  MAS NMR studies, 154, 65

Aluminum phosphate

catalysis of conversion of  $\alpha$ -methylated alcohols, 151, 307

Amines

aromatic, isomerization to methyl-aza-aromatics over zeolites, 155, 268 Aminomethyl pyridine

polyglycidyl methacrylate resin with, support of Mo(VI) catalysts for cyclohexene epoxidation, catalyst synthesis, characterization, and activity, **152**, 368

Amino species

adsorbed on RuS<sub>2</sub>, identification by inelastic neutron scattering, 157, 414

Ammonia

adsorption on

metal oxides, energy distribution of surface acid sites during, evaluation, **150**, 274; *errata*, **152**, 215, **157**, 270

RuS<sub>2</sub>, characterization: identification of amino species by inelastic neutron scattering, 157, 414

conversion reactions over CuO/γ-Al<sub>2</sub>O<sub>3</sub> catalysts, effects of formation of nitrate species, **152**, 75

and  $O_2$ , reaction with NO over  $Cu/\gamma$ - $Al_2O_3$  catalysts, adsorbed species and competitive pathways in, analysis, 152, 93

oxidation to NO over  $La_2MO_4$  (M = Co,Ni,Cu) catalysts, **157**, 749 reduction of NO,  $V_2O_5$ – $WO_3$ / $TiO_2$  catalysts for, reactivity and physicochemical characterization, **155**, 117

selective reduction of NO over

Cr<sub>2</sub>O<sub>3</sub> catalysts in absence and presence of O<sub>2</sub>, effect of water, N-labeling studies, **154**, 107

delaminated Fe<sub>2</sub>O<sub>3</sub>-pillared clay catalysts, 151, 135

ion-exchanged pillared clays, 155, 414

SCR catalysts, associated adsorption, activation, and oxidation of NH<sub>3</sub>, **157**, 523

TiO<sub>2</sub>-supported CrO<sub>2</sub>, CrOOH, and Cr<sub>2</sub>O<sub>3</sub> catalysts, in situ diffuse reflectance FTIR study, **157**, 312

V2O5/TiO2 catalysts

active sites and formulation of catalytic cycles, 151, 241

combined temperature-programmed *in situ* FTIR and on-line MS studies. **151**, 226

support effects in monolayer catalysts, 155, 171

Ammonia synthesis catalyst

crystallite shape and iron lattice orientation, 152, 243

Ammonium tetrathiomolybdate

decomposition, molybdenum sulfide catalysts prepared by, TPD and hydrogenation studies, 157, 536

Aniline

isomerization to methyl-aza-aromatics over zeolites, **155**, 268 liquid-phase oxidation over transition metal-substituted molecular sieves. **157**, 124

Applied bias

modification of catalytic activity of CuO/ZnO gradient composition heterocontact, **153**, 350

Aromatic compounds

formation by methane dehydro-oligomerization over Mo/HZSM-5 catalysts. **157.** 190

Aromatization

cyclohexane and *n*-hexane over Pt/KL catalysts, sulfur poisoning of catalyst during, analysis, **157**, 550

ethane, in Ga-MFI zeolites, effect of control of intrazeolitic Ga cation content, 157, 66

*n*-hexane, structure and catalytic selectivity of Ir clusters in K-LTL zeolites for, analysis, **155**, 131

by medium pore zeolites ZSM-5 and ZSM-22 and Eu-1, comparison, 153, 353

propane with H-ZSM-5 and Ga/H-ZSM-5 zeolites in presence of cofed NO, O<sub>2</sub>, and H<sub>2</sub>, **151**, 33

Arylamines

isomerization to methyl-aza-aromatics over zeolites, **155**, 268 Autoxidation

selective, hydrocarbons with O<sub>2</sub> over chromium aluminophosphate-5 molecular sieve catalysts, **153**, 1

Aza-aromatic compounds

ortho-substituted, formation by zeolite-catalyzed isomerization of aromatic amines, 155, 268

В

Basicity

alkali-exchanged X zeolites, microcalorimetric characterization, 157, 266

hydrotalcites, variation with structural parameters and effect on catalytic activity, **151**, 50

supported MoO<sub>3</sub> catalysts, effects in propylene oxidation, **157**, 740 supported vanadium catalysts, effects on oxidative dehydrogenation of *n*-butane, **157**, 271

Benzaldehyde

and acetone, condensation over hydrotalcite catalysts, sensitivity to catalyst basicity, **151**, 50

and substituted acetophenones. Claisen–Schmidt condensation over zeolite and hydrotalcite catalysts, in production of chalcones and flavanones of pharmaceutical interest, **151**, 60

Benzene

hydrogenation over

HY zeolites with encaged NiMo phases, 152, 275

Pd/C catalysts, effect of support pretreatment, 155, 327

Pt/carbon black catalysts, effects of graphitization of heat-treated support, **154**, 299

isopropylation with 2-propanol over high-silica large-pore zeolite NCL-1, 154, 216

liquid-phase alkylation with light olefins over  $\beta$  zeolites. **157**, 227 liquid-phase oxidation to phenol with O<sub>2</sub> over Cu-zeolites, **155**, 158 oxidation over micro-mesoporous amorphous titanosilicate catalysts, **157**, 501

and toluene, interaction with supported Rh catalyst, effect of carrier doping, 152, 331

Benzoic acid

vapor-phase oxidation to phenol over catalyst system with NiO and NiFe<sub>2</sub>O<sub>4</sub>, **151**, 323

Benzyl alcohol

oxidation on Cu-Na-ZSM-5 catalysts, effect of alkali promoters, 153, 254

Beryllium oxide

surface acid sites, energy distribution during NH<sub>3</sub> adsorption, evaluation, **150**, 274; errata, **152**, 215, **157**, 270

Bis(2-mercapto-2,2-diphenyl-ethanoate) dioxomolybdate (VI)

intercalated in Zn(II)-Al(III) layered double hydroxide, catalysis of air oxidation of thiols, **152**, 237

Bismuth

modified Pt(111) electrodes in sulfuric acid medium, CO adsorption and oxidation, 152, 264

promoted Pd catalysts, glucose oxidation, 152, 116

-Pt catalysts, Al<sub>2</sub>O<sub>3</sub>-supported, selective oxidation of cinnamyl alcohol to cinnamaldehyde, 153, 131

-Sn pyrochlore nonstoichiometric catalysts, oxidative coupling of methane, effect of catalyst composition. 153, 197

Book reviews

New Aspects of Spillover Effect in Catalysis. T. Inui et al. (Eds.), 1993, 152, 421

NMR Techniques in Catalysis. A. T. Bell and A. Pines (Eds.), 1994, 152, 419

Oscillating Heterogeneous Catalytic Systems. M. M. Slin'ko and N. I. Jaeger, 1994, **153**, 356

Surface Chemistry and Catalysis, G. A. Somorjai, 1994, **152**, 420 Borosilicates

chemical vapor deposition Fe/Mo/DBH molecular sieve catalysts, characterization and catalysis of alkylaromatic oxidation, **151**, 338

Butadiene

dimerization over Cu-exchanged zeolite Y, rate, effect of zeolitic water, 151, 456

1,3-Butadiene

and n-butane, adsorption and decomposition on vanadium carbide films on V(110), comparison, **154**, 80

hydrogenation over

Co-Pd catalysts, promoter effect of Pd, 157, 179

Pd/graphite thin film catalysts, morphological transformation of catalyst during, air and ultrahigh vacuum scanning tunneling microscopic studies, **156**, 120

self-supported model catalysts derived from Co-based cluster of clusters, 152, 396

n-Butane

and 1,3-butadiene, adsorption and decomposition on vanadium carbide films on V(110), comparison, **154**, 80

<sup>13</sup>C-labeled, skeletal rearrangement on sulfuric acid-treated ZrO<sub>2</sub> catalysts. 151, 26

cracking over

acidic zeolite catalysts, theoretical description, **153**, 94 Fe- and Mn-promoted sulfated ZrO<sub>2</sub> catalysts, **153**, 344 isomerization

over acidic mordenite, 155, 376

catalytic activity for, generation upon sulfate promotion of ZrO<sub>2</sub> supports prepared by sol-gel synthesis, **157**, 321

and disproportionation, over Fe- and Mn-promoted sulfated ZrO<sub>2</sub> superacid catalysts, **151**, 464

to isobutane over sulfated and metal-promoted ZrO<sub>2</sub> catalysts: acid site analysis, 151, 364

to isobutene by ferrierite and modified ferrierite catalysts, **157**, 423 over Pt/SO<sub>4</sub><sup>2</sup>-ZrO<sub>2</sub> and mechanical mixtures of Pt/Al<sub>2</sub>O<sub>3</sub> + SO<sub>4</sub><sup>2</sup>-ZrO<sub>2</sub>, **153**, 218

over SO<sub>4</sub><sup>2</sup> -ZrO<sub>2</sub> catalysts, effects of ZrO<sub>2</sub> crystalline structure and sulfate concentration, **151**, 96

over sulfate-doped ZrO2 catalysts, 157, 109

monomolecular conversion over H-ZSM-5 zeolites, 157, 388 oxidation

in fluidized bed reactors: olefin production, 155, 403

into maleic anhydride, role of VO(H<sub>2</sub>PO<sub>4</sub>)<sub>2</sub> precursor, **154,** 253

over VPO catalysts, associated evolution of catalyst during activation time, **156**, 28

oxidative dehydrogenation over supported V catalysts, effect of support acid-base character, 157, 271

partial oxidation to maleic anhydride over layered vanadyl(IV) phosphite-derived VPO catalysts, 156, 298

tert-Butanol, see tert-Butyl alcohol

1-Butanol, see n-Butyl alcohol

2-Butanol, see sec-Butyl alcohol

1-Butene

interaction with titanosilicates TS-1 and ETS-10, NMR studies, **155**, 345 isomerization over TiO<sub>2</sub>-SiO<sub>2</sub> and ZrO<sub>2</sub>-SiO<sub>2</sub> mixed oxide catalysts, relationship to catalyst proton affinity distributions, **157**, 244 oxidation over SiO<sub>2</sub>-supported Wacker catalysts

catalysis by Pd salts of heteropolyacids, 154, 187

heteropolyanions as catalyst redox components, 154, 175

skeletal isomerization on

10-member ring zeolite catalysts, 151, 467

WO<sub>3</sub>/γ-Al<sub>2</sub>O<sub>3</sub> catalysts

analysis, 154, 201

IR study, 156, 147

2-Butene

skeletal isomerization by WO<sub>3</sub>/ $\gamma$ -Al<sub>2</sub>O<sub>3</sub> catalysts, IR study, **156**, 147 n-Butyl alcohol

dehydration over SiO<sub>2</sub>-Ta<sub>2</sub>O<sub>5</sub> mixed oxides prepared by sol-gel method, **156**, 132

sec-Butyl alcohol

dehydration on Al<sub>2</sub>O<sub>3</sub> catalysts: mechanism of ether formation, 157, 359 tert-Butyl alcohol

conversion on AlPO<sub>4</sub> catalysts, 151, 307

tert-Butyl hydroperoxide

epoxidation of  $\alpha$ -isophorone over TiO<sub>2</sub>-SiO<sub>2</sub> catalysts, **157**, 665 oxidation of olefins on Ti-beta catalysts, **152**, 18

 $\mathbf{C}$ 

### Calcination

high-temperature, CuH-ZSM-5, associated rearrangement of cationic sites and reactivity loss, **157**, 603

Calorimetry, see also Microcalorimetry

hydrogenation of substituted pyrazine over Pd/C catalysts, 157, 201

# Caprylene

hydroformylation over supported homogeneous film catalysts, 155, 383

C<sub>6</sub>, formation and fate during 2-methylpentane cracking on USHY, **153**, 239

### Carbon

amorphous, heat-treated supports for Pt catalysts, graphitization, effects on catalyst properties, 154, 299

carbon-carbon bonds

double bonds

selective activation on metal carbides: comparison of n-butane and 1,3-butadiene reactions on vanadium carbide films on V(110), **154**, 80

in  $\alpha$ - $\beta$  unsaturated aldehydes, competitive adsorption on Pt and Pd surfaces in relation to selectivity of hydrogenation, theoretical analysis, **152**, 217

formation and cleavage on metal surfaces, mechanism: implications of 3,3-dimethyl-1-butene hydrogenolysis and homologation on Ru/SiO<sub>2</sub> catalysts, **152**, 306

single bonds, monomolecular cracking over acidic zeolite catalysts, theoretical description, **153**, 94

carbon-hydrogen bonds

in hydrocarbons, activation over transition metal oxide catalysts: FTIR study of hydrocarbon catalytic combustion over MgCr<sub>2</sub>O<sub>4</sub>, 151, 204

selective activation on metal carbides: comparison of n-butane and 1,3-butadiene reactions on vanadium carbide films on V(110), 154, 80

carbon-oxygen double bonds in  $\alpha-\beta$  unsaturated aldehydes, competitive adsorption on Pt and Pd surfaces in relation to selectivity of hydrogenation, theoretical analysis, **152**, 217

catalysis of selective production of acetylene from methane via processes using high-power pulsed radiofrequency and microwave radiation, **151**, 349

deposition, characterization by temperature-programmed oxidation, 156, 295

filamentous, metal-catalyzed formation, roles of ordinary and Soret diffusion, **152**, 42

support of

CoMo sulfide catalysts, hydrodeoxygenation of carbonyl, carboxyl, and guaiacol-type molecules: effects of support and addition of K and Pt, 154, 288

niobium sulfide catalysts, preparation for hydrodesulfurization reactions, **156**, 279

Pd catalysts

adsorption and absorption properties, effect of support pretreatment, 155, 312

catalytic behavior, effect of support pretreatment, 155, 327

hydrogenation of substituted pyrazine, calorimetric study, **157**, 201 morphological transformation of thin film catalysts during 1,3-butadiene hydrogenation, air and ultrahigh vacuum scanning tunneling microscopic studies, **156**, 120

Ru as dispersing agent during hydrogenation, 155, 166

Carbon black, see Carbon, amorphous

Carbon dioxide

decomposition on oxide-supported polycrystalline Cu catalysts, inverted temperature dependence, **157**, 153

hydrogenation over Rh/TiO<sub>2</sub> (W<sup>6</sup>·) catalysts, surface species formed during, FTIR and MS studies, **156**, 37

methanation over

Rh/CeO<sub>2</sub> and CeO<sub>2</sub>-promoted Rh/SiO<sub>2</sub> catalysts under transient and steady-state conditions, role of surface and bulk ceria, **151**, 111 Rh/CeO<sub>2</sub>, Rh/Nb<sub>2</sub>O<sub>5</sub>, and Rh/TiO<sub>2</sub> catalysts, metal-support interactions, **156**, 171

methanol synthesis over

clean and K-promoted Cu/SiO<sub>2</sub> catalysts, IR study, **154**, 314 Cu/ZnO catalysts at atmospheric pressure, mechanism, **157**, 403 reaction with ethylene and H<sub>2</sub> or H<sub>2</sub>O over PtSn/SiO<sub>2</sub> alloy catalysts, **156**, 139

reforming reactions over supported noble metal catalysts, molecular aspects, 157, 162

#### Carbonium ions

formation and collapse during monomolecular cracking of C-C single bonds over acidic zeolites, **153**, 94

#### Carbon monoxide

adsorption and oxidation on Pt(111) electrodes modified by irreversibly adsorbed Bi in sulfuric acid medium, 152, 264

#### and H<sub>2</sub>

formation of alcohols over Co-Cu/ZnO-Al<sub>2</sub>O<sub>3</sub> catalysts, effects of in situ addition of CH<sub>3</sub>NO<sub>2</sub>, **153**, 100

high-temperature reactions over Ru/TiO<sub>2</sub> and Ru-Rh/TiO<sub>2</sub> catalysts at high pressure, FTIR study, 157, 396

reaction with ethylene on Rh/SiO2 catalysts

dynamic and Langmuir-Hinshelwood-Hougen-Watson kinetic analysis, 151, 266

propionaldehyde formation during, transient response, 151, 253 hydrogenation over

Co/Al<sub>2</sub>O<sub>3</sub> catalysts, effects of La promotion, isotopic transient study, **153**, 224

Pd/C catalysts, effect of support pretreatment, 155, 327

Pd/SiO<sub>2</sub> catalysts, effect of Li<sup>+</sup> promotion, 157, 1

promoted Rh catalysts, formation of higher oxygenates: metalpromoter interaction in RhMn/NaY, 154, 245

Pt-promoted Co/Al<sub>2</sub>O<sub>3</sub> and Co/SiO<sub>2</sub> catalysts, 156, 85

Rh-Fe/NaY zeolite catalysts, analysis, 153, 144

Rh/SiO<sub>2</sub> catalysts, dynamics of adsorbed species during, IR studies, 157, 51

Rh/TiO<sub>2</sub> (W<sup>6+</sup>) catalysts, surface species formed during, FTIR and MS studies, **156**, 37

methanation on Ni surfaces, kinetics, 151, 216

methanol synthesis at atmospheric pressure over Cu/ZnO catalysts, mechanism, 157, 403

and NO, reaction on

Rh(110) and Rh(111) catalysts, selectivity, effect of surface structure, 155, 204

Rh/SiO<sub>2</sub> catalysts, step and pulse transient studies of IR-observable adsorbates in situ, 157, 512

and NO and  $O_2$ , interaction on  $Cu_xCo_{3-x}O_4$  catalysts, analysis by transient response technique, 156, 219

#### oxidation over

Au-ZrO<sub>2</sub>-iron oxide and Au-Ag-ZrO<sub>2</sub> catalysts prepared in situ,

CeO<sub>2-x</sub> nanocrystalline catalysts, effect of doping with La or Cu,

CuO/ZnO gradient composition heterocontact, effect of applied bias, 153, 350

La(Sr)MnO3 catalysts

ionic redox behavior during transient oxidation, 157, 545 solid electrolyte potentiometric study, 152, 147

 $Mn_2O_3$  and Pd catalysts, cooperative catalyst action in, analysis, 151, 279

Pd/C catalysts, effect of support pretreatment, 155, 327

Rh catalysts dispersed on SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, and TiO<sub>2</sub>, kinetics and oscillatory behavior, **156**, 265

Rh/CeO<sub>2</sub> catalysts, kinetics, 157, 222

transition metal-fluorite oxide composite catalysts analysis of catalyst composition and activity, **153**, 304 catalyst characterization and reaction kinetics, **153**, 317 reduction of NO over Pt-Rh/Al<sub>2</sub>O<sub>3</sub> catalysts, **154**, 276 Carbonylation

methanol with Ni-isoquinoline complex catalyst, kinetics, 156, 290 Carbonyl clusters

Rh<sub>4</sub>, attached on tris(hydroxymethyl)phosphine-modified SiO<sub>2</sub>, active sites in gas-phase olefin hydroformylation, structural control, **157**, 436

Carbonyl coupling

aliphatic alcohols on  ${\rm TiO_2}$  catalysts, effects of bulk titania crystal structure, 153, 41

# Carbonyl groups

hydrodeoxygenation over CoMo sulfide catalysts: effects of support and addition of K and Pt, 154, 288

## Carboxybenzimidazole

polystyrene resin with, support of Mo(VI) catalysts for cyclohexene epoxidation, catalyst synthesis, characterization, and activity, 152, 368

#### Carboxyl groups

hydrodeoxygenation over CoMo sulfide catalysts: effects of support and addition of K and Pt, 154, 288

#### Catalytic cycles

during isobutane cracking over Y-zeolite catalysts, role in determination of catalyst activity and selectivity, **153**, 65

in selective reduction of NO by NH $_3$  over  $V_2O_5/TiO_2$  catalysts, formulation, 151, 241

### Ceramic foam monoliths

Pt-coated, in oxidative dehydrogenation of isobutane at short contact times, **155**, 82

Ceria, see Ceric oxide

#### Ceric oxide

catalysts, and catalysts supported by, reactions of acetaldehyde, **155**, 219 NO adsorption, decomposition, and reduction by methane, **155**, 290 support of

Na<sub>2</sub>WO<sub>4</sub>, and related catalysts, oxidative coupling of methane, **154**, 163

Pt catalysts, metal-support interactions: comparison with Pt/TiO<sub>2</sub> catalysts, 155, 148

Rh catalysts

CO oxidation, kinetics, 157, 222

CO<sub>2</sub> reforming reactions, molecular aspects, **157**, 162

metal-support interactions, characterization based on CO<sub>2</sub> methanation activity, **156**, 171

and promoted Rh/SiO<sub>2</sub> catalysts, CO<sub>2</sub> methanation under transient and steady-state conditions, role of surface and bulk ceria, **151**, 111

 -ZrO<sub>2</sub> solid solutions, Rh-loaded, reduction behavior and oxygen storage capacity, dependence on structural properties, 151, 168

# Cerium oxides

CeO<sub>2-x</sub> nanocrystalline catalysts, redox activity, analysis in pure and La- or Cu-doped catalysts, **157**, 42

-Cu catalysts, total oxidation of CO and methane catalyst characterization and reaction kinetics, 153, 317 catalyst composition and activity, 153, 304

## Cesium

doped  $V_2O_5$ -Fe<sub>2</sub>O<sub>3</sub> catalysts, active species in, analysis, **154**, 11 exchanged X zeolites, basicity, microcalorimetric characterization, **157**, 266

# Chalcones

pharmaceutically useful, production by Claisen-Schmidt condensation on zeolite and hydrotalcite catalysts, 151, 60

# Chemical vapor deposition

Fe/Mo/DBH molecular sieve catalysts prepared by, characterization and catalysis of alkylaromatic oxidation, 151, 338

low-temperature organometallic, in one-step preparation of highly dispersed supported Rh catalysts, 157, 294

#### Chemisorption

in characterization of low-loaded Pd/Al<sub>2</sub>O<sub>3</sub> catalysts, **153**, 86 methane on Al and La oxide surfaces, ab initio SCF MO study, **156**, 273 volumetric, hydrogen, optimization for dispersions of Ru/SiO<sub>2</sub> catalysts, **156**, 60

#### Chloride

addition to Li<sup>+</sup>-MgO catalyst, effect on oxidative dehydrogenation of ethane, **151**, 155

effect on photoactivity of aqueous suspension of TiO<sub>2</sub>, **153**, 32 Chlorine

role in induction periods during methane oxidation over Pd/SiO<sub>2</sub> catalysts, 152, 410

#### Chlorofluorocarbons

CFC12, decomposition on TiO2 catalysts, 151, 394

Chromia, see Chromic oxide

Chromic oxide

conditioned catalysts, isomerization of 1,1,2,2-tetrafluoroethane, kinetic and mechanistic study, **155**, 283

 -CuO-ZnO catalysts, structural and surface properties, relationship to selectivity in higher alcohol synthesis, 156, 208

redox properties derived from TPR and TPO studies, correlation with catalytic activity for hydrofluoroalkane synthesis, 152, 70

TiO2-supported catalysts

preparation and characterization, 157, 301

selective reduction of NO by NH<sub>3</sub>, in situ diffuse reflectance FTIR spectroscopic study, **157**, 312

#### α-Chromic oxide

selective catalytic reduction of NO with NH<sub>3</sub> in presence and absence of O<sub>2</sub>, effect of water, N-labeling studies, **154**, 107

#### Chromium

catalysis of filamentous carbon formation, roles of ordinary and Soret diffusion. 152, 42

doped Raney nickel catalysts, acetone hydrogenation, associated electrode potential: influence of solution and reaction kinetics, 155, 12 halogenated metalloporphyrin complexes with, for selective catalytic reactions of acyclic alkanes with O<sub>2</sub>, 155, 59

SiO<sub>2</sub>-supported catalysts, ethylene polymerization, initiation, FTIR study, **154**, 329

#### Chromium aluminophosphate-5

molecular sieve catalysts, selective oxidation of hydrocarbons with  $O_2$ , 153, 1

# Chromium dioxide

 $TiO_2\text{-supported catalysts}$ 

preparation and characterization, 157, 301

selective reduction of NO by NH<sub>3</sub>, in situ diffuse reflectance FTIR spectroscopic study, **157**, 312

# Chromium peroxide

TiO2-supported catalysts

preparation and characterization, 157, 301

selective reduction of NO by NH<sub>3</sub>, in situ diffuse reflectance FTIR spectroscopic study, **157**, 312

# Cinchona

modified Pt catalyst for enantioselective hydrogenation, template model, letter to editor, 156, 175; reply, 156, 180

#### Cinnamaldehyde

adsorption geometries on Pt and Pd surfaces, analysis in terms of selective hydrogenation, 152, 217

formation by selective oxidation of cinnamyl alcohol with air over Bi-Pt/Al<sub>2</sub>O<sub>3</sub> catalysts, 153, 131

# Cinnamyl alcohol

selective oxidation to cinnamal dehyde with air over  $Bi-Pt/Al_2O_3$  catalysts, 153, 131

# Claisen-Schmidt condensation

production of chalcones and flavonones of pharmaceutical interest on zeolite and hydrotalcite catalysts, 151, 60

#### Clavs

pillared, see Pillared clays

#### Cobalt

Al<sub>2</sub>O<sub>3</sub>-supported catalysts

La promotion for CO hydrogenation, isotopic transient study, 153, 224

Pt-promoted, CO hydrogenation, 156, 85

based clusters of clusters, self-supported model catalysts derived from, characterization and activity for 1,3-butadiene hydrogenation, 152, 396

catalysis of filamentous carbon formation, roles of ordinary and Soret diffusion, **152**, 42

CeO<sub>2</sub>-supported catalysts, reactions of acetaldehyde, 155, 219

-Cu catalysts, ZnO-Al<sub>2</sub>O<sub>3</sub>-supported, alcohol synthesis from CO/H<sub>2</sub>, effects of in situ addition of CH<sub>3</sub>NO<sub>2</sub>, 153, 100

Cu<sub>x</sub>Co<sub>3-x</sub>O<sub>4</sub> catalysts, interaction of CO, NO, and O<sub>2</sub> on, analysis by transient response technique, **156**, 219

K-promoted catalysts, in situ XAFS study, 151, 17

La<sub>2</sub>CoO<sub>4</sub> catalysts, NH<sub>3</sub> oxidation to NO, 157, 749

#### -Mo catalysts

Al<sub>2</sub>O<sub>3</sub>-supported, for hydrotreatment and hydroconversion of petroleum fractions, nuclear microprobe analysis, **152**, 103

γ-Al<sub>2</sub>O<sub>3</sub>-supported, sulfided, XPS and NO adsorption studies, 156, 243

supported sulfided catalysts, hydrodeoxygenation of carbonyl, carboxyl, and guaiacol-type molecules: effects of support and addition of K and Pt, 154, 288

#### -Pd catalysts

1,3-butadiene hydrogenation, promoter effect of Pd, 157, 179

CeO<sub>2</sub>-supported, reactions of acetaldehyde, 155, 219

promotion of molybdenum sulfide catalysts prepared by ammonium tetrathiomolybdate decomposition, TPD and hydrogenation studies, **157**, 536

 -Rh calcined catalysts, Nb<sub>2</sub>O<sub>5</sub>-supported, particle and phase thicknesses, determination by XPS analysis, 152, 164

role in activation of VPO catalyst precursor VO(HPO<sub>4</sub>) · 0.5H<sub>2</sub>O prepared by isobutanol reduction of V<sub>2</sub>O<sub>5</sub>, in situ laser Raman spectroscopic study, **157**, 687

# SiO<sub>2</sub>-supported catalysts

Fischer-Tropsch synthesis reactions

effect of Zr promotion, 157, 35

eggshell catalysts for, synthesis and properties, 153, 108

prereduced and precalcined, effects of aqueous impregnation, 157, 25 Pt-promoted, CO hydrogenation, 156, 85

selectivity for high-temperature hydrogenation of acetone, **157**, 461 surface properties, effects of activation, **154**, 56

 ZSM-5 zeolite catalysts for ethane oxydehydrogenation, <sup>18</sup>O<sub>2</sub> temperature-programmed isotope exchange study, 154, 24

# Coke

induced stabilization of silylated ZSM-5 catalytic activity during alkylation of ethylbenzene, 155, 154

# Coking

reforming catalyst in supercritical reaction mixtures, olefinic oligomer and cosolvent effects, 152, 31

#### Combustion

hydrocarbons over MgCr<sub>2</sub>O<sub>4</sub> catalysts, FTIR study, 151, 204

methane on Mn<sub>3</sub>O<sub>4</sub> catalysts on hexaaluminate microcrystals, enhancement by formation of coherent spinel surface layers, **157**, 713

#### Condensation

acetone and acetaldehyde, chemistry at Brønsted acid sites in H-ZSM-5, <sup>13</sup>C NMR study, **151**, 373

acetone and benzaldehyde over hydrotalcite catalysts, sensitivity to catalyst basicity, 151, 50

Claisen-Schmidt, production of chalcones and flavonones of pharmaceutical interest on zeolite and hydrotalcite catalysts, 151, 60

### Conversion

effect on selectivity in enantioselective hydrogenation of ethyl pyruvate, 154, 91

gas-phase, cyclohexanol over Mg<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub> catalysts, effect of sodium carbonate addition, 157, 97

*n*-hexane on supported Pt catalysts, letter to editor, **156**, 301; reply, **156**, 304

isobutane over  $Al_2O_3$  catalysts, effect of catalyst fluoridation, 157, 721 monomolecular, light alkanes over H–ZSM-5 zeolites, 157, 388

oxidative, methane to syngas over Ni/Al<sub>2</sub>O<sub>3</sub> catalysts, effects of noble metal addition, **157**, 752

#### Copper

-CeO<sub>2</sub> catalysts, total oxidation of CO and methane catalyst characterization and reaction kinetics, 153, 317

catalyst composition and activity, 153, 304

-Co catalysts, ZnO-Al<sub>2</sub>O<sub>3</sub>-supported, alcohol synthesis from CO/H<sub>2</sub>, effects of in situ addition of CH<sub>3</sub>NO<sub>2</sub>, 153, 100

 $Cu_xCo_{3-x}O_4$  catalysts, interaction of CO, NO, and  $O_2$  on, analysis by transient response technique, **156**, 219

Cu(100) single-crystal catalysts, methanol synthesis, kinetic model, 156, 229

doped  $CeO_{2-x}$  nanocrystalline catalysts, effect on redox activity, 157, 42 exchanged pillared clays, selective catalytic reduction of NO by hydrocarbons and NH<sub>3</sub>, 155, 414

La<sub>2</sub>CuO<sub>4</sub> catalysts, NH<sub>3</sub> oxidation to NO, 157, 749

precipitated Fischer-Tropsch catalyst of composition 100 Fe/5 Cu/ 4.2 K/25 SiO<sub>2</sub>, activation studies

catalyst characterization, 155, 353

reaction studies, 155, 366

SiO<sub>2</sub>-supported catalysts, K-promoted

and clean catalysts, methanol synthesis from CO<sub>2</sub>, IR study, **154**, 314 formic acid and formaldehyde adsorption, FTIR study, **155**, 52

 Ti amorphous alloy catalyst, 2-propanol dehydrogenation, catalyst activation and surface characterization in, comparison with Cu-Zr, 153, 333

and ZnO, synergistic effects in hydrogenation of Cu- and ZnO-derived formates on Cu/ZnO catalysts, 157, 259

ZnO-Al<sub>2</sub>O<sub>3</sub>-supported polycrystalline catalysts, CO<sub>2</sub> decomposition, inverted temperature dependence, **157**, 153

ZnO-supported catalysts, methanol synthesis from CO<sub>2</sub> and from CO, mechanisms, **157**, 403

ZSM-5 catalysts containing

for ethane oxydehydrogenation, <sup>18</sup>O<sub>2</sub> temperature-programmed isotope exchange study, **154**, 24

surface isocyanate complex, IR study, 156, 75

#### Cosolvents

and olefinic oligomers, effects on coking and activity of reforming catalysts in supercritical reaction mixtures, 152, 31

## Cracking, see also Hydrocracking

n-butane over Fe- and Mn-promoted sulfated ZrO<sub>2</sub> catalysts, 153, 344
 -dehydrogenation, cumene on pillared clay and acid-activated pillared clay catalysts, comparison, 153, 76

*n*-heptane on H-ZSM-5 zeolites under high hydrogen pressure, kinetics and mechanism, **152**, 189

n-hexane over Pt mordenite catalysts, in parallel with skeletal isomerization, activation energies for, falsification by pore diffusion, 154, 364

isobutane over Y-zeolite catalysts

catalytic cycles and reaction selectivity, 153, 65

kinetic model, 153, 54

and isomerization, heptane on Pd/H-beta zeolites, reaction mechanisms, 155, 141

light alkanes over H-ZSM-5 zeolites, 157, 388

2-methylpentane on

steamed HY catalyst, effects of extraction of extraframework Al, 157. 209

USHY, formation of C<sub>6</sub> isomers during, analysis, 153, 239

monomolecular, C-C single bonds over acidic zeolite catalysts, theoretical description, **153**, 94

## Crotonaldehyde

adsorption geometries on Pt and Pd surfaces, analysis in terms of selective hydrogenation, 152, 217

reactions on Pt/SiO<sub>2</sub> catalysts, activity and selectivity, 151, 431

#### Crystal phases

pure and lanthanide-modified  $ZrO_2$ , neutron scattering study, 157, 636 sulfate-doped  $ZrO_2$  catalysts, analysis, 157, 109

#### Cumene

cracking-dehydrogenation on pillared clay and acid-activated pillared clay catalysts, comparison, **153**, 76

### Cumene hydroperoxide

epoxidation of

 $\alpha$ -isophorone over TiO<sub>2</sub>-SiO<sub>2</sub> catalysts, **157**, 665

olefins over TiO2-SiO2 aerogels, 153, 177

#### Cupric chloride

catalysts for low-temperature oxyhydrochlorination of ethylene, mobilities of active species in, effects of supports and promoters, **157**, 380

# $\gamma$ -Al<sub>2</sub>O<sub>3</sub>-supported catalysts, NO adsorption

adsorbed species and competitive pathways in NO reaction with NH<sub>3</sub> and O<sub>2</sub>, **152**, 93

nitrate species formation and effects of reactivity in NO and NH<sub>3</sub> conversion, **152**, 75

 $-\text{Fe}_2\text{O}_3-\text{K}_2\text{O}$  Fischer-Tropsch synthesis catalysts, precipitated, activation effects, 156, 185

-ZnO-Cr<sub>2</sub>O<sub>3</sub> catalysts, structural and surface properties, relationship to selectivity in higher alcohol synthesis, 156, 208

 -ZnO gradient composition heterocontact, modification of catalytic activity by applied bias, 153, 350

## Cuprous oxide

 $-\text{TiO}_2$  catalysts, adsorption, activation, and oxidation of NH<sub>3</sub>, **157**, 523 Cyclic operation

in analysis of reaction dynamics of NO reduction by ethylene over Cu-ZSM-5 under lean conditions, 155, 184

#### Cyclobutanes

monoalkyl-substituted, ring-opening hydrogenation over Ni/SiO<sub>2</sub> catalysts, 151, 315

# Cyclododecene

epoxidation, TiO<sub>2</sub>-SiO<sub>2</sub> catalysts for, catalytic behavior, **153**, 177 Cyclohexane

dehydrogenation over Pt/KL catalysts, sulfur poisoning of catalyst during, analysis, 157, 550

oxidation on titanium silicalite-1: overoxidation and comparison with other oxidation systems, 157, 631

selective oxidation with O<sub>2</sub> over chromium aluminophosphate-5 molecular sieve catalysts, **153**, 1

### Cyclohexanol

gas-phase conversion over Mg<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub> catalysts, effect of sodium carbonate addition, **157**, 97

gas-phase dehydrogenation-dehydration over sodium carbonatedoped zinc phosphate catalysts, selectivity, 151, 44

oxidation on titanium silicalite-1, 157, 631

# Cyclohexanone

oxidation on titanium silicalite-1, 157, 631

#### Cyclohexene

epoxidation

over Mo(VI) catalysts supported on imidazole-containing polymers catalyst synthesis, characterization, and activity, **152**, 368

recycling of polybenzimidazole-supported Mo(VI) in, analysis, 152, 377

TiO<sub>2</sub>-SiO<sub>2</sub> catalysts for, catalytic behavior, 153, 177

hydrogenation by MgO-supported tetrairidium clusters. **154**, 335 oxidation over Ti-MCM-41 structures. **156**, 65

1,3-Cyclooctadiene

liquid-phase hydrogenation over pumice-supported Pd-Pt bimetallic catalysts, **151**, 125

1-Cyclopentylethanol

dehydration on Al<sub>2</sub>O<sub>3</sub> catalysts: mechanism of ether formation, 157, 359

D

#### Deactivation

and simultaneous compound formation, in sulfuric acid catalysts and related model systems, **155**, 32

#### Decomposition

1.3-butadiene and n-butane on vanadium carbide films on V(110), comparison, 154, 80

chlorofluorocarbon CFC12 on TiO2 catalysts, 151, 394

CO<sub>2</sub> on oxide-supported polycrystalline Cu catalysts, inverted temperature dependence, **157**, 153

ethyl chloride on oxide-supported Pt catalysts, **157**, 730 NO

over Cu-ZSM-5, IR study, 157, 592

over rare earth oxide catalysts, 155, 290

N<sub>2</sub>O

Cu-ZSM-5 and Cu-Y catalysts for, comparison, **153**, 190 over heterogeneous rare earth ion photocatalysts, **157**, 262 Dehydration

aliphatic alcohols on TiO<sub>2</sub> catalysts, effects of bulk titania crystal structure, 153, 41

1-butanol on

pillared clay and acid-activated pillared clay catalysts, comparative study, **153**, 76

SiO<sub>2</sub>-Ta<sub>2</sub>O<sub>5</sub> mixed oxides prepared by sol-gel method, **156**, 132 –dehydrogenation

gas-phase, cyclohexanol over sodium carbonate-doped zinc phosphate catalysts, selectivity, **151**, 44

 $\alpha$ -methylated alcohols on AlPO<sub>4</sub> catalysts, 151, 307

methyl  $\alpha$ -hydroxyisobutyrate over zeolite catalysts, 151, 10

secondary alcohols on Al<sub>2</sub>O<sub>3</sub> catalysts: mechanism of ether formation, **157**, 359

Dehydrocyclization

n-octane on Pt-Sn/SiO<sub>2</sub> catalysts: H/D exchange and reversible adsorption, **157**, 626

Dehydrogenation

aliphatic alcohols on TiO<sub>2</sub> catalysts, effects of bulk titania crystal structure. **153**, 41

C<sub>2</sub>, in Ga-MFI zeolites, effect of control of intrazeolitic Ga cation content, **157**, 66

cracking, cumene on pillared clay and acid-activated pillared clay catalysts, comparison, **153**, 76

cyclohexane over Pt/KL catalysts, sulfur poisoning of catalyst during, analysis, 157, 550

-dehydration

gas-phase, cyclohexanol over sodium carbonate-doped zinc phosphate catalysts, selectivity, **151**, 44

 $\alpha$ -methylated alcohols on AlPO<sub>4</sub> catalysts, **151**, 307

isobutane over Pt/SiO<sub>2</sub> and PtSn/SiO<sub>2</sub> catalysts, effects of potassium, **157**, 576

oxidative, see Oxidative dehydrogenation

2-propanol over Cu-Ti amorphous alloy catalyst, comparison with Cu-Zr: catalyst activation and surface characterization, **153**, 333

Dehydro-oligomerization

methane to ethylene and aromatics over Mo/HZSM-5 catalysts, 157, 190

Deoxygenation

nitrobenzene on oxidic catalysts, role of Mars and van Krevelen mechanism, 157, 706

Deposition

chemical vapor, see Chemical vapor deposition

Desorption

olefin, during isobutane cracking over Y-zeolites, role in catalytic activity and selectivity, **153**, 65

propylene from Ag(110), kinetics, effect of subsurface oxygen, **153**, 158 Deuterium

-hydrogen exchange

in dehydrocyclization of *n*-octane on PtSn/SiO<sub>2</sub> catalysts, analysis, **157**, 626

between perdeuterioisobutane and H-zeolites, analysis, 151, 1

in unsaturated hydrocarbons on Pd(100)-p(1  $\times$  1)-H(D) catalysts, **155**, 336

-propene addition and exchange reactions over dispersed ZrO<sub>2</sub> catalysts, mechanism, support effects, **154**, 306

Diethylsebacate

hydrodeoxygenation over CoMo sulfide catalysts: effect of support and addition of K and Pt on catalytic performance, **154**, 288

Differential thermal analysis

and thermogravimetric analysis and mass spectrometry, sulfated ZrO<sub>2</sub> catalysts with and without Pt, **153**, 123

Diffusion, see also Pore diffusion

bulk, limitations, influence on selectivity in enantioselective hydrogenation of ethyl pyruvate, **154**, 91

ordinary and Soret, roles in metal-catalyzed formation of filamentous carbon, **152**, 42

Dihydrocinchonidine

modified Pt catalysts, enantioselective hydrogenation of ethyl pyruvate: influence of conversion and bulk diffusion limitations, **154**, 91

Dimerization

butadiene over Cu-exchanged zeolite Y, rate, effect of zeolitic water, 151, 456

oxidative, methane on supported alkali molten carbonate catalysts, 152, 204

2,3-Dimethylbutane

cracking on USHY, formation of C<sub>6</sub> olefins and paraffin isomers, analysis, **153**, 239

3.3-Dimethyl-1-butene

hydrogenolysis and homologation on Ru/SiO<sub>2</sub> catalysts, implications for mechanism of C-C bond formation and cleavage on metal surfaces, **152**, 306

Dinitrogen monoxide, see Nitrous oxide

Dispersion

Pt catalysts, effects of graphitization of heat-treated carbon black support, **154**, 299

Rh/Al<sub>2</sub>O<sub>3</sub> catalysts, effect of Al<sub>2</sub>O<sub>3</sub> phase structure, **151**, 385

Disproportionation

n-butane by Fe- and Mn-promoted sulfated ZrO<sub>2</sub> catalysts, 153, 344
 n-butane isomerization products over sulfated Fe- and Mn-promoted ZrO<sub>2</sub> superacid catalysts, 151, 464

1.2.4-trimethylbenzene on Y-type zeolite and pillared montmorillonite, stabilization of catalytic activities for, effect of spillover hydrogen, 154, 41

Dissociation

and adsorption, CH<sub>2</sub>Cl<sub>2</sub> on Pd/SiO<sub>2</sub> catalysts, infrared spectroscopic study: generation of CH<sub>2</sub> species, **155**, 74

NO on Rh-Sn/SiO<sub>2</sub> catalysts, molecular reaction intermediate and mechanism, **157**, 472

DRIFTS, see Fourier transform infrared spectroscopy, diffuse reflectance

Drying methods

effects on structural properties of TiO<sub>2</sub>-SiO<sub>2</sub> catalysts, 153, 165

 $\mathbf{E}$ 

Eggshell catalysts

Co/SiO<sub>2</sub>, for Fischer-Tropsch synthesis, synthesis and catalytic properties, **153**, 108

Electrocatalysis

propylene oxide synthesis on Pt black during water electrolysis, **157**, 450 Electrochemical modification

non-Faradaic, catalytic activity in Rh-catalyzed  $C_2H_4$  oxidation, 154, 124

Electrochemical oxygen ion pumping

oxygen species formed by, analysis with temperature-programmable electrochemical cell, **155**, 21

Electrochemical promotion

NO reaction with ethylene over  $Pt/\beta''$ -Al<sub>2</sub>O<sub>3</sub> catalysts, **152**, 211

Pt(111), modified by irreversibly adsorbed Bi in sulfuric acid medium, CO adsorption and oxidation, **152**, 264

Electrolysis

water, electrocatalytic synthesis of propylene oxide on Pt black during, analysis, 157, 450

Electron microscopy

low-loaded Pd/Al<sub>2</sub>O<sub>3</sub> catalysts, 153, 86

Pd supported on Al<sub>2</sub>O<sub>3</sub>, SiO<sub>2</sub>, and ZrO<sub>2</sub> in oxygen, *in situ* studies, **157**, 676

Electron paramagnetic resonance

Ag/SiO<sub>2</sub> catalysts with wide range of Ag crystallite dispersion, **151**, 87 CuH-ZSM-5 up to 500°C in flowing dry mixtures of NO (NO<sub>2</sub>), C<sub>3</sub>H<sub>6</sub> (C<sub>2</sub>H<sub>5</sub>OH), and excess O<sub>2</sub>, in situ studies, **152**, 63

Electron spin resonance, see Electron paramagnetic resonance Energy distribution

metal oxide surface acid sites during NH<sub>3</sub> adsorption, evaluation, **150**, 274; errata, **152**, 215, **157**, 270

Enthalpy

changes during adsorption and reaction of CO,  $O_2$ , and CO +  $O_2$  over Pd metal and Pd/SnO<sub>2</sub> catalysts, effect of catalyst pretreatment, 153, 208

**Epoxidation** 

cyclohexene over Mo(VI) catalysts supported on imidazole-containing polymers

catalyst synthesis, characterization, and activity, 152, 368

recycling of polybenzimidazole-supported Mo(VI) in, analysis, 152, 377

ethylene,  $Ag/\alpha$ - $Al_2O_3$ -supported catalysts for, real structure of Ag particles of different dispersity, **154**, 194

1-hexene over titanium silicate catalysts synthesized in presence of alkali metal and alkaline earth ions, 151, 77

 $\alpha$ -isophorone with hydroperoxides over TiO<sub>2</sub>-SiO<sub>2</sub> catalysts, **157**, 665 olefins, TiO<sub>2</sub>-SiO<sub>2</sub> catalysts for, catalytic behavior, **153**, 177

styrene over titanium silicate molecular sieve TS-1 using dilute  $H_2O_2$  as oxidizing agent, **156**, 163

ESR, see Electron paramagnetic resonance

Ethane

catalytic oxidation in fluidized bed reactors: olefin production, **155**, 403 dehydrogenation in Ga-MFI zeolites, effect of control of intrazeolitic Ga cation content, **157**, 66

hydrogenolysis over

Pd/SiO<sub>2</sub> catalysts, effect of Li<sup>+</sup> promotion, 157, 1

Ru/NaY catalysts, effects of cluster size on catalytic activity and XANES, 153, 232

Ru/SiO<sub>2</sub> catalysts, isotopic transient kinetic analysis, **154**, 1 oxidative dehydrogenation over

Li'-MgO catalyst, effect of chloride addition to catalyst, **151**, 155 transition-metal-containing ZSM-5 zeolites, <sup>18</sup>O<sub>2</sub> temperature-programmed isotope exchange study, **154**, 24

Ethanol, see Ethyl alcohol

Ethers

formation by dehydration of secondary alcohols on Al<sub>2</sub>O<sub>3</sub> catalyst, mechanism, **157**, 359

Ethyl alcohol

adsorption and reaction on TiO<sub>2</sub> catalysts, effects of bulk titania crystal structure, **153**, 41

alkylation of ethylbenzene over silylated ZSM-5 catalysts: coke-induced stabilization of catalytic activity, **155**, 154

conversion on AlPO4 catalysts, 151, 307

and isobutene, reaction to form ethyl tert-butyl ether on H-mordenite, gas-phase kinetics and DRIFTS studies, 157, 645

or propylene, flowing dry mixtures with NO or  $NO_2$  and excess  $O_2$ , CuH-ZSM-5 in, in situ ESR monitoring up to  $500^{\circ}C$ , 152, 63

synthesis from CO/H<sub>2</sub> over Co-Cu/ZnO-Al<sub>2</sub>O<sub>3</sub> catalysts, effects of *in situ* addition of CH<sub>3</sub>NO<sub>2</sub>, **153**, 100

Ethylbenzene

alkylation with ethanol over silylated ZSM-5 catalysts: coke-induced stabilization of catalytic activity, **155**, 154

selective oxidation with O<sub>2</sub> over chromium aluminophosphate-5 molecular sieve catalysts, **153**, 1

Ethyl tert-butyl ether

synthesis on H-mordenite, gas-phase kinetics and DRIFTS studies, 157, 645

Ethyl chloride

decomposition on oxide-supported Pt catalysts, 157, 730

Ethylene

epoxidation,  $Ag/\alpha$ - $Al_2O_3$ -supported catalysts for, real structure for Ag particles of different dispersity, **154**, 194

formation by methane dehydro-oligomerization over Mo/HZSM-5 catalysts, **157**, 190

and  $H_2$  or  $H_2O$ , reaction with  $CO_2$  over  $PtSn/SiO_2$  alloy catalysts, 156, 139

hydroformylation over Rh/SiO<sub>2</sub> catalysts

dynamic and Langmuir-Hinshelwood-Hougen-Watson kinetic analysis, **151**, 266

propionaldehyde formation during, transient response, 151, 253

liquid-phase alkylation of benzene over  $\beta$  zeolites, 157, 227

and NO, reaction over  $Pt/\beta''$ -Al $_2$ O $_3$  catalysts, electrochemical promotion, **152**, 211

and NO and O<sub>2</sub>, reaction over Pt–ZSM-5 catalysts under highly oxidizing conditions, autonomous kinetic oscillations during, analysis, **157**, 14

oxidation, Rh catalysts for, catalytic activity, non-Faradaic electrochemical modification, **154**, 124

oxyhydrochlorination at low temperature, CuCl<sub>2</sub> catalysts for, mobilities of active species in, effects of supports and promoters, **157**, 380 polymerization on Cr/SiO<sub>2</sub> catalysts, initiation, FTIR study, **154**, 329 reduction of NO over Cu–ZSM-5 under lean conditions, reaction dynamics, analysis by transient experimental techniques, **155**, 184

Ethyl pyruvate

enantioselective hydrogenation on

dihydrocinchonidine-modified Pt catalysts, influence of conversion and bulk diffusion, **154**, 91

Pt/Al<sub>2</sub>O<sub>3</sub> catalysts, effect of (R)-2-(1-pyrrolidinyl)-1-(1-naphthyl) ethanol, **154**, 371

Exchange reactions

propene-deuterium, over dispersed ZrO<sub>2</sub> catalysts, support effects, 154, 306

F

#### Ferric oxide

-CuO-K<sub>2</sub>O Fischer-Tropsch synthesis catalysts, precipitated, activation effects, 156, 185

delaminated Fe<sub>2</sub>O<sub>3</sub>-pillared clay, preparation, characterization, and activity for selective catalytic reduction of NO by NH<sub>3</sub>, **151**, 135

-MgO catalysts, adsorption, activation, and oxidation of NH<sub>3</sub>, 157, 523

-V<sub>2</sub>O<sub>5</sub> catalysts, Cs-doped, active species in, analysis, **154,** 11

# γ-Ferric oxide

selective oxidation of nitrosobenzene and deoxygenation of nitrobenzene, role of Mars and van Krevelen mechanism, 157, 706

# Ferric phosphate

catalysis of methane oxidation to methanol with  $H_2$ - $O_2$  gas mixture at atmospheric pressure, 155, 256

#### Ferrierite

catalysis of skeletal isomerization of 1-butene, 151, 467

and modified ferrierite, catalysis of *n*-butane isomerization to isobutene, **157**, 423

#### Film catalysts

homogenous, SiO<sub>2</sub>-supported, hydroformylation of olefins, **155**, 383 thin, Pd/graphite, morphological transformation during 1,3-butadiene hydrogenation, air and ultrahigh vacuum scanning tunneling microscopic studies, **156**, 120

#### Fischer-Tropsch synthesis

catalysis by Ru/TiO $_2$  catalysts, effect of sodium, 152, 350 Co/SiO $_2$  catalysts for

effect of Zr promotion, 157, 35

eggshell catalysts, synthesis and catalytic properties, 153, 108

Fe<sub>2</sub>O<sub>3</sub>-CuO-K<sub>2</sub>O catalysts for, precipitated, activation effects, **156**, 185  $\alpha$ -olefin readsorption in, chain-length dependence, **152**, 137 precipitated Fe catalyst for, activation studies

catalyst characterization, 155, 353

reaction studies, 155, 366

#### Flavanones

pharmaceutically useful, production by Claisen-Schmidt condensation on zeolite and hydrotalcite catalysts, 151, 60

# Fluidized bed reactors

olefin production by catalytic oxidation of alkanes, 155, 403

#### Fluorene

gas-phase oxidation on V<sub>2</sub>O<sub>5</sub>-Fe<sub>2</sub>O<sub>3</sub> catalysts, effects of Cs doping, **154**, 11

## Fluoridation

Al<sub>2</sub>O<sub>3</sub> catalysts, effect on isobutane reactions, 157, 721

# Fluorination

CF<sub>3</sub>CH<sub>2</sub>Cl, chromium(III) oxide catalysts for, TPR and TPO studies, 152, 70

## Fluorite oxides

-transition metal composite oxides, total oxidation of CO and methane catalyst characterization and reaction kinetics, **153**, 317 catalyst composition and activity, **153**, 304

#### Formaldehyde

formation by methane oxidation over V/SiO<sub>2</sub> catalysts, role of V-O double bond sites, **156**, 167

and formic acid, adsorption on K-promoted Cu/SiO<sub>2</sub> catalysts, FTIR study, 155, 52

oxidation over Ag catalysts, 154, 230

#### Formate

Cu- and ZnO-derived, hydrogenation on Cu/ZnO catalysts, synergistic effects between Cu and ZnO, 157, 259

# Formic acid

and formaldehyde, adsorption on K-promoted Cu/SiO<sub>2</sub> catalysts, FTIR study, 155, 52

Fourier transform infrared spectroscopy

CO/H<sub>2</sub> reactions over Ru/TiO<sub>2</sub> and Ru-Rh/TiO<sub>2</sub> catalysts at high temperature and pressure, **157**, 396

diffuse reflectance, in situ studies of

 $CrO_2$ , CrOOH, and  $Cr_2O_3$  in selective catalytic reduction of NO by  $NH_3$ , 157, 312

ethyl tert-butyl ether synthesis on H-mordenite, 157, 645

in far infrared, silicalite-1 and titanium silicalite-1, 157, 482

formic acid and formaldehyde adsorption on K-promoted Cu/SiO<sub>2</sub> catalysts, **155**, 52

hydrocarbon combustion over MgCr<sub>2</sub>O<sub>4</sub> catalysts, 151, 204

initiation of ethylene polymerization on Cr/SiO<sub>2</sub> catalysts, 154, 329

NO adsorption on  $Pd/Al_2O_3$  catalysts, metal-support interaction, 155, 303

surface species formed during CO and  $CO_2$  hydrogenation over Rh/ $TiO_2$  (W<sup>6+</sup>) catalysts, **156**, 37

temperature-programmed, in situ study of selective reduction of NO by NH<sub>3</sub> over V<sub>2</sub>O<sub>5</sub>/TiO<sub>2</sub> catalysts, **151**, 226

### Fourier transform Raman spectroscopy

silicalite-1 and titanium silicalite-1, 157, 482

FTIR, see Fourier transform infrared spectroscopy

G

#### Gallium

alteration of acid properties of H-ZSM-5 zeolites, 157, 283 intrazeolitic cations in Ga-MFI zeolites, control, effect on C<sub>2</sub> dehydrogenation, 157, 66

#### Gallium oxide

and H-ZSM-5, mixture, conversion of propane in presence of co-fed NO, O<sub>2</sub>, and H<sub>2</sub>, 151, 33

# Glucose

oxidation on Bi-promoted catalysts, 152, 116

#### Gold

Au(I), NaY zeolite with, preparation, characterization, and acidity generation, 152, 322

Au-ZrO<sub>2</sub>-iron oxide and Au-Ag-ZrO<sub>2</sub> catalysts prepared in situ, CO oxidation, 151, 407

-CeO<sub>2</sub> catalysts, total oxidation of CO and methane, catalyst characterization and reaction kinetics, 153, 317

-Pd catalysts, SiO<sub>2</sub>-supported, characterization and catalytic activity, 151, 67

-Pt catalysts,  $\alpha$ -Al<sub>2</sub>O<sub>3</sub>-supported, ethane oxidation in fluidized bed reactors: olefin production, **155**, 403

# Graphite

support of Pd thin film catalysts, morphological transformation during 1,3-butadiene hydrogenation, air and ultrahigh vacuum scanning tunneling microscopic studies, 156, 120

#### Graphitization

heat-treated carbon black supports for Pt catalysts, effects on catalyst properties, 154, 299

#### Guaiacol

hydrodeoxygenation over CoMo sulfide catalysts: effects of support and addition of K and Pt on catalytic performance, 154, 288

H

# Hartree-Fock theory

ab initio SCF MO study of methane chemisorption on Al and La oxide surfaces, 156, 273

# Heptane

# cracking on

H-ZSM-5 zeolites under high hydrogen pressure, kinetics and mechanism. 152, 189

Pd/H-beta zeolites, reaction mechanisms, 155, 141

hydroconversion over HY zeolites with encaged NiMo phases, **152**, 275 hydrocracking

and hydroisomerization, on Pt/SAPO-5 and Pt/SAPO-11 catalysts, 156, 11

o-xylene transformation on sulfided NiMo on Y zeolite during, analysis: model reaction for characterization of hydrogenating and acid properties of industrial hydrocracking catalysts. **151**, 102

isomerization on

Pd/H-beta zeolites, reaction mechanisms, 155, 141

Pd-loaded silico-alumino-phosphate molecular sieve catalysts, **155**, 1 Heteropolyacids

catalysts for propene oligomerization, IR and thermal analysis, **153**, 293 H<sub>4</sub>PVMo<sub>11</sub>O<sub>40</sub> · 32H<sub>2</sub>O catalyst for selective oxidation of 2-methylpropanoic acid, active phase, analysis, **153**, 275

Keggin series, SiO2-supported

application as redox components in heterogeneous Wacker oxidation catalysts, **154**, 175

Pd salts, catalysis of Wacker oxidation of 1-butene, **154**, 187 substitution and stability effects: theoretical analysis of Keggin ion diversity, **154**, 137

12-Heteropoly compounds

crystal structure and dynamics, analysis by molecular dynamics, 157, 569 Hexaaluminate

microcrystals, coherent spinel surface layers on, structure and catalytic properties, 157, 713

n-Hexadecane

isomerization over Pt-promoted sulfated ZrO<sub>2</sub> catalysts, effect of water, **151**, 292

Hexane

aromatization

over medium pore zeolites ZSM-5, ZSM-22, and EU-1, comparison, **153**, 353

structure and catalytic selectivity of Ir clusters in K-LTL zeolites for, analysis, **155**, 131

conversion on supported Pt catalysts, letter to editor. **156**, 301; reply. **156**, 304

cracking over acidic zeolite catalysts, theoretical description, 153, 94 monomolecular conversion over H–ZSM-5 zeolites, 157, 388

parallel skeletal isomerization and cracking over Pt mordenite catalysts, activation energies for, falsification by pore diffusion, **154**, 364 Pt black-catalyzed reactions

on catalysts sintered at 473 and 633 K, 152, 252

on K-free and K-doped catalysts, 156, 19

reforming in absence of oxygen, bulk tungsten catalysts for, characterization and catalytic activity, **153**, 9

skeletal reactions over

Pt/KL catalysts, sulfur poisoning of catalyst during, analysis, **157**, 550 Pt-NaY, Pt/SiO<sub>2</sub>, HY, and mixed Pt/SiO<sub>2</sub> + HY catalysts, **155**, 43 Heyene

epoxidation over titanium silicate catalysts synthesized in presence of alkali metal and alkaline earth ions, 151, 77

hydroformylation over supported homogeneous film catalysts, **155**, 383 isomerization over Pt/ $\gamma$ -Al<sub>2</sub>O<sub>3</sub> catalysts, associated catalyst coking and activity, olefinic oligomer and cosolvent effects, **152**, 31

oxidation over Ti-MCM-41 structures, 156, 65

Hexyl ions

reactions on USHY, analysis, 153, 239

Homologation

and hydrogenolysis, 3,3-dimethyl-1-butene on Ru/SiO<sub>2</sub> catalysts, implications for mechanism of C-C bond formation and cleavage on metal surfaces, **152**, 306

Hydride ions

transfer reactions during isobutane cracking over Y-zeolites, role in catalytic activity and selectivity, 153, 65

Hydrocarbons

C-H bonds, activation over transition metal oxide catalysts: FTIR study of hydrocarbon catalytic combustion over MgCr<sub>2</sub>O<sub>4</sub>, **151**, 204 isomerization over Pt-promoted sulfated ZrO<sub>2</sub> catalysts, effect of water,

and oxygen, role in NO reduction by ethylene over Cu-ZSM-5 under lean conditions, analysis by transient experimental techniques, **155**, 184

selective oxidation with O<sub>2</sub> over chromium aluminophosphate-5 molecular sieve catalysts, **153**, 1

selective reduction of

NO over ion-exchanged pillared clays, 155, 414

NO<sub>x</sub> on CoZSM-5 and HZSM-5 catalysts and in homogeneous reactions, comparison, **153**, 265

unsaturated, selective hydrogenation and H–D exchange on Pd(100)– $p(1 \times 1)$ –H(D), **155**, 336

Hydrocarbonylation

methyl acetate with homogeneous Rh complex catalyst, selectivity, 157, 334

Hydroconversion

heptane over HY zeolites with encaged NiMo phases, **152**, 275 petroleum fractions, catalysts for, nuclear microprobe analysis. **152**, 103 Hydrocracking

n-heptane on Pt/SAPO-5 and Pt/SAPO-11 catalysts, 156, 11

industrial catalysts for, hydrogenating and acid properties, *in situ* characterization: model reaction, **151**, 102

vacuum gasoil on NiMo/MCM-41 aluminosilicate catalysts, **153**, 25 Hydrodenitrogenation

pyridine on

molybdenum carbide catalysts, 154, 33

MoO<sub>3</sub> catalysts supported on γ-Al<sub>2</sub>O<sub>3</sub>, SiO<sub>2</sub>, and SiO<sub>2</sub>-Al<sub>2</sub>O<sub>3</sub>, bifunctional mechanism, **156**, 255

Hydrodesulfurization

Al<sub>2</sub>O<sub>3</sub>- and carbon-supported niobium sulfide catalysts for, preparation, **156**, 279

sulfided Al<sub>2</sub>O<sub>3</sub>-supported transition metal catalysts: formation of nonstoichiometric sulfur, **151**, 178

thiophene on high-surface-area Mo/ZrO<sub>2</sub> catalysts, **153**, 17 Hydrofluoric acid

activation of Cu-Ti and Cu-Zr catalysts for dehydrogenation of 2propanol, effects on catalyst activity and structure, **153**, 333 Hydrofluoroalkanes

synthesis, chromium(III) oxide catalysts for, TPR and TPO studies, **152**, 70

Hydroformylation

ethylene over Rh/SiO2 catalysts

dynamic and Langmuir-Hinshelwood-Hougen-Watson kinetic analysis, 151, 266

propionaldehyde formation during, transient response, **151**, 253

gas-phase reactions on  $Rh_4$  carbonyl clusters attached on tris(hydroxymethyl)phosphine-modified  $SiO_2$ , active sites in, structural control, 157, 436

over supported homogeneous film catalysts, **155**, 383 Hydrogen

activation on zeolites: kinetics and mechanism of *n*-heptane cracking on H-ZSM-5 under high hydrogen pressure, **152**, 189

 -carbon bonds, in hydrocarbons, activation over transition metal oxide catalysts: FTIR study of hydrocarbon catalytic combustion over MgCr<sub>2</sub>O<sub>4</sub>, 151, 204

and CO

formation of alcohols over Co-Cu/ZnO-Al<sub>2</sub>O<sub>3</sub> catalysts, effects of in situ addition of CH<sub>3</sub>NO<sub>2</sub>, **153**, 100

high-temperature reactions over Ru/TiO<sub>2</sub> and Ru-Rh/TiO<sub>2</sub> catalysts at high pressure, FTIR study, **157**, 396

reaction with ethylene on Rh/SiO2 catalysts

dynamic and Langmuir-Hinshelwood-Hougen-Watson kinetic analysis, 151, 266

propionaldehyde formation during, transient response, **151**, 253 –deuterium exchange

in dehydrocyclization of *n*-octane on PtSn/SiO<sub>2</sub> catalysts, **157**, 626 between perdeuterioisobutane and H-zeolites, **151**, 1

in unsaturated hydrocarbons on  $Pd(100)-p(1 \times 1)-H(D)$  catalysts, 155, 336

or H<sub>2</sub>O, reaction with CO<sub>2</sub> and ethylene over PtSn/SiO<sub>2</sub> alloy catalysts, **156**, 139

molecular, reduction of NO over Pt-Rh/Al<sub>2</sub>O<sub>3</sub> catalysts, **154**, 276 and NO, reaction on Rh-Sn/SiO<sub>2</sub> catalysts, molecular reaction intermediate and mechanism, **157**, 472

and NO and O<sub>2</sub>, in analysis of propane conversion with Ga/H-ZSM-5 and H-ZSM-5 zeolites, **151**, 33

and O<sub>2</sub>, gas mixture at atmospheric pressure, oxidation of methane to methanol over FePO<sub>4</sub> catalysts, **155**, 256

partial pressure, effect on methylcyclopentane ring opening over supported Pt catalysts, **151**, 330

spillover, effects on catalytic activities of Y-type zeolite and pillared montmorillonite for 1,2,4-trimethylbenzene disproportionation, 154, 41

volumetric chemisorption, optimization for dispersions of Ru/SiO<sub>2</sub> catalysts, **156**, 60

Hydrogenation

acetone on

 $SiO_2$ -supported Ni and Co catalysts at high temperature, selectivity, 157, 461

undoped and Cr-doped Raney nickel catalysts, associated electrode potential: influence of solution and reaction kinetics, 155, 12

acrolein on Pt catalysts, selectivity: model for hydrogenation of  $\alpha,\beta$ -unsaturated aldehydes. **156**, 51

aliphatic alcohols on  ${\rm TiO_2}$  catalysts, effects of bulk titania crystal structure, 153, 41

asymmetric, 2-(6'-methoxy-2'-naphthyl)acrylic acid on organometallic Ru catalysts, **152**, 25

benzene on

HY zeolites with encaged NiMo phases, 152, 275

Pd/C catalysts, effect of support pretreatment, 155, 327

Pt/carbon black catalysts, effects of graphitization of heat-treated support, 154, 299

1,3-butadiene on

Co-Pd catalysts, promoter effect of Pd, 157, 179

Pd/graphite thin film catalysts, morphological transformation of catalyst during, air and ultrahigh vacuum scanning tunneling microscopic studies, **156**, 120

self-supported model catalysts derived from Co-based cluster of clusters, 152, 396

CO on

Co/Al<sub>2</sub>O<sub>3</sub> catalysts promoted with La<sup>3+</sup>, isotopic transient study, 153, 224

Pd/C catalysts, effect of support pretreatment, 155, 327

Pd/SiO<sub>2</sub> catalysts, effect of Li<sup>+</sup> promotion, 157, 1

promoted Rh catalysts, associated formation of higher oxygenates: metal-promoter interaction in RhMn/NaY, 154, 245

Pt-promoted Co/Al<sub>2</sub>O<sub>3</sub> and Co/SiO<sub>2</sub> catalysts, 156, 85

Rh-Fe/NaY zeolite catalysts, 153, 144

Rh/SiO<sub>2</sub> catalysts, dynamics of adsorbed species during, IR studies, **157**, 51

Rh/TiO<sub>2</sub> (W<sup>6\*</sup>) catalysts, surface species formed during, FTIR and MS studies, **156**, 37

CO<sub>2</sub> over Rh/TiO<sub>2</sub> (W<sup>6+</sup>) catalysts, surface species formed during, FTIR and MS studies, **156**, 37

Cu- and ZnO-derived formates on Cu/ZnO catalysts, synergistic effects between Cu and ZnO, 157, 259

cyclohexene by MgO-supported tetrairidium clusters, 154, 335 enantioselective

cinchona-modified Pt catalyst for, template model, letter to editor, **156**, 175; reply, **156**, 180

ethyl pyruvate over

dihydrocinchonidine-modified Pt catalysts: influence of conversion and bulk diffusion limitations, 154, 91

Pt/Al<sub>2</sub>O<sub>3</sub> catalysts, effect of (R)-2-(1-pyrrolidinyl)-1-(1-naphthyl) ethanol. **154.** 371

by industrial hydrocracking catalysts, in situ characterization: model reaction, 151, 102

isobutylene over Pd/SiO<sub>2</sub> catalysts, effect of Li promotion, 157, 1

liquid-phase, 1,3-cyclooctadiene over pumice-supported Pd-Pt bimetallic catalysts, **151**, 125

propylene over molybdenum sulfide catalysts prepared by ammonium tetrathiomolybdate decomposition, effect of Co promotion, 157, 536

ring-opening, monoalkyl-substituted cyclobutanes over Ni/SiO<sub>2</sub> catalysts, **151**, 315

selective

phenylacetylene on pumice-supported Pd catalysts, 154, 69 unsaturated hydrocarbons on Pd(100)-p(1  $\times$  1)-H(D) catalysts, 155, 336

selectivity, relationship to competitive adsorption of C-C and C-O double bonds in  $\alpha$ - $\beta$  unsaturated aldehydes on Pt and Pd surfaces, theoretical analysis, **152**, 217

substituted pyrazine over Pd/C catalysts, calorimetric study, 157, 201 substituted  $\alpha,\beta$ -unsaturated aldehydes on Pt/SiO<sub>2</sub> catalysts, activity and selectivity, 151, 431

 $\alpha$ , $\beta$ -unsaturated aldehydes on Pt catalysts, selectivity: acrolein hydrogenation as model reaction, **156**, 51

Hydrogenolysis

ethane on

Pd/SiO<sub>2</sub> catalysts, effect of Li<sup>+</sup> promotion, 157, 1

Ru/NaY catalysts, effects of cluster size on catalytic activity and XANES, 153, 232

Ru/SiO2 catalysts, isotopic transient kinetic analysis, 154, 1

hexane isomers in absence of oxygen, bulk tungsten catalysts for, characterization and catalytic activity, **153**, 9

and homologation, 3,3-dimethyl-1-butene on Ru/SiO<sub>2</sub> catalysts, implications for mechanism of C-C bond formation and cleavage on metal surfaces, **152**, 306

selective, Sn(n-C<sub>4</sub>H<sub>9</sub>)<sub>4</sub> on Ni/SiO<sub>2</sub> catalysts: preparation of bimetallic catalysts, **155**, 238

Hydrogen peroxide

application as oxidizing agent in epoxidation of styrene over titanium silicate molecular sieve TS-1, **156**, 163

effects on

photoactivity of aqueous suspension of TiO2, 153, 32

preparation of titanium boralites with MFI structure, 157, 235

oxidation of olefins on Ti-beta catalysts, 152, 18

Hydrogen sulfide

temperature-programmed desorption from unpromoted and Co-promoted molybdenum sulfide catalysts prepared by ammonium tetrathiomolybdate decomposition, **157**, 536

Hydroisomerization

*n*-heptane on Pt/SAPO-5 and Pt/SAPO-11 catalysts, **156**, 11 Hydrotalcites

basic, catalysis of production of chalcones and flavanones of pharmaceutical interest by Claisen-Schmidt condensation, 151, 60

support of V catalysts, acid-base character, effect on catalysis of oxidative dehydrogenation of *n*-butane, **157**, 271

textural properties and catalytic activity, 151, 50

Hydrotreatment

petroleum fractions, catalysts for, nuclear microprobe analysis, 152, 103 Hydroxyl groups

adsorbed to pure and lanthanide-modified ZrO<sub>2</sub> catalysts, dynamics, neutron scattering study, **157**, 636

on  $\eta$ -Al $_2O_3$  and Mo/ $\eta$ -Al $_2O_3$  catalysts, quantitative  $^1H$  MAS NMR studies, **154**, 65

Hydroxylpropyl aminomethyl pyridine

polystyrene resin with, support of Mo(VI) catalysts for cyclohexene epoxidation, catalyst synthesis, characterization, and activity, 152, 368

I

Impregnation

aqueous, effects on prereduced and precalcined Co/SiO<sub>2</sub> catalysts, 157, 25

Indane

selective oxidation with O<sub>2</sub> over chromium aluminophosphate-5 molecular sieve catalysts, **153**, 1

Indium

Pt<sub>x</sub>In<sub>y</sub> bimetallics in NaY zeolites, preparation and characterization, 152, 313

Infrared spectroscopy

in analysis of acidic properties of sulfated zirconia, 152, 341

CO reaction with NO on Rh/SiO<sub>2</sub> catalysts, step and pulse transient studies of observable adsorbates in situ, 157, 512

dynamics of adsorbed species on Rh/SiO<sub>2</sub> catalysts during CO hydrogenation, 157, 51

Fourier transform, see Fourier transform infrared spectroscopy heteropoly acids, 153, 293

isocyanate surface complex over Cu-ZSM-5 catalysts, 156, 75

metal-support interactions in Ni–SiO $_2$  catalyst precursors: role of SiO $_2$ , 151, 453

methanol synthesis from CO<sub>2</sub> on clean and K-promoted Cu/SiO<sub>2</sub> catalysts, 154, 314

methylene chloride adsorption and dissociation on Pd/SiO<sub>2</sub> catalysts: generation of CH<sub>2</sub> species, 155, 74

NO decomposition over Cu-ZSM-5 zeolites, 157, 592

skeletal isomerization of butene by  $WO_3/\gamma$ - $Al_2O_3$  catalysts, 156, 147 sulfate-doped  $ZrO_2$  catalysts, 157, 109

titanium boralites with MFI structure: effect of  $H_2O_2$  on preparation, 157, 235

Ion-exchange materials

hydrous titanium oxide, metals supported on, reduction behavior, 156, 154

Ionization

hydrons of heteropolyacid hydrate in acetic acid solution, 152, 198 Ion scattering

low-energy, see Low-energy ion scattering

Iridium, see also Tetrairidium clusters

α-Al<sub>2</sub>O<sub>3</sub>-supported catalysts, CO<sub>2</sub> reforming reactions, molecular aspects, **157**, 162

clusters in K-LTL zeolites, structure and catalytic selectivity for *n*-hexane aromatization, analysis, **155**, 131

Iron

chemical vapor deposition Fe/Mo/DBH molecular sieve catalysts, characterization and catalysis of alkylaromatic oxidation, 151, 338

 $\alpha$ -Fe and  $\gamma$ -Fe catalysts, filamentous carbon formation, roles of ordinary and Soret diffusion, **152**, 42

halogenated metalloporphyrin complexes with, for selective catalytic reactions of acyclic alkanes with O<sub>2</sub>, **155**, 59

lattice orientation in ammonia synthesis catalyst, 152, 243

NiFe<sub>2</sub>O<sub>4</sub>, and NiO, catalyst system with, vapor-phase oxidation of benzoic acid to phenol, **151**, 323

precipitated Fischer-Tropsch catalyst of composition 100 Fe/5 Cu/ 4.2 K/25 SiO<sub>2</sub>, activation studies

catalyst characterization, 155, 353

reaction studies, 155, 366

promoted Rh clusters in NaY zeolites, characterization and performance in CO hydrogenation, 153, 144

promoted sulfated ZrO2 catalysts

n-butane isomerization: acid site analysis, 151, 364

cracking of n-butane, 153, 344

superacid catalysts, low-temperature conversion of *n*-butane, **151**, 464 role in activation of VPO catalyst precursor VO(HPO<sub>4</sub>) · 0.5H<sub>2</sub>O prepared by isobutanol reduction of V<sub>2</sub>O<sub>5</sub>, in situ laser Raman spectroscopic study, **157**, 687

supported on hydrous titanium oxide ion-exchange materials, reduction behavior, 156, 154

-ZSM-5 zeolite catalysts for ethane oxydehydrogenation, <sup>18</sup>O<sub>2</sub> temperature-programmed isotope exchange study, 154, 24

Iron oxide, see also Ferric oxide

-Au-ZrO<sub>2</sub>, catalysts prepared *in situ*, CO oxidation over, analysis, **151**, 407

Iron phosphate, see Ferric phosphate

Isobutane

catalytic oxidation in fluidized bed reactors: olefin production, **155**, 403 <sup>13</sup>C-labeled, skeletal rearrangement on sulfuric acid-treated ZrO<sub>2</sub> catalysts. **151**, 26

cracking over Y-zeolite catalysts

catalytic cycles and reaction selectivity, 153, 65

kinetic model, 153, 54

dehydrogenation over Pt/SiO<sub>2</sub> and PtSn/SiO<sub>2</sub> catalysts, effects of potassium, 157, 576

formation by n-butane isomerization over sulfated and metal-promoted ZrO<sub>2</sub> catalysts, **151**, 364

oxidative dehydrogenation over Pt-coated monoliths at short contact times, 155, 82

perdeuterated, H-D exchange with H-zeolites, 151, 1

reactions over Al<sub>2</sub>O<sub>3</sub> catalysts, effect of catalyst fluoridation, **157**, 721 selective reduction of NO<sub>x</sub> on CoZSM-5 and HZSM-5 catalysts and in homogeneous reactions, comparison, **153**, 265

Isobutanol, see Isobutyl alcohol

Isobutene, see Isobutylene

Isobutyl alcohol

reduction of V<sub>2</sub>O<sub>5</sub>, VPO catalyst precursor VO(HPO<sub>4</sub>) · 0.5H<sub>2</sub>O prepared by, activation, role of Fe and Co dopants: *in situ* laser Raman spectroscopic study, **157**, 687

Isobutylene

adsorption on Amberlyst-15, HY, and HZSM-5 zeolites, effect on MTBE synthesis, 152, 122

and ethanol, reaction to form ethyl *tert*-butyl ether on H-mordenite, gas-phase kinetics and DRIFTS studies, **157**, 645

formation by *n*-butane isomerization by ferrierite and modified ferrierite catalysts, **157**, 423

hydrogenation over Pd/SiO<sub>2</sub> catalysts, effect of Li\* promotion, 157, 1 Isobutyric acid

selective oxidation,  $H_4PVMo_{11}O_{40} \cdot 32H_2O$  catalyst for, active phase analysis, 153, 275

Isocyanate

surface complex over Cu-ZSM-5 catalysts, IR study, **156**, 75 Isomerization

aromatic amines to methyl-aza-aromatics over zeolites, 155, 268 *n*-butane

over acidic mordenite, 155, 376

catalytic activity for, generation upon sulfate promotion of ZrO<sub>2</sub> supports prepared by sol-gel synthesis, **157**, 321

over Fe- and Mn-promoted sulfated ZrO<sub>2</sub> catalysts analysis, **153**, 344

low-temperature superacid catalysis, 151, 464

to isobutane over sulfated and metal-promoted ZrO<sub>2</sub> catalysts: acid site analysis, **151**, 364

to isobutene by ferrierite and modified ferrierite catalysts, **157**, 423 over  $Pt/SO_4^{2-}$ – $ZrO_2$  and mechanical mixtures of  $Pt/Al_2O_3 + SO_4^{2-}$ – $ZrO_2$ , **153**, 218

over  $SO_4^{2-}$ - $ZrO_2$  catalysts, effects of  $ZrO_2$  crystalline structure and sulfate concentration, 151, 96

over sulfate-doped ZrO2 catalysts, 157, 109

1-butene over TiO<sub>2</sub>-SiO<sub>2</sub> and ZrO<sub>2</sub>-SiO<sub>2</sub> mixed oxide catalysts, relationship to catalyst proton affinity distributions, **157**, 244

and cracking, heptane on Pd/H-beta zeolites, reaction mechanisms, 155, 141

n-heptane over Pd-loaded silico-alumino-phosphate molecular sieve catalysts, 155, 1

1-hexene over  $Pt/\gamma$ - $Al_2O_3$  catalysts, associated catalyst coking and activity, olefinic oligomer and cosolvent effects, 152, 31

hydrocarbons over Pt-promoted sulfated ZrO<sub>2</sub> catalysts, effect of water, 151, 292

during isobutane cracking over Y-zeolite, role in catalytic activity and selectivity, **153**, 65

skeletal

n-butane on Pt-promoted zeolites and sulfated ZrO<sub>2</sub> catalysts, effect of reaction pressure, **157**, 289

1-butene on

10-member ring zeolite catalysts, 151, 467

 $WO_3/\gamma$ -Al<sub>2</sub>O<sub>3</sub> catalysts, **154**, 201; **156**, 147

n-hexane over Pt mordenite catalysts, in parallel with cracking reactions, activation energies for, falsification by pore diffusion, 154, 364

rearrangement of labeled butanes on sulfuric acid-treated ZrO<sub>2</sub> catalysts, **151**, 26

1,1,2,2-tetrafluoroethane over conditioned Cr<sub>2</sub>O<sub>3</sub> catalysts, kinetic and mechanistic study, **155**, 283

 $\alpha$ -Isophorone

epoxidation with hydroperoxides over TiO<sub>2</sub>-SiO<sub>2</sub> catalysts, 157, 665 Isopropyl alcohol

adsorption and reaction on TiO<sub>2</sub> catalysts, effects of bulk titania crystal structure, 153, 41

conversion on AlPO<sub>4</sub> catalysts, 151, 307

dehydrogenation over Cu-Ti amorphous alloy catalyst, catalyst activation and surface characterization in, comparison with Cu-Zr, 153, 333

isopropylation of benzene over high-silica large-pore zeolite NCL-1, 154, 216

photocatalytic oxidation on TiO<sub>2</sub>, transient studies, 157, 611 Isopropylamine

adsorption on Cu-ZSM-5 and Cu-Y zeolites, comparison, 153, 190 Isopropylation

benzene with 2-propanol over high-silica large-pore zeolite NCL-1, 154, 216

Isoquinoline

-Ni complex catalyst, methanol carbonylation, kinetics, **156**, 290 Isotopic analysis

kinetics of ethane hydrogenolysis on Ru/SiO<sub>2</sub>, **154**, 1 Isotopic labeling

NO with <sup>15</sup>N, in analysis of effect of water on selective catalytic reduction of NO with NH<sub>3</sub> over Cr<sub>2</sub>O<sub>3</sub> catalysts in presence and absence of oxygen, **154**, 107

Isotopic tracing

in analysis of La promotion of Co/Al<sub>2</sub>O<sub>3</sub> catalysts for CO hydrogenation, 153, 224

K

Keggin ions

diversity, theoretical analysis: substitution and stability effects in heteropolyacids, 154, 137

α-Keto esters

enantioselective hydrogenation, cinchona-modified Pt catalyst for, template model, letter to editor, **156**, 175; reply, **156**, 179

Ketonization

acetate on CeO<sub>2</sub> and CeO<sub>2</sub>-supported catalysts, **155**, 219 Kinetics

acetone hydrogenation on dispersed Raney nickel electrode, 155, 12

CO methanation on Ni surfaces, 151, 216 CO and methane oxidation over transition metal-fluorite oxide com-

CO and methane oxidation over transition metal-fluorite oxide composite catalysts, **153**, 317

CO oxidation on

Rh catalysts dispersed on  $SiO_2$ ,  $Al_2O_3$ , and  $TiO_2$ , **156**, 265 Rh/CeO<sub>2</sub> catalysts, **157**, 222

ethane hydrogenolysis on  $Ru/SiO_2$  catalysts, steady-state isotopic transient analysis, 154, 1

ethylene hydroformylation on Rh/SiO<sub>2</sub> catalysts, dynamic and Langmuir-Hinshelwood-Hougen-Watson analysis, 151, 266

gas-phase, ethyl *tert*-butyl ether synthesis on H-mordenite, **157**, 645 *n*-heptane cracking on H-ZSM-5 zeolites under high hydrogen pressure, **152**, 189

isobutane cracking over Y-zeolite catalysts, model development, **153**, 54 isotopic transient, in mechanistic study of oxidative coupling of methane over La<sub>2</sub>O<sub>3</sub> catalysts, **155**, 106

La promotion of Co/Al<sub>2</sub>O<sub>3</sub> catalysts for CO hydrogenation, steadystate isotopic transient analysis, **153**, 224

methanol carbonylation over Ni-isoquinoline complex catalyst, 156, 290

methanol synthesis, deduction from Cu single-crystal experiments, 156, 229

NO reaction with  $C_2H_4$  and  $O_2$  over Pt–ZSM-5 catalysts under highly oxidizing conditions, autonomous oscillations during, analysis, 157, 14

NO reduction with H<sub>2</sub> or CO over Pt-Rh/Al<sub>2</sub>O<sub>3</sub> catalysts, **154**, 276 oxidative coupling of methane over MgO-based catalysts, steady-state isotope transient analysis, **156**, 106

propylene desorption from Ag(110), effect of subsurface oxygen, 153, 158

selective reduction of NO by methane over Co-ZSM5 in presence of oxygen: rate-determining step, 151, 356

1,1,2,2-tetrafluoroethane isomerization over conditioned  $Cr_2O_3$  catalysts, 155, 283

transient, from TAP reactor system: application to propylene oxidation to acrolein, 154, 151

trichloroethylene oxidation in air via heterogeneous photocatalysis, 157, 87

Krypton

adsorption: direct determination of effective BET-area, 155, 163

I

Langmuir-Hinshelwood-Hougen-Watson model

in dynamic and kinetic analysis of heterogeneous catalytic hydroformylation, 151, 266

Lanthana, see Lanthanum oxide

Lanthanum

addition to Pd/SiO<sub>2</sub> catalysts, effects on sulfur resistance and catalytic properties, 155, 95

doping of  $CeO_{2\ x}$  nanocrystalline catalysts, effect on redox activity, 157, 42

 $La_2MO_4$  ( $M = Co_1Ni_1Cu$ ) catalysts, NH<sub>3</sub> oxidation to NO, 157, 749  $La(Sr)MnO_3$  catalysts, CO oxidation

ionic redox behavior during transient oxidation, **157**, 545 solid electrolyte potentiometric study, **152**, 147

modified ZrO<sub>2</sub> catalysts, crystal phases, defects, and dynamics of adsorbed hydroxyl groups and water, neutron scattering study, **157.** 636

promotion of

Co/Al<sub>2</sub>O<sub>3</sub> catalysts for CO hydrogenation, isotopic transient study, **153**, 224

CuCl<sub>2</sub> catalysts for low-temperature ethylene oxyhydrochlorination, effect on mobilities of catalyst active species, **157**, 380

Lanthanum oxide

 $\gamma$ -Al<sub>2</sub>O<sub>3</sub>-supported, and C-La<sub>2</sub>O<sub>3</sub>, methane chemisorption, ab initio SCF MO study, **156**, 273

catalysis of oxidative coupling of methane

identification and role of specific active sites, 151, 439

mechanistic study using isotope transient kinetics, 155, 106

Sr-promoted and unpromoted catalysts, NO adsorption, decomposition, and reduction by methane, **155**, 290

support of Rh catalysts, CO<sub>2</sub> reforming reactions, molecular aspects, 157, 162

Lanthanum trioxide, see Lanthanum oxide

Layered double hydroxides

Zn(II)-Al(III), Mo(VI)O<sub>2</sub> complex center intercalated at, mediation of catalytic air oxidation of thiols, **152**, 237

LEIS, see Low-energy ion scattering

Light intensity

effect on photoactivity of aqueous suspension of TiO<sub>2</sub>, **153**, 32 Lithium

exchanged X zeolites, basicity, microcalorimetric characterization, 157, 266

ionic, titanium silicates synthesized in presence of, catalytic activity, 151. 77

Li\*-MgO catalyst, oxidative dehydrogenation of ethane, effect of chloride addition, 151, 155

promoted MgO catalysts, oxidative coupling of methane, steady-state isotope transient kinetic analysis, 156, 106

promotion of Pd/SiO<sub>2</sub> catalysts, effects on hydrogenation, hydrogenolysis, and methanol synthesis, **157**, 1

γ-Lithium aluminate

support of alkali molten carbonate catalysts, oxidative dimerization of methane, 152, 204

Lithium potassium carbonate

γ-LiAlO<sub>2</sub>-supported catalysts, oxidative dimerization of methane, 152, 204

Low-energy ion scattering

in analysis of effect of V concentration on activity of vanadiumniobium oxide catalysts for oxidative dehydrogenation of propane, 157, 584

Lutetium oxide

NO adsorption, decomposition, and reduction by methane, 155, 290

M

Magnesium

ionic, titanium silicates synthesized in presence of, catalytic activity, 151, 77

Magnesium chloride

support of Ti catalysts for Ziegler-Natta polymerization, quantum mechanical study, **157**, 145

Magnesium chromite

catalytic combustion of hydrocarbons, FTIR study, 151, 204

Magnesium oxide

-Fe<sub>2</sub>O<sub>3</sub> catalysts, adsorption, activation, and NH<sub>3</sub> oxidation, 157, 523
 -Li<sup>+</sup> catalysts, oxidative dehydrogenation of ethane, effect of chloride addition, 151, 155

support of

Na-Mn catalysts, oxidative coupling of methane, 155, 390; erratum, 157, 270

Rh catalysts, CO<sub>2</sub> reforming reactions, molecular aspects, **157**, 162 tetrairidium clusters, cyclohexene hydrogenation, **154**, 335

V catalysts, acid-base character, effect on catalysis of oxidative dehydrogenation of *n*-butane, **157**, 271

unpromoted and Li- and Sn-promoted catalysts, oxidative coupling of methane, steady-state isotope transient kinetic analysis, **156**, 106 Magnesium phosphate

tribasic, catalysis of gas-phase conversion of cyclohexanol, effect of sodium carbonate addition, 157, 97

Maleic anhydride

formation by

n-butane oxidation, role of VO(H<sub>2</sub>PO<sub>4</sub>)<sub>2</sub> precursor, 154, 253
 partial oxidation of n-butane over layered vanadyl(IV) phosphite-derived VPO catalysts, 156, 298

Manganese

halogenated metalloporphyrin complexes with, for selective catalytic reactions of acyclic alkanes with O<sub>2</sub>, **155**, 59

La(Sr)MnO<sub>3</sub> catalysts, CO oxidation

ionic redox behavior during transient oxidation, 157, 545 solid electrolyte potentiometric study, 152, 147

-Na catalysts, oxide-supported, oxidative coupling of methane, 155, 390; erratum, 157, 270

promoted NaY zeolite-supported Rh catalysts, CO hydrogenation to higher oxygenates, 154, 245

promoted sulfated ZrO2 catalysts

n-butane isomerization: acid site analysis, 151, 364

cracking of n-butane, 153, 344

superacid catalysts, low-temperature conversion of *n*-butane, **151**, 464

Manganese oxide

on hexaaluminate microcrystals, coherent spinel surface layers on, structure and catalytic properties, **157**, 713

α-Manganese oxide

selective oxidation of nitrosobenzene and deoxygenation of nitrobenzene, role of Mars and van Krevelen mechanism, 157, 706

Manganese sesquioxide

and Pd, cooperative action in CO oxidation, 151, 279

Mars and van Krevelen mechanism

role in selective oxidation of nitrosobenzene and deoxygenation of nitrobenzene on oxidic catalysts, 157, 706

Mass spectrometry

and differential thermal analysis and thermogravimetric analysis, sulfated ZrO<sub>2</sub> catalysts with and without Pt, 153, 123

on-line, in situ study of selective catalytic reduction of NO by NH<sub>3</sub> over V<sub>2</sub>O<sub>5</sub>/TiO<sub>2</sub> catalysts, **151**, 226

surface species formed during CO and CO $_2$  hydrogenation over Rh/ TiO $_2$  (W<sup>6+</sup>) catalysts, 156, 37

Mercury

porosimetry based on, compacting effects on SiO<sub>2</sub> polymerization catalysts, **152**, 415

Metal carbides

selective activation of C-H bonds and C-C double bonds on, analysis: comparison of *n*-butane and 1,3-butadiene reactions on vanadium carbide films on V(110), **154**, 80

Metalloporphyrin complexes

halogenated, for selective catalytic reaction of acyclic alkanes with  $O_2$ , 155, 59

Metal-promoter interaction

RhMn/NaY catalysts for CO hydrogenation to higher oxygenates, 154, 245

Metals

surfaces, C-C bond formation and cleavage on, mechanism: implications of 3,3-dimethyl-1-butene hydrogenolysis and homologation on Ru/SiO<sub>2</sub> catalysts, **152**, 306

Metal sulfates

γ-Al<sub>2</sub>O<sub>3</sub>-supported catalysts, selective O-alkylation of phenol with methanol, **152**, 52

Metal-support interactions

Ni-SiO<sub>2</sub> catalyst precursors, IR studies: role of SiO<sub>2</sub>, **151**, 453 Pd/Al<sub>2</sub>O<sub>3</sub> catalysts, evidence from FTIR studies of NO adsorption, **155**, 303

Pt catalysts supported by heat-treated carbon blacks, 154, 299  $Pt/CeO_2$  and  $Pt/TiO_2$  catalysts, comparison, 155, 148

Rh catalysts supported on CeO<sub>2</sub>, Nb<sub>2</sub>O<sub>5</sub>, and TiO<sub>2</sub>, characterization based on CO<sub>2</sub> methanation activity, **156**, 171

Methacrolein

reactions on Pt/SiO<sub>2</sub> catalysts, activity and selectivity, 151, 431 Methanation

CO on Ni surfaces, kinetics, 151, 216

CO2 over

Rh/CeO<sub>2</sub> and CeO<sub>2</sub>-promoted Rh/SiO<sub>2</sub> catalysts under transient and steady-state conditions, role of surface and bulk ceria, **151**, 111 Rh/CeO<sub>2</sub>, Rh/Nb<sub>2</sub>O<sub>5</sub>, and Rh/TiO<sub>2</sub> catalysts: metal-support interactions, **156**, 171

Methane

adsorption: direct determination of effective BET-area, 155, 163 chemisorption on Al and La oxide surfaces, ab initio SCF MO study, 156, 273

combustion on Mn<sub>3</sub>O<sub>4</sub> catalysts on hexaaluminate microcrystals, enhancement by formation of coherent spinel surface layers, **157**, 713 dehydro-oligomerization to ethylene and aromatics over Mo/HZSM-

5 catalysts, **157,** 190

oxidation

over  $CeO_{2-x}$  nanocrystalline catalysts, effect of doping with La or Cu, 157, 42

to formaldehyde over V/SiO<sub>2</sub> catalysts, role of V-O double bond sites, **156**, 167

over Pd/SiO<sub>2</sub> catalysts, induction periods during, role of chlorine, 152, 410

total, over transition metal-fluorite oxide composite catalysts catalyst characterization and reaction kinetics, 153, 317 catalyst composition and activity, 153, 304

oxidative conversion to syngas over Ni/Al<sub>2</sub>O<sub>3</sub> catalysts, effects of noble metal addition, **157**, 752

oxidative coupling over

 $Bi_2-Sn_2$  <sub>x</sub> $Bi_xO_{7-x/2}$  pyrochlore catalysts, effect of variable composition on catalytic performance, **153**, 197

La<sub>2</sub>O<sub>3</sub> catalysts

identification and role of specific active sites, **151**, 439 mechanistic study using isotope transient kinetics, **155**, 106

MgO-based catalysts, steady-state isotope transient kinetic analysis, 156, 106

Na<sub>2</sub>WO<sub>4</sub>/CeO<sub>2</sub> and related catalysts, 154, 163

oxide-supported Na-Mn catalysts, **155**, 390; *erratum*, **157**, 270 oxidative dimerization on supported alkali molten carbonate catalysts, **152**, 204

reduction of NO over rare earth oxide catalysts, **155**, 290 selective conversion to acetylene by high-power pulsed radiofrequency and microwave catalytic processes over carbon catalysts, **151**, 349 selective oxidation over SiO<sub>2</sub>-supported MoO<sub>3</sub> and silicomolybdic acid catalysts, comparison, **155**, 249

selective reduction of

NO over Co-ZSM5 catalyst in presence of oxygen, rate-determining step. 151, 356

NO<sub>x</sub> on CoZSM-5 and HZSM-5 catalysts and in homogeneous reactions, comparison, **153**, 265

Methanol

adsorption on

Amberlyst-15, HY, and HZSM-5 zeolites, effect on MTBE synthesis, 152, 122

NiAl(100) and NiAl(110) surfaces, comparison, 154, 379

 $TiO_2$  catalysts, associated reactions, effects of bulk titania crystal structure, 153, 41

carbonylation with Ni-isoquinoline complex catalyst, kinetics, 156, 290 conversion on AlPO<sub>4</sub> catalysts, 151, 307

formation by methane oxidation with H<sub>2</sub>-O<sub>2</sub> gas mixture at atmospheric pressure over FePO<sub>4</sub> catalysts, **155**, 256

oxidation

over MoO<sub>3</sub> monoatomic layer formed on SnO<sub>2</sub>, 151, 285

over  $MoO_3/SiO_2$  catalysts, silicomolybdic acid species generated during, in situ analysis, 155, 249

Pt-Ru/C catalyst for, structure and chemical composition, 154, 98 selective O-alkylation of phenol over sulfate catalysts supported on  $\gamma$ -Al<sub>2</sub>O<sub>3</sub>, 152, 52

synthesis

from CO and from CO<sub>2</sub> at atmospheric pressure over Cu/ZnO catalysts, mechanisms, **157**, 403

from CO and H<sub>2</sub> over Co-Cu/ZnO-Al<sub>2</sub>O<sub>3</sub> catalysts, effects of in situ addition of CH<sub>3</sub>NO<sub>2</sub>, **153**, 100

from CO<sub>2</sub> on clean and K-promoted Cu/SiO<sub>2</sub> catalysts, IR study, 154, 314

kinetic model, deduction from Cu single-crystal experiments, **156**, 229 over Pd/SiO<sub>2</sub> catalysts, effect of Li<sup>+</sup> promotion, **157**, 1

2-(6'-Methoxy-2'-naphthyl)acrylic acid

asymmetric hydrogenation on organometallic Ru catalysts, 152, 25 Methyl acetate

hydrocarbonylation with homogeneous Rh complex catalyst, selectivity, **157**, 334

4-Methylacetophenone

hydrodeoxygenation over CoMo sulfide catalysts: effects of support and addition of K and Pt, 154, 288

Methyl tert-butyl ether

synthesis on Amberlyst-15, HY, and HZSM-5 zeolites, effect of reactant adsorption on catalyst, 152, 122

3-Methylcrotonaldehyde, see Senecialdehyde

Methylcyclobutane

ring-opening hydrogenation over Ni/SiO<sub>2</sub> catalysts, **151**, 315 Methylcyclopentane

reforming in absence of oxygen, bulk tungsten catalysts for, characterization and catalytic activity, 153, 9

ring opening over supported Pt catalysts, effect of hydrogen partial pressure, **151**, 330

Methylene

species, generation by adsorption and dissociation of CH<sub>2</sub>Cl<sub>2</sub> on Pd/SiO<sub>2</sub> catalysts, IR spectroscopic study, **155**, 74

Methylene chloride

adsorption and dissociation on Pd/SiO<sub>2</sub>, IR spectroscopic study: generation of CH<sub>2</sub> species, 155, 74

Methyl α-hydroxyisobutyrate

dehydration over zeolite catalysts, 151, 10

2-Methylpentane

cracking on

steamed HY catalyst, effects of extraction of extraframework Al, 157, 209

USHY, formation of C<sub>6</sub> olefins and paraffin isomers, 153, 239

reforming in absence of oxygen, bulk tungsten catalysts for, characterization and catalytic activity, **153**, 9

3-Methylpentane

cracking on USHY, formation of C<sub>6</sub> olefins and paraffin isomers, 153, 239

Methyl species

reaction with acetyl species on CeO<sub>2</sub> and CeO<sub>2</sub>-supported catalysts, 155, 219

Methyl vinyl ketone

reactions on Pt/SiO<sub>2</sub> catalysts, activity and selectivity, **151**, 431

Microcalorimetry

characterization of basicity in alkali-exchanged X zeolites, 157, 266 Microporosity

ammonium and Cs salts of 12-tungstophosphoric, 12-molybdophosphoric, and 12-tungstosilicic acids, <sup>129</sup>Xe NMR study, **151, 147** Microscopy

scanning tunneling, under air and ultrahigh vacuum, analysis of morphological transformation of Pd/graphite thin film catalysts during 1,3-butadiene hydrogenation, 156, 120

Microstructure

Pt-Rh/Al<sub>2</sub>O<sub>3</sub> catalysts, 154, 261

Microwave radiation

high-power pulsed, selective production of acetylene from reaction of methane over carbon catalysts, **151**, 349

Molecular dynamics

in analysis of crystal structure and dynamics of 12-heteropoly compounds, **157**, 569

Molecular orbital calculations

ab inito SCF, for methane chemisorption on Al and La oxide surfaces, 156, 273

Molecular sieves, see also Zeolites

chromium aluminophosphate-5 catalysts, selective oxidation of hydrocarbons with O<sub>2</sub>, 153, 1

Fe/Mo/DBH, catalysts prepared by chemical vapor deposition, characterization and catalysis of alkylaromatic oxidation, 151, 338

silicalite-1, spectroscopic characterization, 157, 482

silico-alumino-phosphate catalysts

Pd-loaded, n-heptane isomerization, 155, 1

SAPO-5 and SAPO-11, support of Pt catalysts, *n*-heptane hydroisomerization and hydrocracking, **156**, 11

titanosilicate

ETS-10 and TS-1, interaction with 1-butene, NMR studies, 155, 345 TS-1

catalysis of cyclohexane oxidation: overoxidation and comparison with other oxidation systems, **157**, 631

epoxidation of styrene using dilute  $H_2O_2$  as oxidizing agent, 156, 163

spectroscopic characterization, 157, 482

transition metal-substituted, catalysis of liquid-phase oxidation of aniline, 157, 124

Molten salt method

in preparation of high-surface-area Mo/ZrO<sub>2</sub> catalysts, 153, 17

η-Al<sub>2</sub>O<sub>3</sub>-supported catalysts, and η-Al<sub>2</sub>O<sub>3</sub> catalysts, structurally different OH surface groups on, quantitative <sup>1</sup>H MAS NMR studies, **154**, 65

catalysis of filamentous carbon formation, roles of ordinary and Soret diffusion, 152, 42

chemical vapor deposition Fe/Mo/DBH molecular sieve catalysts, characterization and catalysis of alkylaromatic oxidation, 151, 338

-Co catalysts

SiO<sub>2</sub>-supported, for hydrotreatment and hydroconversion of petroleum fractions, nuclear microprobe analysis, **152**, 103 sulfided

Al<sub>2</sub>O<sub>3</sub>-supported, XPS and NO adsorption studies, **156**, 243 supported, hydrodeoxygenation of carbonyl, carboxyl, and guaia-col-type molecules: effects of support and addition of K and Pt, **154**, 288

loaded HZSM-5 zeolites, methane dehydro-oligomerization to ethylene and aromatics, 157, 190

Mo(VI)

imidazole-containing polymer-supported catalysts for cyclohexene epoxidation, synthesis, characterization, and activity, **152**, 368 polybenzimidazole-supported catalysts, recycling in cyclohexene

epoxidation, 152, 377

Mo<sub>3</sub>V-sulfur cluster compounds, sulfidation study: comparison with MoO<sub>3</sub>/SiO<sub>2</sub>/Si(100) model catalysts, **157**, 698

-Ni catalysts

mesoporous MCM-41 aluminosilicate-supported, hydrocracking of vacuum gasoil, **153**, 25

phases encaged in HY zeolites, characterization, 152, 275

SiO<sub>2</sub>-supported, for hydrotreatment and hydroconversion of petroleum fractions, nuclear microprobe analysis, **152**, 103

sulfided, on Y zeolite, o-xylene transformation during hydrocracking of n-heptane: characterization of hydrogenating and acid properties of industrial hydrocracking catalysts, **151**, 102

-Rh catalysts, γ-Al<sub>2</sub>O<sub>3</sub>-supported, surface acidity, 156, 96

ZrO<sub>2</sub>-supported catalysts with high surface area, preparation by molten salt method and application to hydrodesulfurization, **153**, 17

Molybdenum carbide

catalysis of pyridine hydrodenitrogenation, 154, 33

Molybdenum oxides

clusters and supported catalysts, UV-visible absorption edges, effect of local structure, 151, 470

Molybdenum sulfide

unpromoted and Co-promoted catalysts prepared by ammonium tetrathiomolybdate decomposition, TPD and hydrogenation studies, 157, 536

Molybdenum trioxide

Al<sub>2</sub>O<sub>3</sub>-, SiO<sub>2</sub>-, and TiO<sub>2</sub>-supported catalysts, acid-base properties, effects on propylene oxidation, **157**, 740

γ-Al<sub>2</sub>O<sub>3</sub>-, SiO<sub>2</sub>-, and SiO<sub>2</sub>-Al<sub>2</sub>O<sub>3</sub>-supported catalysts, pyridine hydrodenitrogenation, bifunctional mechanism, **156**, 255

monoatomic layer formed on SnO2, structure and activity, 151, 285

SiO<sub>2</sub>-Al<sub>2</sub>O<sub>3</sub>-supported catalysts, Brønsted-Lewis acidity, effect of catalyst composition. **151**, 192

SiO<sub>2</sub>-Si(100)-supported model catalysts, sulfidation study: comparison with Mo<sub>3</sub><sup>1V</sup>-sulfur cluster compounds, **157**, 698

SiO<sub>2</sub>-supported catalysts, formation and stability of silicomolybdic acid: in situ structural-selectivity study on selective oxidation reactions, 155, 249

 $12\hbox{-}Molybdophosphoric acid, \it see\ 12\hbox{-}Phosphomolybdic acid}$ 

Monte Carlo simulation

tracer exchange and catalytic reaction in single-file systems, 157, 656 Montmorillonite

pillared, disproportionation of 1,2,4-trimethylbenzene, stabilization of catalytic activities for, effect of spillover hydrogen, **154**, 41 Mordenites

acidic, n-butane isomerization, 155, 376

H, ethyl tert-butyl ether synthesis, gas-phase kinetics and DRIFTS studies, 157, 645

Pr ion-exchanged photocatalysts, N<sub>2</sub>O decomposition, 157, 262

Pt, parallel skeletal isomerization and cracking of *n*-hexane, activation energies for, falsification by pore diffusion, **154**, 364

MTBE, see Methyl tert-butyl ether

Multimetallic catalysts

on support particles, XPS analysis, 157, 133

Multiphase catalysts

on support particles, XPS analysis, 157, 133

N

Naphthylamines

isomerization to methyl-aza-aromatics over zeolites, **155**, 268 Naproxen

asymmetric synthesis by organometallic Ru catalysts, 152, 25 Neodymium

modified ZrO<sub>2</sub> catalysts, crystal phases, defects, and dynamics of adsorbed hydroxyl groups and water, neutron scattering study, **157.** 636

Neodymium oxide

NO adsorption, decomposition, and reduction by methane, **155**, 290 Neopentane

conversion over Pd-Au/SiO<sub>2</sub> catalysts, 151, 67

Neutron scattering

analysis of crystal phases, defects, and dynamics of adsorbed hydroxyl groups and water in pure and lanthanide-modified ZrO<sub>2</sub>, **157**, 636 inelastic, identification of amino species adsorbed on RuS<sub>2</sub>, **157**, 414 Nickel, see also Raney nickel

Al<sub>2</sub>O<sub>3</sub>-supported catalysts, oxidative methane-to-syngas conversion, effects of noble metal addition, 157, 752

α-Al<sub>2</sub>O<sub>3</sub>-supported catalysts

ethane oxidation in fluidized bed reactors: olefin production, **155**, 403 NiAl<sub>2</sub>O<sub>4</sub> intermediate layer in, effect on sintering of catalyst Ni, **151**, 300

catalysis of filamentous carbon formation, roles of ordinary and Soret diffusion, **152**, 42

isoquinoline complex catalyst, methanol carbonylation, kinetics,
 156, 290

La<sub>2</sub>NiO<sub>4</sub> catalysts, NH<sub>3</sub> oxidation to NO. 157, 749

-Mo

Al<sub>2</sub>O<sub>3</sub>-supported catalysts, for hydrotreatment and hydroconversion of petroleum fractions, nuclear microprobe analysis, **152**, 103

mesoporous MCM-41 aluminosilicate-supported catalysts, hydrocracking of vacuum gasoil, **153**, 25

phases encaged in HY zeolites, characterization, 152, 275

sulfided, on Y zeolite, catalysis of o-xylene transformation during hydrocracking of n-heptane: characterization of hydrogenating and acid properties of industrial hydrocracking catalysts, **151**, 102

NiAl(100) and NiAl(110) surfaces, methanol adsorption, comparison, **154**, 379

 $NiFe_2O_4$  and NiO, catalyst system with, vapor-phase oxidation of benzoic acid to phenol,  ${\bf 151},\,323$ 

NiTa<sub>2</sub>O<sub>6</sub>, SiO<sub>2</sub>-supported catalysts, reduction, induction of strong metal-oxide interaction, **151**, 460

SiO<sub>2</sub>-supported catalysts

metal-support interactions, IR studies: role of  $SiO_2$ , 151, 453 ring-opening hydrogenation of monoalkyl-substituted cyclobutanes,

151, 315 selective hydrogenolysis of Sn(n-C<sub>4</sub>H<sub>9</sub>)<sub>4</sub>: preparation of bimetallic catalysts, 155, 238

selectivity for high-temperature hydrogenation of acetone, **157**, 461 supported on hydrous titanium oxide ion-exchange materials, reduction behavior, **156**, 154

surfaces, CO methanation on, kinetics, 151, 216

Nickel aluminate

intermediate layer in Ni/NiAl<sub>2</sub>O<sub>4</sub>/α-Al<sub>2</sub>O<sub>3</sub> samples, role in sintering behavior of Ni/α-Al<sub>2</sub>O<sub>3</sub>, **151**, 300

Nickel monoxide

-NiFe<sub>2</sub>O<sub>4</sub> catalysts, vapor-phase oxidation of benzoic acid to phenol, 151, 323 Niobium

-ZSM-5 zeolite catalysts for ethane oxydehydrogenation, <sup>18</sup>O<sub>2</sub> temperature-programmed isotope exchange study, **154**, 24

Niobium oxide

 -vanadium catalysts, oxidative dehydrogenation of propane, effect of vanadium concentration: low-energy ion scattering study, 157, 584
 Niobium pentoxide

support of

calcined Co-Rh catalysts, particle and phase thicknesses, determination by XPS analysis, 152, 164

Rh catalysts, metal-support interactions in, characterization based on CO<sub>2</sub> methanation activity, **156**, 171

surface acid sites, energy distribution during NH<sub>3</sub> adsorption, evaluation, **150**, 274; *errata*, **152**, 215, **157**, 270

Niobium sulfide

Al<sub>2</sub>O<sub>3</sub>- and carbon-supported catalysts, preparation for hydrodesulfurization reactions, 156, 279

Nitrate

formation on  $CuO/\gamma$ - $Al_2O_3$  catalysts and effects on reactivity in NO and NH<sub>3</sub> conversion, **152**, 75

Nitric oxide

adsorption on

Co-Mo/γ-Al<sub>2</sub>O<sub>3</sub> sulfided catalysts, 156, 243

copper-on-alumina catalysts

adsorbed species and competitive pathways in NO reaction with NH<sub>3</sub> and O<sub>2</sub>, **152**, 93

nitrate species formation and effects of reactivity in NO and NH<sub>3</sub> conversion, **152**, 75

12-molybdophosphoric, 12-tungstophosphoric, and 12-tungstosilicic acids, and associated reactions, comparison, **152**, 179

Pd/Al<sub>2</sub>O<sub>3</sub> catalysts, FTIR study: metal-support interaction, **155**, 303 rare earth oxide catalysts, associated NO decomposition and reduction by methane, **155**, 290

and CO, reaction on

Rh(110) and Rh(111) catalysts, selectivity, effect of surface structure, 155, 204

Rh/SiO<sub>2</sub> catalysts, step and pulse transient studies of IR-observable adsorbates in situ, 157, 512

and CO and O<sub>2</sub>, interaction on Cu<sub>x</sub>Co<sub>3</sub> <sub>x</sub>O<sub>4</sub> catalysts, analysis by transient response technique, **156**, 219

decomposition over Cu-ZSM-5 zeolites, IR study, 157, 592

dissociation and reaction with H<sub>2</sub> on Rh-Sn/SiO<sub>2</sub> catalysts, molecular reaction intermediate and mechanism, **157**, 472

formation by NH<sub>3</sub> oxidation over La<sub>2</sub> $MO_4$  (M = Co,Ni,Cu) catalysts, 157, 749

and H<sub>2</sub> and O<sub>2</sub>, in analysis of propane conversion with Ga/H-ZSM-5 and H-ZSM-5 zeolites, **151**, 33

linkages in tungstophosphoric acid with Keggin units, structure, **157**, 76 and N atoms, coadsorbed on Rh(111) catalyst, reaction, **157**, 559 or NO<sub>2</sub>, flowing dry mixtures with  $C_3H_6$  or  $C_2H_5OH$  and excess  $O_2$ ,

CuH–ZSM-5 in, *in situ* ESR monitoring up to 500°C, **152**, 63 reduction

by CO or H<sub>2</sub> over Pt-Rh/Al<sub>2</sub>O<sub>3</sub> catalysts, **154**, 276 by ethylene

over Cu–ZSM-5 under lean conditions, reaction dynamics, analysis by transient experimental techniques, **155**, 184

over Pt/β"-Al<sub>2</sub>O<sub>3</sub> catalysts, electrochemical promotion, 152, 211
 over Pt-ZSM-5 catalysts under highly oxidizing conditions, autonomous kinetic oscillations during, analysis, 157, 14

by  $NH_3$ ,  $V_2O_5$ – $WO_3$ / $TiO_2$  catalysts for, reactivity and physicochemical characterization, **155**, 117

selective catalytic reduction by

hydrocarbons and NH<sub>3</sub> over ion-exchanged pillared clays, **155**, 414 methane over Co–ZSM5 in presence of oxygen, rate-determining step, **151**, 356

selective catalytic reduction by NH3 over

chromia catalysts in absence and presence of O<sub>2</sub>, effect of water, N-labeling studies, **154**, 107

CuO-TiO<sub>2</sub> and MgO-Fe<sub>2</sub>O<sub>3</sub> catalysts, associated adsorption, activation, and oxidation of NH<sub>3</sub>, 157, 523

delaminated Fe<sub>2</sub>O<sub>3</sub>-pillared clay catalysts, 151, 135

TiO<sub>2</sub>-supported CrO<sub>2</sub>, CrOOH, and Cr<sub>2</sub>O<sub>3</sub> catalysts, in situ diffuse reflectance FTIR study, **157**, 312

V2O5/TiO2 catalysts

active sites and formulation of catalytic cycles, **151**, 241 combined temperature-programmed *in situ* FTIR and on-line MS studies, **151**, 226

support effects in monolayer catalysts, 155, 171

#### Nitrobenzene

deoxygenation on oxidic catalysts, role of Mars and van Krevelen mechanism, 157, 706

#### Nitrogen

atomic, coadsorbed with NO on Rh(111) catalyst, reaction, 157, 559 Nitrogen dioxide

adsorption and reaction on 12-molybdophosphoric, 12-tungstophosphoric, and 12-tungstosilicic acids, comparison, **152**, 179

or NO, flowing dry mixtures with  $C_3H_6$  or  $C_2H_5OH$  and excess  $O_2$ , CuH-ZSM-5 in, in situ ESR monitoring up to 500°C, 152, 63

Nitrogen oxides

selective reduction by hydrocarbons on CoZSM-5 and HZSM-5 catalysts and in homogeneous reactions, comparison, **153**, 265

Nitromethane

effects on alcohol synthesis from CO/H<sub>2</sub> over Co-Cu/ZnO-Al<sub>2</sub>O<sub>3</sub> catalysts, **153**, 100

Nitrosobenzene

selective oxidation on oxidic catalysts, role of Mars and van Krevelen mechanism, 157, 706

Nitrous oxide

decomposition

Cu-ZSM-5 and Cu-Y catalysts for, comparison, **153**, 190 over heterogeneous rare earth ion photocatalysts, **157**, 262

NMR, see Nuclear magnetic resonance

Noble metals

addition to Ni/Al<sub>2</sub>O<sub>3</sub> catalysts, effects on oxidative methane-to-syngas conversion, 157, 752

Norbornene

epoxidation, TiO<sub>2</sub>-SiO<sub>2</sub> catalysts for, catalytic behavior, **153**, 177 Nuclear magnetic resonance

13C

1-butene interaction with titanosilicates TS-1 and ETS-10, **155**, 345 condensation of acetone and acetaldehyde adsorbed at Brønsted acid sites in H-ZSM-5, **151**, 373

 $^{1}H$ 

1-butene interaction with titanosilicates TS-1 and ETS-10, **155**, 345 magic angle spinning, quantitative analysis of structurally different OH surface groups on η-Al<sub>2</sub>O<sub>3</sub> and Mo/η-Al<sub>2</sub>O<sub>3</sub> catalysts, **154**, 65 solid-state <sup>1</sup>H, <sup>15</sup>N, and <sup>51</sup>V studies of V<sub>2</sub>O<sub>5</sub>-WO<sub>3</sub>/TiO<sub>x</sub>-Al<sub>2</sub>O<sub>3</sub> catalysts, **156**, 1

<sup>129</sup>Xe, comparative microporosity of ammonium and Cs salts of 12-tungstophosphoric, 12-molybdophosphoric, and 12-tungstosilicic acids, 151, 147

Nuclear microprobe analysis

catalysts for hydrotreatment and hydroconversion of petroleum fractions, 152, 103

o

#### 1-Octadecene

hydroformylation over supported homogeneous film catalysts, 155, 383

n-Octane

dehydrocyclization on Pt-Sn/SiO<sub>2</sub> catalysts: H/D exchange and reversible adsorption, 157, 626

oxidation over titanium silicate catalysts synthesized in presence of alkali metal and alkaline earth ions, 151, 77

1-Octene, see Caprylene

Olefins, see also Alkenes

C<sub>6</sub>, formation during 2-methylpentane cracking on USHY, **153**, 239 desorption during isobutane cracking over Y-zeolites, role in catalytic activity and selectivity, **153**, 65

epoxidation, TiO<sub>2</sub>-SiO<sub>2</sub> catalysts for, catalytic behavior, **153**, 177 hydroformylation

gas-phase reactions on Rh<sub>4</sub> carbonyl clusters attached on tris(hydroxymethyl)phosphine-modified SiO<sub>2</sub>, active sites in, structural control, **157**, 436

over supported homogeneous film catalysts, 155, 383

light, liquid-phase alkylation of benzene over  $\beta$  zeolites, 157, 227 oligomers, and cosolvents, effects on coking and activity of reforming catalysts in supercritical reaction mixtures, 152, 31

oxidation

with  $H_2O_2$  and tert-butyl hydroperoxide on Ti-beta catalysts, 152, 18 over Ti-MCM-41 structures, 156, 65

polymerization,  $Ti/MgCl_2$ -supported Ziegler-Natta catalysts for, quantum mechanical study, 157, 145

production by catalytic oxidation of alkanes in fluidized bed reactors, 155, 403

α-Olefins

readsorption in Fischer-Tropsch synthesis, chain-length dependence, **152**, 137

Oligomerization

during isobutane cracking over Y-zeolite, role in catalytic activity and selectivity, 153, 65

propene, heteropolyacid catalysts for, IR and thermal analysis, **153**, 293 Organometallic catalysts

Ru-containing, asymmetric synthesis of naproxen, **152**, 25 Organotin compounds

Sn(n-C<sub>4</sub>H<sub>9</sub>)<sub>4</sub>, selective hydrogenolysis on Ni/SiO<sub>2</sub> catalysts: preparation of bimetallic catalysts, **155**, 238

Oxidation, see also Autoxidation; Photooxidation

acetaldehyde on CeO<sub>2</sub> and CeO<sub>2</sub>-supported catalysts, 155, 219

alkanes in fluidized bed reactors: olefin production, 155, 403

alkylaromatics over chemical vapor deposition Fe/Mo/DBH molecular sieve catalysts, **151**, 338

benzene over micro-mesoporous amorphous titanosilicate catalysts, 157, 501

benzyl alcohol on Cu-Na-ZSM-5 catalysts, effect of alkali promoters, 153, 254

n-butane

into maleic anhydride, role of VO(H<sub>2</sub>PO<sub>4</sub>)<sub>2</sub> precursor, **154**, 253 over VPO catalysts, associated evolution of catalyst during activation time, **156**, 28

1-butene over SiO<sub>2</sub>-supported Wacker catalysts

catalysis by Pd salts of heteropolyacids, 154, 187

heteropolyanions as catalyst redox components, 154, 175

CFC12 on TiO<sub>2</sub> catalysts, 151, 394

 $^{\circ}$ 

over Au-ZrO<sub>2</sub>-iron oxide and Au-Ag-ZrO<sub>2</sub> catalysts prepared in situ. 151, 407

over  $CeO_{2-x}$  nanocrystalline catalysts, effect of doping with La or Cu, 157, 42

by cooperative action of Pd and Mn<sub>2</sub>O<sub>3</sub> catalysts, 151, 279

at CuO/ZnO gradient composition heterocontact, effect of applied bias, 153, 350

over La(Sr)MnO3 catalysts

ionic redox behavior during transient oxidation, 157, 545 solid electrolyte potentiometric study, 152, 147

over Pd/C catalysts, effect of support pretreatment, 155, 327

over Pt(111) electrodes modified by irreversibly adsorbed Bi in sulfuric acid medium, analysis, 152, 264

over Rh catalysts dispersed on SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, and TiO<sub>2</sub>, kinetics and oscillatory behavior, **156**, 265

over Rh/CeO<sub>2</sub> catalysts, kinetics, 157, 222

cyclohexane on titanium silicalite-1: overoxidation and comparison with other oxidation systems, **157**, 631

ethylene, Rh catalysts for, non-Faradaic electrochemical modification, 154, 124

fluorene on  $V_2O_5$ -Fe<sub>2</sub>O<sub>3</sub> catalysts, effects of Cs doping, **154**, 11 formaldehyde over Ag catalysts, **154**, 230

glucose on Bi-promoted Pd catalysts, 152, 116

liquid-phase

aniline over transition metal-substituted molecular sieves, 157, 124 benzene to phenol with  $O_2$  over Cu-zeolites, 155, 158

over  $CeO_{2-x}$  nanocrystalline catalysts, effect of doping with La or Cu, 157, 42

to formaldehyde over V/SiO<sub>2</sub> catalysts, role of V-O double bond sites, **156**, 167

to methanol with H<sub>2</sub>-O<sub>2</sub> gas mixture at atmospheric pressure over FePO<sub>4</sub> catalysts, **155**, 256

over Pd/SiO<sub>2</sub> catalysts, induction periods during, role of chlorine, **152**, 410

methanol

over MoO<sub>3</sub> monoatomic layer formed on SnO<sub>2</sub>, analysis, **151**, 285 over MoO<sub>3</sub>/SiO<sub>2</sub> catalysts, silicomolybdic acid species generated during, *in situ* analysis, **155**, 249

Pt-Ru/C catalyst for, structure and chemical composition, 154, 98 NH<sub>3</sub>

to NO over  $La_2MO_4$  (M = Co, Ni, Cu) catalysts, 157, 749 over SCR catalysts, 157, 523

olefins

with hydrogen peroxide and tert-butyl hydroperoxide on Ti-beta catalysts, 152, 18

over Ti-MCM-41 structures, 156, 65

partial, n-butane to maleic anhydride over layered vanadyl(IV) phosphite-derived VPO catalysts, 156, 298

phenol over micro-mesoporous amorphous titanosilicate catalysts, 157, 501

propylene

to acrolein, transient kinetics: TAP reactor system application, 154, 151

over supported MoO<sub>3</sub> catalysts, effects of catalyst acid-base properties, 157, 740

selective

acyclic alkanes with O<sub>2</sub>, catalysis by halogenated metalloporphyrin complexes, **155**, 59

alkanes and alkenes over titanium silicate catalysts synthesized in presence of alkali metal and alkaline earth ions, 151, 77

cinnamyl alcohol to cinnamaldehyde with air over Bi-Pt/Al<sub>2</sub>O<sub>3</sub> catalysts, 153, 131

hydrocarbons with O<sub>2</sub> over chromium aluminophosphate-5 molecular sieve catalysts, **153**, 1

isobutyric acid over  $H_4PVMo_{11}O_{40} \cdot 32H_2O$  catalysts, active phase analysis, 153, 275

methane over SiO<sub>2</sub>-supported MoO<sub>3</sub> and silicomolybdic acid catalysts, comparison, **155**, 249

nitrosobenzene on oxidic catalysts, role of Mars and van Krevelen mechanism, 157, 706

thiols by air, mediation at Mo(VI)O<sub>2</sub> complex center intercalated in Zn(II)-Al(III) layered double hydroxide host, **152**, 237

toluene over micro-mesoporous amorphous titanosilicate catalysts, 157, 501

total, CO and methane over transition metal-fluorite oxide composite catalysts

catalyst characterization and reaction kinetics, 153, 317 catalyst composition and activity, 153, 304

trichloroethylene in air via heterogeneous photocatalysis, kinetics, 157, 87

vapor-phase, benozoic acid to phenol over catalyst system with NiO and NiFe<sub>2</sub>O<sub>4</sub>, **151**, 323

o-xylene to phthalic anhydride over V<sub>2</sub>O<sub>5</sub>/TiO<sub>2</sub> catalysts

conversion and product selectivities, effects of catalyst composition, preparation method, and operating condition, 157, 344

formation of carbonaceous deposits during, characterization by temperature-programmed oxidation, **156**, 295

transient catalytic behavior, 157, 353

Oxidative coupling

methane over

 $Bi_2Sn_{2-x}Bi_xO_{7-x/2}$  pyrochlore catalysts, effect of composition on catalytic performance, **153**, 197

La<sub>2</sub>O<sub>3</sub> catalysts

identification and role of specific active sites, **151**, 439 mechanistic study using isotope transient kinetics, **155**, 106

MgO-based catalysts, steady-state isotope transient kinetic analysis, **156**, 106

Na<sub>2</sub>WO<sub>4</sub>/CeO<sub>2</sub> and related catalysts, 154, 163

oxide-supported Na-Mn catalysts, 155, 390; erratum, 157, 270

Oxidative dehydrogenation

n-butane over supported V catalysts, effect of support acid-base character, 157, 271

ethane over

Li<sup>+</sup>-MgO catalysts, effect of chloride addition to catalyst, **151**, 155 transition-metal-containing ZSM-5 zeolites, <sup>18</sup>O<sub>2</sub> temperature-programmed isotope exchange study, **154**, 24

isobutane over Pt-coated monoliths at short contact times, 155, 82 propane

over vanadium-niobium oxide catalysts, effect of vanadium concentration: low-energy ion scattering study, 157, 584

VAPO-5 catalysts for, preparation, characterization, and catalytic properties, **152**, 1

Oxidative dimerization

methane on supported alkali molten carbonate catalysts, **152**, 204 Oxygen

C-O double bonds, and C-C double bonds, in  $\alpha$ - $\beta$  unsaturated aldehydes, competitive adsorption on Pt and Pd surfaces in relation to selectivity of hydrogenation, theoretical analysis, **152**, 217

and CO and NO, interaction on  $Cu_xCo_{3-x}O_4$  catalysts, analysis by transient response technique, **156**, 219

Co-ZSM5 catalyst in presence of, selective reduction of NO by methane, rate-determining step, 151, 356

effect on performance of Pt-Rh/Al<sub>2</sub>O<sub>3</sub> three-way catalysts, **154**, 47 and H<sub>2</sub>, gas mixture at atmospheric pressure, oxidation of methane to

methanol over FePO<sub>4</sub> catalysts, **155**, 256 and H<sub>2</sub> and NO, in analysis of propane conversion with Ga/H-ZSM-

5 and H-ZSM-5 zeolites, **151**, 33

and hydrocarbon, role in NO reduction by ethylene over Cu-ZSM-5 under lean conditions, analysis by transient experimental techniques, **155**, 184

liquid-phase oxidation of benzene to phenol over Cu-zeolites, **155**, 158 and NO and C<sub>2</sub>H<sub>4</sub>, reaction over Pt–ZSM-5 catalysts under highly oxidizing conditions, autonomous kinetic oscillations during, analysis, **157**, 14

and NO (NO<sub>2</sub>) and C<sub>3</sub>H<sub>6</sub> (C<sub>2</sub>H<sub>5</sub>OH), flowing dry mixtures, Cu–ZSM-5 in, *in situ* ESR monitoring up to 500°C, **152**, 63

Pd supported on Al<sub>2</sub>O<sub>3</sub>, SiO<sub>2</sub>, and ZrO<sub>2</sub> in, in situ electron microscopic studies, 157, 676

selective catalytic reduction of NO with NH<sub>3</sub> in presence of, reaction over chromia catalysts, effect of water, N-labeling studies, **154**, 107 selective oxidation of hydrocarbons over chromium aluminophosphate-

5 molecular sieve catalysts, 153, 1

storage by Rh-loaded CeO<sub>2</sub>-ZrO<sub>2</sub> solid solutions, dependence on structural properties, **151**, 168

subsurface, effect on kinetics of propylene desorption from Ag(110), 153, 158

surface species generated electrochemically, analysis with temperatureprogrammable electrochemical cell, **155**, 21

-V double bonds, sites, role in methane oxidation over V/SiO<sub>2</sub> catalysts, 156, 167

#### Oxyhydrochlorination

ethylene at low temperature, CuCl<sub>2</sub> catalysts for, mobilities of active species in, effects of supports and promoters, **157**, 380

P

#### Palladium

addition to Ni/Al<sub>2</sub>O<sub>3</sub> catalysts, effects on oxidative methane-to-syngas conversion, **157**, 752

Al<sub>2</sub>O<sub>3</sub>-supported catalysts

NO adsorption, FTIR study: metal-support interaction, **155**, 303 in oxygen, *in situ* electron microscopic studies, **157**, 676

α-Al<sub>2</sub>O<sub>3</sub>-supported catalysts

characterization by chemisorption, electron microscopy, and photoelectron spectroscopy, **153**, 86

ethane oxidation in fluidized bed reactors: olefin production, **155**, 403 –Au, SiO<sub>2</sub>-supported catalysts, characterization and catalytic activity, **151**, 67

Bi-promoted catalysts, glucose oxidation, 152, 116 carbon-supported catalysts

adsorption and absorption properties, effect of support pretreatment, 155, 312

catalytic behavior, effect of support pretreatment, **155**, 327 hydrogenation of substituted pyrazine, calorimetric study, **157**, 201 Ru as dispersing agent during hydrogenation, **155**, 166

CeO<sub>2</sub>-supported catalysts, reactions of acetaldehyde, **155**, 219 –Co catalysts

1,3-butadiene hydrogenation, promoter effect of Pd, **157**, 179 CeO<sub>2</sub>-supported, reactions of acetaldehyde, **155**, 219

competitive adsorption of C-C and C-O double bonds in  $\alpha$ - $\beta$  unsaturated aldehydes in relation to selectivity of hydrogenation, theoretical analysis, **152**, 217

graphite-supported thin film catalysts, morphological transformation during 1,3-butadiene hydrogenation, air and ultrahigh vacuum scanning tunneling microscopic studies, **156**, 120

H-beta zeolite-supported catalysts, cracking and isomerization of heptane, reaction mechanisms, 155, 141

loaded silico-alumino-phosphate molecular sieve catalysts, isomerization of n-heptane, 155, 1

and Mn<sub>2</sub>O<sub>3</sub>, cooperative action in CO oxidation, 151, 279

Pd(100)-p(1 × 1)-H(D) catalysts, selective hydrogenation and H-D exchange of unsaturated hydrocarbons, **155**, 336

polycrystalline powder and  $SnO_2$ -supported catalysts, enthalpy changes during adsorption and reaction of CO,  $O_2$ , and CO +  $O_2$ , effect of catalyst pretreatment, **153**, 208

-Pt catalysts, pumice-supported, synthesis, structural characterization, and liquid-phase hydrogenation of 1,3-cyclooctadiene, **151**, 125

pumice-supported catalysts, selective phenylacetylene hydrogenation, **154**, 69

SiO<sub>2</sub>-supported catalysts

adsorption and dissociation of CH<sub>2</sub>Cl<sub>2</sub>, IR spectroscopic study: generation of CH<sub>2</sub>, **155**, 74

application in characterization of carbonaceous deposits by temperature-programmed oxidation. **156.** 295

CO and isobutylene hydrogenation, ethane hydrogenolysis, and methanol synthesis, effects of Li<sup>+</sup> promotion, **157**, 1

methane oxidation, induction periods during, role of chlorine, **152**, 410

in oxygen, in situ electron microscopic studies, 157, 676

sulfur resistance and catalytic properties, modification by La addition, **155**, 95

ZrO<sub>2</sub>-supported catalysts in oxygen, *in situ* electron microscopic studies, **157**, 676

Palladium sulfate

impregnated Wacker catalysts supported on SiO<sub>2</sub> with heteropolyanions as redox components, oxidation of 1-butene, **154**, 175

Paraffins

C<sub>6</sub>, formation during 2-methylpentane cracking on USHY, **153**, 239 Parallel reaction networks

activation energies in, falsification by pore diffusion, 154, 364 Particles

calcined Co-Rh/Nb<sub>2</sub>O<sub>5</sub> catalysts, thickness, determination by XPS analysis, **152**, 164

size, effect on photoactivity of aqueous suspension of TiO<sub>2</sub>, **153**, 32 spherical support, multimetallic and multiphase catalysts on, XPS analysis, **157**, 133

n-Pentane

monomolecular conversion over H-ZSM-5 zeolites, **157**, 388 3-Pentanol

dehydration on  $Al_2O_3$  catalysts: mechanism of ether formation, 157, 359 Perovskites

AlLaO<sub>3</sub> surfaces, methane chemisorption, ab initio SCF MO study, 156, 273

La(Sr)MnO<sub>3</sub> catalysts, CO oxidation, solid electrolyte potentiometric study, **152**, 147

Petroleum fractions

hydroconversion and hydrotreatment, catalysts for, nuclear microprobe analysis, 152, 103

pН

effect on photoactivity of aqueous suspension of TiO<sub>2</sub>, **153**, 32 Phase structure

 $Al_2O_3$ , effect on dispersion of Rh/ $Al_2O_3$  catalysts, 151, 385 Phenol

formation by

liquid-phase oxidation of benzene with O<sub>2</sub> over Cu-zeolites, **155**, 158 vapor-phase oxidation of benzoic acid over catalyst system with NiO and NiFe<sub>2</sub>O<sub>4</sub>, **151**, 323

oxidation over micro-mesoporous amorphous titanosilicate catalysts, **157**, 501

photooxidation in aqueous suspension of TiO<sub>2</sub>, variables influencing, analysis, **153**, 32

selective O-alkylation with methanol over sulfate catalysts supported on  $\gamma$ -Al<sub>2</sub>O<sub>3</sub>, **152**, 52

Phenylacetylene

selective hydrogenation on pumice-supported Pd catalysts, **154**, 69 m-Phenylenediamine

isomerization to methyl-aza-aromatics over zeolites, 155, 268 Phosphate

doped Al<sub>2</sub>O<sub>3</sub>, surface characterization, 152, 384

12-Phosphomolybdic acid

and 12-tungstophosphoric and 12-tungstosilicic acids adsorption and reaction of nitrogen oxides, comparison, **152**, 179

ammonium and Cs salts, comparative microporosity, <sup>129</sup>Xe NMR, **151.** 147

12-Phosphotungstic acid

acidity in acetic acid solution, measurement: independent ionization of hydrons, 152, 198

with Keggin units, NO linkages in, structure, 157, 76

and 12-molybdophosphoric and 12-tungstosilicic acids

adsorption and reaction of nitrogen oxides, comparison, **152**, 179 ammonium and Cs salts, comparative microporosity, <sup>129</sup>Xe NMR study, **151**, 147

and salts, thermal stability and acidity, IR and thermal analysis, 153, 293 Photoelectron spectroscopy

low-loaded Pd/Al<sub>2</sub>O<sub>3</sub> catalysts, 153, 86

**Photolysis** 

water over  $Pt-RuO_2/TiO_2$  catalysts, intrinsic rate, definition, 152, 360 Photooxidation

phenol in aqueous suspension of TiO<sub>2</sub>, variables influencing, analysis, 153, 32

propane over alkali ion-modified  $V_2O_5/SiO_2$  catalysts, 155, 196 2-propanol on  $TiO_2$  catalysts, transient studies, 157, 611 Phthalic anhydride

rittiane amiyuride

formation by o-xylene oxidation over V<sub>2</sub>O<sub>5</sub>/TiO<sub>2</sub> catalysts conversion and product selectivities, effects of catalyst composition, preparation method, and operating condition, **157**, 344

formation of carbonaceous deposits during, characterization by temperature-programmed oxidation, **156**, 295

transient catalytic behavior, 157, 353

Pillared clays

and acid-activated pillared clay catalysts, physical, acidic, and catalytic properties, 153, 76

-delaminated Fe<sub>2</sub>O<sub>3</sub>, preparation, characterization, and activity for selective catalytic reduction of NO by NH<sub>3</sub>, **151**, 135

ion-exchanged, selective catalytic reduction of NO by hydrocarbons and  $NH_3$ , 155, 414

montmorillonite, disproportionation of 1,2,4-trimethylbenzene, stabilization of catalytic activities for, effect of spillover hydrogen, 154, 41

Platinum

addition to

CoMo sulfide catalysts, effects on catalytic performance for hydrodeoxygenation of carbonyl, carboxyl, and guaiacol-type molecules, 154, 288

Ni/Al<sub>2</sub>O<sub>3</sub> catalysts, effects on oxidative methane-to-syngas conversion. 157, 752

Al<sub>2</sub>O<sub>3</sub>-supported catalysts

enantioselective hydrogenation of ethyl pyruvate, effect of (R)-2-(1-pyrrolidinyl)-1-(1-naphthyl) ethanol, **154**, 371

ethyl chloride decomposition, 157, 730

 $\alpha\text{-}Al_2O_3\text{-}supported catalysts, alkane oxidation in fluidized bed reactors: olefin production, 155, <math display="inline">403$ 

β"-Al<sub>2</sub>O<sub>3</sub>-supported catalysts, NO reaction with ethylene, electrochemical promotion, **152**, 211

γ-Al<sub>2</sub>O<sub>3</sub>-supported catalysts

coking and activity in supercritical reaction mixtures, olefinic oligomer and cosolvent effects, 152, 31

methylcyclopentane ring opening, effect of hydrogen partial pressure. 151, 330

alteration of acid properties of H-ZSM-5 zeolites, 157, 283

-Au catalysts,  $\alpha$ -Al<sub>2</sub>O<sub>3</sub>-supported, ethane oxidation in fluidized bed reactors: olefin production, **155**, 403

 Bi catalysts, Al<sub>2</sub>O<sub>3</sub>-supported, selective oxidation of cinnamyl alcohol to cinnamaldehyde, 153, 131

carbon black-supported catalysts, effects of graphitization of heattreated support, **154**, 299

CeO<sub>2</sub>- and TiO<sub>2</sub>-supported catalysts, metal-support interactions, comparison, **155**, 148

cinchona-modified catalyst for enantioselective hydrogenation, template model, letter to editor, 156, 175; reply, 156, 180

 $Co/Al_2O_3$  and  $Co/SiO_2$  catalysts promoted by, CO hydrogenation, 156, 85

coated monoliths, oxidative dehydrogenation of isobutane at short contact times, 155, 82

competitive adsorption of C-C and C-O double bonds in  $\alpha$ - $\beta$  unsaturated aldehydes in relation to selectivity of hydrogenation, theoretical analysis, **152**, 217

dihydrocinchonidine-modified catalysts, enantioselective hydrogenation of ethyl pyruvate: influence of conversion and bulk diffusion on catalytic limitations, **154**, 91

incorporation into  $SO_4^{2^-}$ -ZrO<sub>2</sub> superacid catalyst for *n*-butane isomerization, **153**, 218

K-LTL-supported catalysts, methylcyclopentane ring opening, effect of hydrogen partial pressure, **151**, 330

KL zeolite-supported catalysts, high sensitivity to sulfur poisoning, 157, 550

L zeolite-supported catalysts, n-hexane conversion, letter to editor, 156, 301; reply, 156, 304

mordenite, parallel skeletal isomerization and cracking of *n*-hexane, activation energies for, falsification by pore diffusion, **154**, 364

-NaY catalysts, n-hexane skeletal reactions, 155, 43

-Pd catalysts, pumice-supported, synthesis, structural characterization, and liquid-phase hydrogenation of 1,3-cyclooctadiene, **151**, 125 Pt(111)

electrodes modified by irreversibly adsorbed Bi in sulfuric acid medium, CO adsorption and oxidation, **152**, 264

surfaces, Ag-promoted sulfidation, **154**, 355
Pt<sub>x</sub>In<sub>y</sub> bimetallic catalysts in NaY zeolites, preparation and characterization, **152**, 313

Pt<sub>x</sub>Sn<sub>y</sub> bimetallic catalysts in NaY zeolites, preparation and characterization, 154, 345

Pt-SO<sub>4</sub><sup>2</sup>-ZrO<sub>2</sub> catalysts

characterization by TGA/DTA/mass spectrometry, **153**, 123 hydrocarbon conversion activity, effect of water, **151**, 292

skeletal isomerization of *n*-butane, effect of reaction pressure, **157**, 289

-Re reforming catalysts, Al<sub>2</sub>O<sub>3</sub>-supported, Re reducibility in, TPR-XANES study, 154, 222

-Rh catalysts, Al<sub>2</sub>O<sub>3</sub>-supported

kinetic characterization and synergistic effects, **154**, 276 microstructural characterization, **154**, 261

performance in three-way reactions under stationary and cycling conditions, influence of  $O_2$ , 154, 47

-Ru catalysts, carbon-supported, for methanol oxidation: structure and chemical composition, 154, 98

-RuO<sub>2</sub> catalysts, TiO<sub>2</sub>-supported, photocatalytic cleavage of water, intrinsic rate definition, 152, 360

SAPO-5- and SAPO-11-supported catalysts, *n*-heptane hydroisomerization and hydrocracking, **156**, 11

SiO<sub>2</sub>-supported catalysts

acrolein hydrogenation, selectivity: model for hydrogenation of  $\alpha,\beta$ -unsaturated aldehydes, 156, 51

ethyl chloride decomposition, 157, 730

n-hexane conversion, letter to editor, 156, 301; reply, 156, 304

high-surface-area catalysts with well-defined pore size distributions, preparation, **152**, 291

isobutane dehydrogenation, effect of potassium, 157, 576

methylcyclopentane ring opening, effect of hydrogen partial pressure, 151, 330

and mixtures with HY zeolites, *n*-hexane skeletal reactions, 155, 43 reactions of substituted  $\alpha,\beta$ -unsaturated aldehydes, activity and selectivity, 151, 431

-Sn catalysts, SiO2-supported

isobutane dehydrogenation, effect of potassium, 157, 576

n-octane dehydrocyclization: H/D exchange and reversible adsorption, 157, 626

preparation, effect of metallic precursors: characterization and reactivity in catalytic activation of CO<sub>2</sub>, **156**, 139

zeolites promoted by, skeletal isomerization of *n*-butane, effect of reaction pressure, **157**, 289

ZrO<sub>2</sub>-supported catalysts, ethane oxidation in fluidized bed reactors: olefin production, 155, 403

Platinum black

catalysts sintered at 473 and 633 K, surface analysis and activity in nhexane reactions, 152, 252

electrocatalytic synthesis of propylene oxide during water electrolysis, 157, 450

K-free and K-doped, catalysis of reactions of n-hexane, 156, 19 Poisoning

Pd/SiO<sub>2</sub> catalysts by thiophene in hydrogenation of ethylbenzene, effects of La addition, **155**, 95

Pt/KL catalysts by sulfur, analysis, 157, 550

Polybenzimidazole resin

support of Mo(VI) catalysts for cyclohexene epoxidation catalyst synthesis, characterization, and activity, **152**, 368 recycling, **152**, 377

Polyglycidyl methacrylate resin

imidazole-containing, support of Mo(VI) catalysts for cyclohexene epoxidation, catalyst synthesis, characterization, and activity, 152, 368

Polymerization

ethylene on Cr/SiO<sub>2</sub> catalysts, initiation, FTIR study, **154**, 329 SiO<sub>2</sub> catalysts for, compacting effects of mercury porosimetry, **152**, 415 Ti/MgCl<sub>2</sub>-supported Ziegler-Natta catalysts for, quantum mechanical study, **157**, 145

Polystyrene resin

imidazole-containing, support of Mo(VI) catalysts for cyclohexene epoxidation, catalyst synthesis, characterization, and activity, 152, 368

Pore diffusion

falsification of activation energies in parallel reaction networks, **154**, 364 Pore size

 $SiO_2$  polymerization catalysts, effects of mercury porosimetry, 152, 415 well-defined distributions, high-surface-area  $Pt/SiO_2$  catalysts with, preparation, 152, 291

Porosimetry

mercury-based, compacting effects on  $SiO_2$  polymerization catalysts, 152, 415

Porosity, see Microporosity

Potassium

addition to CoMo sulfide catalysts, effects on catalytic performance for hydrodeoxygenation of carbonyl, carboxyl, and guaiacol-type molecules, **154**, 288

doping of Pt black, effect on catalytic reactions of *n*-hexane, **156**, 19 effects on SiO<sub>2</sub>-supported Pt and Pt/Sn catalysts for isobutane dehydrogenation, **157**, 576

exchanged X zeolites, basicity, microcalorimetric characterization, 157, 266

ionic

modified  $V_2O_5/SiO_2$  catalysts, photooxidation of propane, 155, 196 titanium silicates synthesized in presence of, catalytic activity, 151, 77 precipitated Fischer-Tropsch catalyst of composition 100 Fe/5 Cu/4.2 K/25 SiO<sub>2</sub>, activation studies

catalyst characterization, 155, 353

reaction studies, 155, 366

promoted Co catalysts, in situ XAFS study, 151, 17

promoted Cu/SiO<sub>2</sub> catalysts

formic acid and formaldehyde adsorption, FTIR study, 155, 52

methanol synthesis from CO<sub>2</sub>, IR study, 154, 314

promotion of CuCl<sub>2</sub> catalysts for low-temperature ethylene oxyhydrochlorination, effect on mobilities of active species, **157**, 380

Potassium nitrate
-NaNO<sub>3</sub>, molten eutectic mixture, in preparation of high-surface-area
Mo/ZrO<sub>2</sub> catalysts, **153**, 17

Potassium oxide

-Fe<sub>2</sub>O<sub>3</sub>-CuO Fischer-Tropsch synthesis catalysts, precipitated, activation effects, 156, 185

Potentiometry

solid electrolyte, La(Sr)MnO<sub>3</sub> catalysts during CO oxidation, **152**, 147 Praseodymium

Al<sub>2</sub>O<sub>3</sub>- and SiO<sub>2</sub>-Al<sub>2</sub>O<sub>3</sub>-supported photocatalysts, and Pr ion-exchanged mordenite, decomposition of N<sub>2</sub>O, **157**, 262

Prehydrolysis ratio

effects on homogeneity of ZrO<sub>2</sub>-SiO<sub>2</sub> aerogels, 153, 194

Pressure effects

hydrogen partial pressure effects on methylcyclopentane ring opening over supported Pt catalysts, 151, 330

residence time of intermediates leading to propional dehyde formation during  ${\rm Co/H_2/C_2H_4}$  reaction on Rh/SiO<sub>2</sub> catalysts, 151, 253

skeletal isomerization of *n*-butane on zeolites and sulfated ZrO<sub>2</sub> catalysts, **157**, 289

Propanal, see Propionaldehyde

Propane

catalytic oxidation in fluidized bed reactors: olefin production, 155, 403 conversion

with H-ZSM-5 and Ga/H-ZSM-5 zeolites in presence of co-fed NO, O<sub>2</sub>, and H<sub>2</sub>, **151**, 33

monomolecular, over H-ZSM-5 zeolites, 157, 388

oxidative dehydrogenation

over vanadium-niobium oxide catalysts, effect of vanadium concentration: low-energy ion scattering study, 157, 584

VAPO-5 catalysts for, preparation, characterization, and catalytic properties, **152**, 1

photooxidation over alkali ion-modified  $V_2O_3/SiO_2$  catalysts, 155, 196 selective reduction of  $NO_x$  on CoZSM-5 and HZSM-5 catalysts and in homogeneous reactions, comparison, 153, 265

n-Propanol, see n-Propyl alcohol

2-Propanol, see Isopropyl alcohol

Propene, see Propylene

2-Propen-1-ol

reaction in H-ZSM-5, role of propanal, 154, 208

Propionaldehyde

formation during CO/H<sub>2</sub>/C<sub>2</sub>H<sub>4</sub> reaction on Rh/SiO<sub>2</sub> catalysts, transient response, **151**, 253

role in reaction of 2-propen-1-ol in H-ZSM-5, 154, 208

n-Propyl alcohol

synthesis from CO/H<sub>2</sub> over Co-Cu/ZnO-Al<sub>2</sub>O<sub>3</sub> catalysts, effects of in situ addition of CH<sub>3</sub>NO<sub>2</sub>, **153**, 100

Propylcyclobutane

ring-opening hydrogenation over Ni/SiO<sub>2</sub> catalysts, 151, 315

Propylene

desorption from Ag(110), kinetics, effect of subsurface oxygen, **153**, 158 –deuterium addition and exchange reactions over dispersed ZrO<sub>2</sub> catalysts, mechanism, support effects, **154**, 306

or ethanol, flowing dry mixtures with NO or NO<sub>2</sub> and excess O<sub>2</sub>, CuH-ZSM-5 in, in situ ESR monitoring up to 500°C, **152**, 63

hydrogenation over molybdenum sulfide catalysts prepared by ammonium tetrathiomolybdate decomposition, effect of Co promotion, **157.** 536

liquid-phase alkylation of benzene over  $\beta$  zeolites, 157, 227 oligomerization, heteropolyacid catalysts for, IR and thermal analysis, 153, 293

oxidation

to acrolein, transient kinetics: TAP reactor system application, 154, 151

over supported MoO<sub>3</sub> catalysts, effects of catalyst acid-base properties, 157, 740

Propylene oxide

electrocatalytic synthesis on Pt black during water electrolysis, 157, 450 Protons

affinity distributions of TiO<sub>2</sub>-SiO<sub>2</sub> and ZrO<sub>2</sub>-SiO<sub>2</sub> mixed oxides, relationship to catalyst activities for 1-butene isomerization, **157**, 244

Pumice

support of

Pd catalysts, selective phenylacetylene hydrogenation, **154**, 69 Pd-Pt catalysts, synthesis, structural characterization, and liquidphase hydrogenation of 1,3-cyclooctadiene, **151**, 125

Pyrazine

substituted, hydrogenation over Pd/C catalysts, calorimetric study, 157, 201

**Pyridine** 

hydrodenitrogenation on

molybdenum carbide catalysts, 154, 33

MoO<sub>3</sub> catalysts supported on γ-Al<sub>2</sub>O<sub>3</sub>, SiO<sub>2</sub>, and SiO<sub>2</sub>-Al<sub>2</sub>O<sub>3</sub>, bifunctional mechanism. **156**, 255

Pyridyl imidazole

polystyrene and polyglycidyl methacrylate resins with, support of Mo(VI) catalysts for cyclohexene epoxidation, catalyst synthesis, characterization, and activity, **152**, 368

Pyrochlore catalysts

 $Bi_2Sn_{2-x}Bi_xO_{7-x/2}$ , oxidative coupling of methane, influence of variable composition on catalytic performance, **153**, 197

(R)-2-(1-Pyrrolidinyl)-1-(1-naphthyl) ethanol

synthesis and effects on enantioselective hydrogenation of ethyl pyruvate on Pt/Al<sub>2</sub>O<sub>3</sub> catalysts, **154**, 371

R

Radiation, see specific types

Radiofrequency radiation

high-power pulsed, selective production of acetylene from reaction of methane over carbon catalysts, 151, 349

Raman spectroscopy

Fourier transform, silicalite-1 and titanium silicalite-1, 157, 482

laser, in situ study of role of Fe and Co dopants in activation of VPO catalyst precursor  $VO(HPO_4) \cdot 0.5H_2O$  prepared by isobutanol reduction of  $V_2O_5$ , 157, 687

Raney nickel

undoped and Cr-doped catalysts, acetone hydrogenation, electrode potential: influence of solution and reaction kinetics, 155, 12

Rare earth ions

as heterogeneous photocatalysts for  $N_2O$  decomposition, evaluation, 157, 262

Readsorption

α-olefins in Fischer-Tropsch synthesis, chain-length dependence, 152, 137

Reduction

acetaldehyde on CeO<sub>2</sub> and CeO<sub>2</sub>-supported catalysts, **155**, 219 metals supported on hydrous titanium oxide ion-exchange materials, **156**, 154

NiTa<sub>2</sub>O<sub>6</sub> supported on SiO<sub>2</sub>, induction of strong metal-oxide interaction, **151**, 460

NO

with CO or H<sub>2</sub> over Pt-Rh/Al<sub>2</sub>O<sub>3</sub> catalysts, 154, 276

by ethylene

over Cu-ZSM-5 under lean conditions, reaction dynamics, analysis by transient experimental techniques, 155, 184

over Pt/β"-Al<sub>2</sub>O<sub>3</sub> catalysts, electrochemical promotion, **152**, 211 over Pt-ZSM-5 catalysts under highly oxidizing conditions, autonomous kinetic oscillations during, analysis, **157**, 14

by methane over rare earth oxide catalysts, 155, 290

by NH<sub>3</sub>, V<sub>2</sub>O<sub>5</sub>-WO<sub>3</sub>/TiO<sub>2</sub> catalysts for, reactivity and physicochemical characterization, **155**, 117

selective catalytic, see Selective catalytic reduction

 $SO_2$  over  $CeO_{2-x}$  nanocrystalline catalysts, effect of doping with La or Cu, 157, 42

temperature-programmed, see Temperature-programmed reduction  $V_2O_5$  by isobutanol, VPO catalyst precursor  $VO(HPO_4) \cdot 0.5H_2O$  prepared by, activation, role of Fe and Co dopants: in situ laser Raman spectroscopic study, 157, 687

Reductive coupling

acetaldehyde on CeO<sub>2</sub> and CeO<sub>2</sub>-supported catalysts, **155**, 219 Reforming reactions

CO<sub>2</sub> over supported noble metal catalysts, molecular aspects, **157**, 162 hexane isomers in absence of oxygen, bulk tungsten catalysts for, characterization and catalytic activity, **153**, 9

in supercritical reaction mixtures, catalyst coking and activity during, olefinic oligomer and cosolvent effects, 152, 31

Resins, see specific resins

Rhenium

reducibility in Pt-Re/Al<sub>2</sub>O<sub>3</sub> reforming catalysts, TPR-XANES study, 154, 222

Rhodium

Al<sub>2</sub>O<sub>3</sub>-supported catalysts

CO oxidation, kinetics and oscillatory behavior, **156**, 265 dispersion, effect of Al<sub>2</sub>O<sub>3</sub> phase structure, **151**, 385

α-Al<sub>2</sub>O<sub>3</sub>-supported catalysts

CO<sub>2</sub> reforming reactions, molecular aspects, 157, 162

ethane oxidation in fluidized bed reactors: olefin production, **155**, 403 catalysts for C<sub>2</sub>H<sub>4</sub> oxidation, non-Faradaic electrochemical modification, **154**, 124

CeO<sub>2</sub>-supported catalysts

CO oxidation, kinetics, 157, 222

CO<sub>2</sub> methanation under transient and steady-state conditions, role of surface and bulk ceria, 151, 111

CO<sub>2</sub> reforming reactions, molecular aspects, 157, 162

metal-support interactions in, characterization based on  $CO_2$  methanation activity, 156, 171

 Co calcined catalysts, Nb<sub>2</sub>O<sub>5</sub>-supported, particle and phase thicknesses, determination by XPS analysis, 152, 164

Fe-promoted clusters in NaY zeolites, characterization and performance in CO hydrogenation, 153, 144

 $La_{2}O_{3}\text{-supported catalysts, }CO_{2}\text{ reforming reactions, molecular aspects,}\\ \textbf{157, }162$ 

loaded CeO<sub>2</sub>-ZrO<sub>2</sub> solid solutions, reduction behavior and oxygen storage capacity, dependence on structural properties, 151, 168

MgO-supported catalysts, CO<sub>2</sub> reforming reactions, molecular aspects, 157, 162

Mn-promoted and unpromoted catalysts, CO hydrogenation to higher oxygenates: metal-promoter interaction in RhMn/NaY, 154, 245

-Mo catalysts,  $\gamma$ -Al<sub>2</sub>O<sub>3</sub>-supported, surface acidity, **156**, 96

Nb<sub>2</sub>O<sub>5</sub>-supported catalysts, metal-support interactions in, characterization based on CO<sub>2</sub> methanation activity, **156**, 171

-Pt catalysts, Al<sub>2</sub>O<sub>3</sub>-supported

kinetic characterization and synergistic effects, 154, 276 microstructural characterization, 154, 261

performance in three-way reactions under stationary and cycling conditions, influence of O<sub>2</sub>, **154**, 47

Rh(110) and Rh(111) catalysts, NO-CO reaction, selectivity, effect of surface structure, 155, 204

Rh(111) catalysts, reaction of coadsorbed NO and nitrogen atoms, 157, 559

Rh<sub>4</sub> carbonyl clusters attached on tris(hydroxymethyl)phosphine-modified SiO<sub>2</sub>, active sites in gas-phase olefin hydroformylation, structural control, **157**, 436

Rh(CO)Cl(PPh<sub>3</sub>)<sub>2</sub>, homogeneous catalyst, selectivity in hydrocarbonylation of methyl acetate. **157**, 334

 -Ru catalysts, TiO<sub>2</sub>-supported, CO/H<sub>2</sub> reactions at high temperature and pressure, FTIR study, 157, 396

SiO<sub>2</sub>-supported catalysts

CeO<sub>2</sub>-promoted, CO<sub>2</sub> methanation under transient and steady-state conditions, role of surface and bulk ceria, **151**, 111

CO hydrogenation, dynamics of adsorbed species during, IR studies, 157, 51

CO oxidation, kinetics and oscillatory behavior, 156, 265

CO reaction with NO, step and pulse transient studies of IR-observable adsorbates in situ, 157, 512

ethylene hydroformylation

dynamic and Langmuir-Hinshelwood-Hougen-Watson kinetic analysis, 151, 266

propionaldehyde formation during, transient response, **151**, 253 highly dispersed, one-step preparation by low-temperature organometallic chemical vapor deposition, **157**, 294

-Sn catalysts, SiO<sub>2</sub>-supported, NO dissociation and NO-H<sub>2</sub> reaction, molecular reaction intermediate and mechanism, **157**, 472

supported on hydrous titanium oxide ion-exchange materials, reduction behavior, **156**, 154

TiO2-supported catalysts

CO oxidation, kinetics and oscillatory behavior, 156, 265

CO<sub>2</sub> reforming reactions, molecular aspects, 157, 162

interaction with benzene and toluene, effect of carrier doping, 152, 331

metal-support interactions in, characterization based on CO<sub>2</sub> methanation activity, **156**, 171

W<sup>6+</sup>-doped, CO and CO<sub>2</sub> hydrogenation, surface species formed during, FTIR and MS studies, **156**, 37

Ring opening

methylcyclopentane over supported Pt catalysts, effect of hydrogen partial pressure, **151**, 330

monoalkyl-substituted cyclobutanes over Ni/SiO<sub>2</sub> catalysts, **151**, 315

exchanged X zeolites, basicity, microcalorimetric characterization, 157, 266

ionic, modified  $V_2O_5/SiO_2$  catalysts, photooxidation of propane, 155, 196

## Ruthenium

addition to Ni/Al<sub>2</sub>O<sub>3</sub> catalysts, effects on oxidative methane-to-syngas conversion. **157.** 752

 $\alpha\text{-}Al_2O_3\text{-}$  and  $La_2O_3\text{-}supported catalysts, <math display="inline">CO_2$  reforming reactions, molecular aspects, 157, 162

clusters in NaY zeolites, effects of cluster size on catalytic activity for ethane hydrogenolysis and XANES, 153, 232

as dispersing agent in carbon-supported Pd catalysts, 155, 166

organometallic catalysts, asymmetric synthesis of naproxen, **152**, 25 –Pt catalysts, carbon-supported, for methanol oxidation: structure and

chemical composition, **154**, 98

-Rh catalysts, TiO<sub>2</sub>-supported, CO/H<sub>2</sub> reactions at high temperature and pressure, FTIR study, **157**, 396

SiO<sub>2</sub>-supported catalysts

3,3-dimethyl-1-butene hydrogenolysis and homologation, implications for mechanism of C-C bond formation and cleavage on metal surfaces, **152**, 306 dispersion determinations by volumetric hydrogen chemisorption, optimization, **156**, 60

ethane hydrogenolysis, isotopic transient kinetic analysis, **154**, 1 TiO<sub>2</sub>-supported catalysts

CO/H<sub>2</sub> reactions at high temperature and pressure, FTIR study, 157, 396

structure and Fischer-Tropsch synthesis activity, effect of sodium, **152**, 350

Ruthenium dioxide

-Pt catalysts, TiO<sub>2</sub>-supported, photocatalytic cleavage of water, intrinsic rate definition, 152, 360

Ruthenium sulfide

NH<sub>3</sub> adsorption, characterization: identification of amino species by inelastic neutron scattering, **157**, 414

S

Samarium oxide

Sr-promoted and unpromoted catalysts, NO adsorption, decomposition, and reduction by methane, **155**, 290

Scanning tunneling microscopy

under air and ultrahigh vacuum, analysis of morphological transformation of Pd/graphite thin film catalysts during 1,3-butadiene hydrogenation, **156**, 120

**β**-Scission

during isobutane cracking over Y-zeolite, role in catalytic activity and selectivity, 153, 65

Selective catalytic reduction

NO by hydrocarbons and NH<sub>3</sub> over ion-exchanged pillared clays, 155, 414

NO by methane over Co-ZSM5 catalyst in presence of oxygen, ratedetermining step, **151**, 356

NO by NH3 over

chromia catalysts in absence and presence of  $O_2$ , effect of water, N-labeling studies, 154, 107

CuO-TiO<sub>2</sub> and MgO-Fe<sub>2</sub>O<sub>3</sub> catalysts, associated adsorption, activation, and oxidation of NH<sub>3</sub>, **157**, 523

delaminated Fe<sub>2</sub>O<sub>3</sub>-pillared clay catalysts, 151, 135

TiO<sub>2</sub>-supported CrO<sub>2</sub>, CrOOH, and Cr<sub>2</sub>O<sub>3</sub> catalysts, *in situ* diffuse reflectance FTIR study, **157**, 312

V<sub>2</sub>O<sub>5</sub>/TiO<sub>2</sub> catalysts

active sites and formulation of catalytic cycles, **151**, 241 combined temperature-programmed *in situ* FTIR and on-line MS studies, **151**, 226

support effects in monolayer catalysts, 155, 171

 $NO_x$  by hydrocarbons on CoZSM-5 and HZSM-5 catalysts and in homogeneous reactions, comparison, **153**, 265

Selectivity

higher alcohol synthesis over CuO-ZnO-Cr<sub>2</sub>O<sub>3</sub> catalysts, relationship to catalyst structural and surface properties, **156**, 208

hydrocarbonylation of methyl acetate with homogeneous Rh complex catalyst, 157, 334

hydrogenation

acetone with  $SiO_2$ -supported Ni and Co catalysts at high temperature, 157, 461

acrolein on Pt catalysts: model for hydrogenation of  $\alpha,\beta$ -unsaturated aldehydes. **156.** 51

relationship to competitive adsorption of C-C and C-O double bonds in  $\alpha$ - $\beta$  unsaturated aldehydes on Pt and Pd surfaces, theoretical analysis, **152**, 217

isobutane cracking over Y-zeolite catalysts, analysis, 153, 65

MoO<sub>3</sub>/SiO<sub>2</sub> catalysts and associated silicomolybdic acid species for oxidation reactions, *in situ* analysis, **155**, 249

NO-CO reaction over Rh(110) and Rh(111) catalysts, effect of surface structure, **155**, 204

o-xylene oxidation to phthalic anhydride over V<sub>2</sub>O<sub>5</sub>/TiO<sub>2</sub> catalysts, effects of catalyst composition, preparation method, and operating condition, **157**, 344

Self-supported catalysts

model catalysts derived from Co-based clusters of clusters, characterization and activity for 1,3-butadiene hydrogenation, **152**, 396 Senecialdehyde

adsorption geometries on Pt and Pd surfaces, analysis in terms of selective hydrogenation, 152, 217

reactions on Pt/SiO<sub>2</sub> catalysts, activity and selectivity, 151, 431 Sepiolite

support of V catalysts, acid-base character, effect on catalysis of oxidative dehydrogenation of *n*-butane, **157**, 271

surface properties, modification by secondary isomorphic substitution, 151, 420

Silicalite-1

spectroscopic characterization, 157, 482

Silicoaluminophosphates

SAPO-5 and SAPO-11 molecular sieves, support of Pt catalysts, *n*-heptane hydroisomerization and hydrocracking, **156**, 11

Silicomolybdic acid

formation and stability on MoO<sub>3</sub>/SiO<sub>2</sub> catalysts: *in situ* structural-selectivity study on selective oxidation reactions, **155**, 249

Silicon

Si(100), SiO<sub>2</sub> on, support of MoO<sub>3</sub> model catalysts, sulfidation study: comparison with Mo<sub>3</sub><sup>IV</sup>-sulfur cluster compounds, **157**, 698

Silicon dioxide -Al<sub>2</sub>O<sub>3</sub>, support of

MoO<sub>3</sub> catalysts

Brønsted-Lewis acidity, effect of catalyst composition, **151**, 192 pyridine hydrodenitrogenation, bifunctional mechanism, **156**, 255 Pr photocatalysts, decomposition of N<sub>2</sub>O, **157**, 262

polymerization catalysts, compacting effects of mercury porosimetry, 152, 415

precipitated Fischer-Tropsch catalyst of composition 100 Fe/5 Cu/ 4.2 K/25 SiO<sub>2</sub>, activation studies

catalyst characterization, 155, 353

reaction studies, 155, 366

on Si(100), support of MoO $_3$  model catalysts, sulfidation study: comparison with Mo $_3^{IV}$ -sulfur cluster compounds, 157, 698

support of

Ag catalysts

formaldehyde oxidation, 154, 230

with wide-range of Ag crystallite dispersion, ESR studies, 151, 87 Co catalysts

CO hydrogenation, effect of Pt promoter, 156, 85

eggshell catalysts, synthesis and catalytic properties for Fischer-Tropsch synthesis, **153**, 108

Fischer-Tropsch synthesis, effect of Zr promotion, 157, 35

prereduced and precalcined, effects of aqueous impregnation, 157, 25

selectivity for high-temperature hydrogenation of acetone, 157, 461 surface properties, effects of activation, 154, 56

CoMo sulfide catalysts, hydrodeoxygenation of carbonyl, carboxyl, and guaiacol-type molecules: effects of support and addition of K and Pt, 154, 288

Cr catalysts, ethylene polymerization, initiation, FTIR study, 154, 329 Cu catalysts, K-promoted

and clean catalysts, methanol synthesis from CO<sub>2</sub>, IR study, 154, 314

formic acid and formaldehyde adsorption, FTIR study, 155, 52 CuCl<sub>2</sub> catalysts, for low-temperature ethylene oxyhydrochlorination, mobilities of active species in, support and promoter effects, 157, 380

dispersed ZrO<sub>2</sub> catalysts, propene-deuterium addition and exchange reactions, mechanism, **154**, 306

homogeneous film catalysts, hydroformylation of olefins, **155**, 383 molybdenum oxide catalysts, UV-visible absorption edges, effect of local structure, **151**, 470

MoO3 catalysts

acid-base properties, effect on propylene oxidation, **157**, 740 formation and stability of silicomolybdic acid: *in situ* structural-selectivity study on selective oxidation reactions, **155**, 249 pyridine hydrodenitrogenation, bifunctional mechanism, **156**, 255

Na-Mn catalysts, oxidative coupling of methane, 155, 390; erratum, 157, 270

Ni catalysts

metal-support interactions, IR studies: role of SiO<sub>2</sub>, **151**, 453 ring-opening hydrogenation of monoalkyl-substituted cyclobutanes, **151**, 315

selective hydrogenolysis of Sn(n-C<sub>4</sub>H<sub>9</sub>)<sub>4</sub>: preparation of bimetallic catalysts, **155**, 238

selectivity for high-temperature hydrogenation of acetone, 157, 461 NiTa<sub>2</sub>O<sub>6</sub> catalysts, reduction of NiTa<sub>2</sub>O<sub>6</sub> in, induction of strong metal-oxide interaction, 151, 460

Pd-Au catalysts, catalyst characterization and activity, 151, 67 Pd catalysts

adsorption and dissociation of CH<sub>2</sub>Cl<sub>2</sub>, IR spectroscopic study: generation of CH<sub>2</sub> species, **155**, 74

application in characterization of carbonaceous deposits by temperature-programmed oxidation, **156**, 295

CO and isobutylene hydrogenation, ethane hydrogenolysis, and methanol synthesis, effects of Li<sup>+</sup> promotion, **157**, 1

methane oxidation, induction periods during, role of chlorine, 152, 410

sulfur resistance and catalytic properties, modification by La addition, 155, 95

Pt catalysts

acrolein hydrogenation, selectivity: model for hydrogenation of  $\alpha,\beta$ -unsaturated aldehydes, 156, 51

ethyl chloride decomposition, 157, 730

*n*-hexane conversion, letter to editor, **156**, 301; reply, **156**, 304 high-surface-area catalysts with well-defined pore sized distributions, preparation, **152**, 291

isobutane dehydrogenation, effect of potassium, 157, 576 methylcyclopentane ring opening, effect of hydrogen partial pressure. 151, 330

and mixtures with HY zeolites, n-hexane skeletal reactions, 155, 43 reactions of substituted α,β-unsaturated aldehydes, activity and selectivity, 151, 431

PtSn catalysts

isobutane dehydrogenation, effect of potassium, 157, 576

*n*-octane dehydrocyclization: H/D exchange and reversible adsorption, **157**, 626

preparation, effect of metallic precursors: characterization and reactivity in catalytic activation of CO<sub>2</sub>, **156**, 139

Rh catalysts

CeO<sub>2</sub>-promoted, CO<sub>2</sub> methanation under transient and steadystate conditions, role of surface and bulk ceria, **151**, 111

CO hydrogenation, dynamics of adsorbed species during, IR studies, 157, 51

CO oxidation, kinetics and oscillatory behavior, 156, 265

CO reaction with NO, step and pulse transient studies of IRobservable adsorbates in situ, 157, 512 heterogeneous catalytic hydroformylation, dynamic and Langmuir-Hinshelwood-Hougen-Watson kinetic analysis, 151, 266 one-step preparation of highly dispersed catalysts by low-temperature chemical vapor deposition, 157, 294

propionaldehyde formation during CO/H<sub>2</sub>/C<sub>2</sub>H<sub>4</sub> reaction, transient response, 151, 253

Rh-Sn catalysts, NO dissociation and NO-H2 reaction, molecular reaction intermediate and mechanism, 157, 472

### Ru catalysts

3,3-dimethyl-1-butene hydrogenolysis and homologation, implications for mechanism of C-C bond formation and cleavage on metal surfaces, 152, 306

dispersion determinations by volumetric hydrogen chemisorption, optimization, 156, 60

ethane hydrogenolysis, isotopic transient kinetic analysis, 154, 1 V catalysts, methane oxidation to formaldehyde, role of V-O double

bond sites, 156, 167 V<sub>2</sub>O<sub>5</sub> catalysts, alkali ion-modified, photooxidation of propane,

155, 196

Wacker catalysts, oxidation of 1-butene

catalysis by Pd salts of heteropolyacids, 154, 187

heteropolyanions as catalyst redox components, 154, 175

surfaces, Rh<sub>4</sub> carbonyl clusters coordinated with tris(hydroxymethyl)phosphine grafted onto, active sites in gas-phase olefin hydroformylation, structural control, 157, 436

-Ta<sub>2</sub>O<sub>5</sub> mixed oxides prepared by sol-gel method, acidic and catalytic properties, 156, 132

-TiO<sub>2</sub> mixed oxide catalysts

1-butene isomerization, relationship to catalyst proton affinity distributions, 157, 244

 $\alpha$ -isophorone epoxidation with hydroperoxides, 157, 665 olefin epoxidation, analysis of catalytic behavior, 153, 177

structural properties, influence of sol-gel and drying conditions, 153, 165

## $-ZrO_2$

aerogels, homogeneity, effects of prehydrolysis ratio variation,

mixed oxide catalysts, 1-butene isomerization, relationship to catalyst proton affinity distributions, 157, 244

### 12-Silicotungstic acid

and 12-molybdophosphoric and 12-tungstophosphoric acids adsorption and reaction of nitrogen oxides, comparison, 152, 179 ammonium and Cs salts, comparative microporosity, 129Xe NMR, 151, 147

# Silver

Ag(110), propylene desorption from, kinetics, effect of subsurface oxygen, 153, 158

α-Al<sub>2</sub>O<sub>3</sub>-supported catalysts, real structure for Ag particles of different dispersity, 154, 194

-Au-ZrO<sub>2</sub> catalysts prepared in situ, CO oxidation, 151, 407

SiO<sub>2</sub>-supported catalysts, with wide range of Ag crystallite dispersion, ESR studies, 151, 87

and sulfur, coadsorption on Pt(111) surfaces, 154, 355

supported and unsupported catalysts, formaldehyde oxidation, 154, 230 Single-file systems

tracer exchange and catalytic reaction in, analysis, 157, 656

Ni on  $\alpha$ -Al<sub>2</sub>O<sub>3</sub>, role of NiAl<sub>2</sub>O<sub>4</sub> intermediate layer, 151, 300

Pt catalysts, effects of graphitization of heat-treated carbon black support, 154, 299

#### Sodium

effects on structure and Fischer-Tropsch synthesis activity of Ru/TiO2 catalysts, 152, 350

exchanged X zeolites, basicity, microcalorimetric characterization, 157, 266

ionic

titanium silicates synthesized in presence of, catalytic activity, 151, 77 V<sub>2</sub>O<sub>5</sub>/SiO<sub>2</sub> catalysts modified by, photooxidation of propane, 155, 196 Sodium carbonate

addition to Mg<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub> catalysts, effect on catalysis of gas-phase conversion of cyclohexanol, 157, 97

doped zinc phosphate catalysts, gas-phase dehydrogenationdehydration of cyclohexanol, selectivity, 151, 44

### Sodium nitrate

-KNO<sub>3</sub>, molten eutectic mixture, in preparation of high-surface-area Mo/ZrO<sub>2</sub> catalysts, 153, 17

#### Sodium permanganate

oxide-supported catalysts, oxidative coupling of methane, 155, 390; erratum, 157, 270

#### Sodium potassium carbonate

y-LiAlO<sub>2</sub>-supported catalysts, oxidative dimerization of methane, 152, 204

# Sodium tungstate

CeO<sub>2</sub>-supported, and related catalysts, oxidative coupling of methane,

-Mn catalysts, oxide-supported, oxidative coupling of methane, 155, 390; erratum, 157, 270

### Sol-gel chemistry

preparation of ZrO2-SiO2 aerogels, prehydrolysis ratio for, control, **153**, 194

related parameters, effects on structural properties of TiO2-SiO2 catalysts, 153, 165

SiO<sub>2</sub>-Ta<sub>2</sub>O<sub>5</sub> mixed oxides prepared by, acidic and catalytic properties. **156.** 132

synthesis of ZrO<sub>2</sub> supports: properties for generation of n-butane isomerization activity upon sulfate promotion, 157, 321

# Solid electrolyte potentiometry

La(Sr)MnO<sub>3</sub> catalysts during CO oxidation, 152, 147

#### Solid solutions

Rh-loaded CeO<sub>2</sub>-ZrO<sub>2</sub>, reduction behavior and oxygen storage capacity, dependence on structural properties, 151, 168

### Solution effects

acetone hydrogenation on undoped and Cr-doped Raney nickel catalysts, 155, 12

## Spinels

coherent surface layers on hexaaluminate microcrystals, structure and catalytic properties, 157, 713

Cu<sub>x</sub>Co<sub>3-x</sub>O<sub>4</sub> catalysts, interaction of CO, NO, and O<sub>2</sub> on, analysis by transient response technique, 156, 219

#### Stannic oxide

monoatomic MoO<sub>3</sub> layer formed on, structure and activity, 151, 285 support of Pd catalysts, adsorption and reaction of CO, O2, and CO + O2, enthalpy changes during, effect of catalyst pretreatment, 153, 208

#### Steam aging

CuH-ZSM-5, associated rearrangement of cationic sites and reactivity loss, 157, 603

# Strontium

La(Sr)MnO3 catalysts, CO oxidation

ionic redox behavior during transient oxidation, 157, 545 solid electrolyte potentiometric study, 152, 147

promoted La<sub>2</sub>O<sub>3</sub> and Sm<sub>2</sub>O<sub>3</sub> catalysts, NO adsorption, decomposition, and reduction by methane, 155, 290

# Structure

alumina phase in Rh/Al<sub>2</sub>O<sub>3</sub> catalysts, effect on catalyst dispersion, 151, 385

CeO2-ZrO2 solid solutions loaded with Rh, effect on oxygen storage capacity and reduction behavior, 151, 168

coherent spinel surface layers on hexaaluminate microcrystals, 157, 713

 $CuO-ZnO-Cr_2O_3$  catalysts, relationship to selectivity in higher alcohol synthesis, 156, 208

12-heteropoly compound crystals, analysis by molecular dynamics, 157, 569

lanthanide-modified ZrO<sub>2</sub>, crystal phases and defects, neutron scattering study, **157**, 636

local, molybdenum oxide clusters and supported catalysts, effect on UV-visible absortion edges, **151**, 470

MoO<sub>3</sub> monoatomic layer formed on SnO<sub>2</sub>, 151, 285

MoO<sub>3</sub>/SiO<sub>2</sub> catalysts with associated silicomolybdic acid species, *in situ* analysis: selectivity for oxidation reactions, **155**, 249

NO linkages in tungstophosphoric acid with Keggin units, 157, 76

Pd-Pt bimetallic catalysts supported on pumice, 151, 125

Rh(110) and Rh(111) catalyst surfaces, effect on catalysis of NO-CO reaction, 155, 204

Ru/TiO<sub>2</sub> catalysts, effect of sodium, 152, 350

sulfated ZrO<sub>2</sub> acid sites, role of penta-coordinated sulfur, 157, 755

TiO<sub>2</sub>-SiO<sub>2</sub> mixed oxides, effects of sol-gel and drying conditions, **153**, 165

 $V_2O_5/TiO_2$ -Al $_2O_3$  catalysts, effect of composition, 157, 368

ZrO<sub>2</sub> crystals

effect on catalytic activity of  $SO_4^{2-}$ – $ZrO_2$ , 151, 96

phases and defects, neutron scattering study, 157, 636

Styrene

epoxidation over titanium silicate molecular sieve TS-1 using dilute  $H_2O_2$  as oxidizing agent, **156**, 163

Substitution reactions

secondary isomorphic, modification of surface properties of natural sepiolite, **151**, 420

Sulfate

concentration in SO<sub>4</sub><sup>2</sup>-ZrO<sub>2</sub> catalysts, effect on catalytic activity,

doped ZrO<sub>2</sub> catalysts, crystal phase, spectral features, and catalytic activity, **157**, 109

promotion of ZrO<sub>2</sub> supports prepared by sol-gel synthesis, generation of catalytic activity for *n*-butane isomerization, **157**, 321

-ZrO<sub>2</sub>, support of Pt catalysts and cocatalyst in mechanical mixtures with Pt/Al<sub>2</sub>O<sub>3</sub>, n-butane isomerization, **153**, 218

Sulfidation

MoO<sub>3</sub>/SiO<sub>2</sub>/Si(100) model catalysts and Mo<sub>3</sub><sup>IV</sup>-sulfur cluster compounds, comparison, **157**, 698

Pt(111) surfaces, promotion by Ag, 154, 345

Sulfur

interaction with Ag/Pt(111) surfaces, 154, 355

 $Mo_3^{IV}$  -sulfur cluster compounds, sulfidation study: comparison with  $MoO_3/SiO_2/Si(100)$  model catalysts, 157, 698

nonstoichiometric formation in sulfided transition metal catalysts: temperature-programmed reduction and hydrodesulfurization activity, **151**, 178

Pd/SiO<sub>2</sub> catalyst resistance to, effects of La addition, **155**, 95 penta-coordinated, role in acid site structure of sulfated ZrO<sub>2</sub>, **157**, 755 poisoning of Pt/KL catalysts, analysis, **157**, 550

Sulfur dioxide

reduction over CeO<sub>2-x</sub> nanocrystalline catalysts, effect of doping with La or Cu. **157.** 42

Sulfuric acid

production, catalysts for, and related model systems, deactivation and simultaneous compound formation, 155, 32

Pt(111) electrodes modified by irreversibly adsorbed Bi in, CO adsorption and oxidation, 152, 264

ZrO<sub>2</sub> treated with, catalysis of skeletal rearrangement of labeled butanes, **151**, 26

Superacid catalysts

Fe- and Mn-promoted sulfated ZrO<sub>2</sub>, low-temperature conversion of n-butane, **151**, 464 Surfaces

adsorption studies, see Adsorption

Al and La oxide, methane chemisorption, ab initio SCF MO study, 156, 273

coherent spinel surface layers on hexaaluminate microcrystals, structure and catalytic properties, **157**, 713

Co/SiO<sub>2</sub> catalysts, effects of activation, 154, 56

 $CuO-ZnO-Cr_2O_3$  catalysts, properties, relationship to selectivity in higher alcohol synthesis, 156, 208

metal, C-C bond formation and cleavage on, mechanism: implications of 3,3-dimethyl-1-butene hydrogenolysis and homologation on Ru/SiO<sub>2</sub> catalysts, **152**, 306

metal oxide acid sites, energy distribution during NH<sub>3</sub> adsorption, evaluation, **150**, 274; *errata*, **152**, 215, **157**, 270

PO<sub>4</sub>-doped Al<sub>2</sub>O<sub>3</sub>, characterization, **152**, 384

Pt-black catalysts sintered at 473K and 633 K, characterization, **152**, 252 Rh-Mo/y-Al<sub>2</sub>O<sub>3</sub> catalysts, acidity, **156**, 96

Rh(110) and Rh(111) catalysts, structure, effect on catalysis of NO-CO reaction, 155, 204

sepiolite, modification by secondary isomorphic substitution, **151**, 420 SiO<sub>2</sub>, Rh<sub>4</sub> carbonyl clusters coordinated with tris(hydroxymethyl)phosphine grafted onto, active sites in gas-phase olefin hydroformylation, structural control, **157**, 436

specific area, effect on photoactivity of aqueous suspension of  ${\rm TiO_2},$  153, 32

Synthesis gas

formation by oxidative conversion of methane over  $Ni/Al_2O_3$  catalysts, effects of noble metal addition, 157, 752

production, molecular aspects, 157, 162

T

**Tantalum** 

NiTa<sub>2</sub>O<sub>6</sub>, SiO<sub>2</sub>-supported catalysts, reduction, induction of strong metal-oxide interaction, **151**, 460

Tantalum pentoxide

 $-SiO_2$  mixed oxides prepared by sol-gel method, acidic and catalytic properties, **156**, 132

TAP, see Temporal analysis of products reactor system

Temperature effects

CO<sub>2</sub> decomposition on oxide-supported polycrystalline Cu catalysts, 157, 153

Temperature-programmed desorption

in analysis of

electrochemically generated surface oxygen species, 155, 21

reaction dynamics of NO reduction by ethylene over Cu-ZSM-5 under lean conditions, 155, 184

hydrogen sulfide from unpromoted and Co-promoted molybdenum sulfide catalysts prepared by ammonium tetrathiomolybdate decomposition, **157**, 536

Temperature-programmed oxidation

in analysis of reaction dynamics of NO reduction by ethylene over Cu-ZSM-5 under lean conditions, 155, 184

characterization of carbonaceous deposits, 156, 295

and TPR, chromium(III) oxides, redox properties derived from, correlation with catalytic activity for hydrofluoroalkane synthesis, 152, 70

Temperature-programmed reaction

in analysis of electrochemically generated surface oxygen species, 155, 21

Temperature-programmed reduction

Rh-loaded CeO<sub>2</sub>-ZrO<sub>2</sub> solid solutions, dependence on structural properties, **151**, 168

sulfided Al<sub>2</sub>O<sub>3</sub>-supported transition metal catalysts: formation of nonstoichiometric sulfur, **151**, 178

and TPO, chromium(III) oxides, redox properties derived from, correlation with catalytic activity for hydrofluoroalkane synthesis, 152, 70

-XANES, in analysis of reducibility of Re in Pt-Al<sub>2</sub>O<sub>3</sub> reforming catalysts, **154**, 222

Temperature-programmed sulfiding

vanadium oxides and Al<sub>2</sub>O<sub>3</sub>-supported vanadium oxide catalysts, 154, 115

Temporal analysis of products reactor system

transient kinetics of propylene oxidation to acrolein, **154**, 151  $\alpha$ -Terpineol

oxidation over Ti-MCM-41 structures, 156, 65

Tetrabutyl tin

selective hydrogenolysis on Ni/SiO<sub>2</sub> catalysts: preparation of bimetallic catalysts, **155**, 238

1,1,2,2-Tetrafluoroethane

isomerization over conditioned Cr<sub>2</sub>O<sub>3</sub> catalysts, kinetic and mechanistic study, **155**, 283

1,2,3,4-Tetrahydronaphthalene

selective oxidation with  $O_2$  over chromium aluminophosphate-5 molecular sieve catalysts, **153**, 1

Tetrairidium clusters

MgO-supported catalysts, cyclohexene hydrogenation, 154, 335

Tetralin, see 1,2,3,4-Tetrahydronaphthalene

Thermal analysis

heteropoly acids, 153, 293

Thermogravimetric analysis

and differential thermal analysis and mass spectrometry, sulfated ZrO<sub>2</sub> catalysts with and without Pt, **153**, 123

Thiols

catalytic air oxidation, mediation at Mo(VI)O<sub>2</sub> complex center intercalated in Zn(II)-Al(III) layered double hydroxide host, **152**, 237

hydrodesulfurization on high-surface-area Mo/ZrO<sub>2</sub> catalysts, 153, 17 poisoning of Pd/SiO<sub>2</sub> catalysts in hydrogenation of ethylbenzene, effects of La addition, 155, 95

Thulium oxide

NO adsorption, decomposition, and reduction by methane, 155, 290 Tin

-Bi nonstoichiometric pyrochlore catalysts, oxidative coupling of methane, effect of composition on catalytic performance, **153**, 197

promoted MgO catalysts, oxidative coupling of methane, steady-state isotope transient kinetic analysis, 156, 106

-Pt catalysts, SiO<sub>2</sub>-supported

isobutane dehydrogenation, effect of potassium, 157, 576

n-octane dehydrocyclization: H/D exchange and reversible adsorption, 157, 626

preparation, effect of metallic precursors: characterization and reactivity in catalytic activation of CO<sub>2</sub>, **156**, 139

Pt<sub>x</sub>Sn<sub>y</sub> bimetallic catalysts in NaY zeolite, preparation and characterization, **154**, 345

-Rh catalysts, SiO<sub>2</sub>-supported, NO dissociation and NO-H<sub>2</sub> reaction, molecular reaction intermediate and mechanism, **157**, 472

Titanium

-Cu amorphous alloy catalyst, dehydrogenation of 2-propanol, catalyst activation and surface characterization in, comparision with Cu-Zr, 153, 333

MgCl<sub>2</sub>-supported Ziegler-Natta catalysts, quantum mechanical study, 157, 145

substituted molecular sieves, catalysis of liquid-phase oxidation of aniline, 157, 124

Ti-MCM-41 structures, synthesis, characterization, and catalytic activity, **156**, 65

Titanium boralites

with MFI structure, characterization with XRD, XANES, IR, and UV-visible techniques: effect of  $H_2O_2$  on preparation, 157, 235 Titanium dioxide

-Al<sub>2</sub>O<sub>3</sub>, support of V<sub>2</sub>O<sub>5</sub> catalysts, structure and acidity, effect of composition, 157, 368

anatase and rutile powder catalysts, adsorption and reaction of aliphatic alcohols, effects of bulk titania crystal structure, 153, 41

CFC12 decomposition on, analysis, 151, 394

-CuO catalysts, adsorption, activation, and oxidation of NH<sub>3</sub>, **157**, 523 photoactivity in aqueous suspension, variables influencing, analysis, **153**, 32

photocatalytic oxidation of

2-propanol, transient studies, 157, 611

trichloroethylene in air, kinetics, 157, 87

pillared clays, ion-exchanged, selective catalytic reduction of NO by hydrocarbons and NH<sub>3</sub>, **155**, 414

-SiO<sub>2</sub> mixed oxide catalysts

1-butene isomerization, relationship to catalyst proton affinity distributions, 157, 244

 $\alpha$ -isophorone epoxidation with hydroperoxides, 157, 665

olefin epoxidation, analysis of catalytic behavior, 153, 177

structural properties, influence of sol-gel and drying conditions, **153**, 165

support of

CrO<sub>2</sub>, CrOOH, and Cr<sub>2</sub>O<sub>3</sub> catalysts

preparation and characterization, 157, 301

selective reduction of NO by NH<sub>3</sub>, in situ diffuse reflectance FTIR spectroscopic study, 157, 312

dispersed ZrO<sub>2</sub> catalysts, propene-deuterium addition and exchange reactions, mechanism, 154, 306

MoO<sub>3</sub> catalysts, acid-base properties, effect on propylene oxidation, **157**, 740

Pt catalysts, and Pt/CeO<sub>2</sub> catalysts, metal-support interactions, comparison, 155, 148

Pt-RuO<sub>2</sub> catalysts, photocatalytic cleavage of water, intrinsic rate, definition, **152**, 360

Rh catalysts

benzene and toluene interactions with catalyst, effect of carrier doping, 152, 331

CO oxidation, kinetics and oscillatory behavior, 156, 265

CO<sub>2</sub> reforming reactions, molecular aspects, 157, 162

metal-support interactions in, characterization based on  $CO_2$  methanation activity, **156**, 171

W<sup>6+</sup>-doped, CO and CO<sub>2</sub> hydrogenation, surface species formed during, FTIR and MS studies, **156**, 37

Ru catalysts, structure and Fischer-Tropsch synthesis activity, effect of sodium, 152, 350

Ru and Ru-Rh catalysts, CO/H<sub>2</sub> reactions at high temperature and pressure, FTIR study, 157, 396

V<sub>2</sub>O<sub>5</sub> catalysts, oxidation of *ο*-xylene to phthalic anhydride conversion and product selectivities, effects of catalyst composition, preparation method, and operating condition, **157**, 344

formation of carbonaceous deposits during, characterization by temperature-programmed oxidation, **156**, 295

transient catalytic behavior, 157, 353

V<sub>2</sub>O<sub>5</sub> catalysts, selective catalytic reduction of NO with NH<sub>3</sub>, support effects in monolayer catalysts, 155, 171

 $V_2O_5\text{--}WO_3$  de-NO  $_x$  catalysts, reactivity and physicochemical characterization,  $\textbf{155},\,117$ 

surface acid sites, energy distribution during NH<sub>3</sub> adsorption, evaluation, **150**, 274; *errata*, **152**, 215, **157**, 270

-V<sub>2</sub>O<sub>5</sub> catalysts, selective reduction of NO by NH<sub>3</sub> active sites and formulation of catalytic cycles, **151**, 241

combined temperature-programmed in situ FTIR and on-line MS studies 151, 226

Titanium oxide

hydrous, ion-exchange materials, metals supported on, reduction behavior, 156, 154

TiO<sub>x</sub>, modified Al<sub>2</sub>O<sub>3</sub>, support of V<sub>2</sub>O<sub>5</sub>-WO<sub>3</sub> catalysts, solid-state <sup>1</sup>H, <sup>15</sup>N, and <sup>51</sup>V NMR studies, **156**, 1

Titanium silicates

ETS-10, interaction with 1-butene, NMR studies, 155, 345

micro-mesoporous amorphous catalysts, synthesis, characterization, and catalytic properties, 157, 501

synthesized in presence of alkali metal and alkaline earth ions, catalytic activity, 151, 77

TS-1

epoxidation of styrene using dilute  $H_2O_2$  as oxidizing agent, 156, 163 interaction with 1-butene, NMR studies, 155, 345

oxidation of cyclohexane: overoxidation and comparison with other oxidation systems, 157, 631

spectroscopic characterization, 157, 482

Toluene

and benzene, interaction with supported Rh catalyst, effect of carrier doping, 152, 331

oxidation over micro-mesoporous amorphous titanosilicate catalysts, 157, 501

**Toluidines** 

isomerization to methyl-aza-aromatics over zeolites, 155, 268

TPO, see Temperature-programmed oxidation

TPR, see Temperature-programmed reduction

Tracer exchange

and catalytic reaction, in single-file systems, analysis, 157, 656 Transient response technique

analysis of interaction of CO, NO, and O<sub>2</sub> on Cu<sub>x</sub>Co<sub>3-x</sub>O<sub>4</sub> catalysts, 156, 219

Transition metal oxides

activation of hydrocarbon C-H bonds over, analysis: FTIR study of hydrocarbon catalytic combustion over MgCr<sub>2</sub>O<sub>4</sub>, **151**, 204

Transition metals

-fluorite oxide composite oxides, total oxidation of CO and methane catalyst characterization and reaction kinetics, 153, 317 catalyst composition and activity, 153, 304

substituted molecular sieves, catalysis of liquid-phase oxidation of aniline, 157, 124

sulfided, Al<sub>2</sub>O<sub>3</sub>-supported catalysts, temperature-programmed reduction and hydrodesulfurization activity: formation of nonstoichiometric sulfur, **151**, 178

Trichloroethylene

oxidation in air via heterogeneous photocatalysis, kinetics, 157, 87 1,2,4-Trimethylbenzene

disproportionation on Y-type zeolite and pillared montmorillonite, stabilization of catalytic activities for, effect of spillover hydrogen, 154, 41

Tris(hydroxymethyl)phosphine

grafted onto SiO<sub>2</sub> surfaces, Rh<sub>4</sub> carbonyl clusters coordinated with, structural control of active sites in gas-phase olefin hydroformylation, 157, 436

Tungsten

doped Rh/TiO<sub>2</sub> catalysts, CO and CO<sub>2</sub> hydrogenation, surface species formed during, FTIR and MS studies, **156**, 37

doping of TiO<sub>2</sub> support of Rh catalysts, effect on interaction of benzene and toluene with Rh catalyst, 152, 331

Tungsten carbide

bulk catalysts for reforming of hexane isomers in absence of oxygen, characterization and catalytic activity, 153, 9

Tungsten trioxide

y-Al<sub>2</sub>O<sub>3</sub>-supported catalysts, skeletal isomerization of butene

analysis for 1-butene, 154, 201

IR study, 156, 147

surface acid sites, energy distribution during NH<sub>3</sub> adsorption, evaluation, **150**, 274; errata, **152**, 215, **157**, 270

V<sub>2</sub>O<sub>c</sub>

de-NO<sub>x</sub> catalysts, TiO<sub>2</sub>-supported, reactivity and physicochemical characterization, 155, 117

TiO<sub>x</sub>/Al<sub>2</sub>O<sub>3</sub>-supported catalysts, solid-state <sup>1</sup>H, <sup>15</sup>N, and <sup>51</sup>V NMR studies, **156**, 1

12-Tungstophosphoric acid, see 12-Phosphotungstic acid

12-Tungstosilicic acid, see 12-Silicotungstic acid

1 J

Ultraviolet-visible spectroscopy

absorption edges of molybdenum oxide clusters and supported molybdenum oxides, effect of local structure, 151, 470

titanium boralites with MFI structure: effect of H<sub>2</sub>O<sub>2</sub> on preparation, 157, 235

7

Vacuum gasoil

hydrocracking on NiMo/MCM-41 aluminosilicate catalysts, 153, 25 Vanadia, see Vanadium pentoxide

Vanadium

catalysis of filamentous carbon formation, roles of ordinary and Soret diffusion, 152, 42

compounds with, formation during deactivation of sulfuric acid catalysts and related model systems, 155, 32

 -niobium oxide catalysts, oxidative dehydrogenation of propane, effect of vanadium concentration: low-energy ion scattering study, 157, 584

SiO<sub>2</sub>-supported catalysts, methane oxidation to formaldehyde, role of V-O double bond sites, **156**, 167

substituted molecular sieves, catalysis of liquid-phase oxidation of aniline, 157, 124

supported catalysts, acid-base character, effect on catalysis of oxidative dehydrogenation of n-butane, 157, 271

Vanadium aluminophosphates

VAPO-5 catalysts, for propane oxydehydrogenation, preparation, characterization, and catalytic properties, 152, 1

Vanadium carbide

films on V(110), reactions of n-butane and 1,3-butadiene, comparison, 154, 80

Vanadium oxides

Al<sub>2</sub>O<sub>3</sub>-supported and unsupported catalysts, temperature-programmed sulfiding, analysis, **154**, 115

Vanadium pentoxide

γ-Al<sub>2</sub>O<sub>3</sub>-supported monolayers, characterization, 152, 130

-Fe<sub>2</sub>O<sub>3</sub> catalysts, Cs-doped, active species in, analysis, 154, 11

reduction by isobutanol, VPO catalyst precursor VO(HPO<sub>4</sub>) · 0.5H<sub>2</sub>O prepared by, activation, role of Fe and Co dopants: *in situ* laser Raman spectroscopic study, **157**, 687

SiO<sub>2</sub>-supported catalysts, alkali ion-modified, photooxidation of propane, 155, 196

TiO<sub>2</sub>-Al<sub>2</sub>O<sub>3</sub>-supported catalysts, structure and acidity, effect of composition, **157**, 368

-TiO<sub>2</sub> catalysts, selective reduction of NO by NH<sub>3</sub>

active sites and formulation of catalytic cycles, 151, 241

combined temperature-programmed in situ FTIR and on-line MS studies, 151, 226

TiO<sub>2</sub>-supported catalysts

oxidation of o-xylene to phthalic anhydride

conversion and product selectivities, effects of catalyst composition, preparation method, and operating condition, 157, 344 formation of carbonaceous deposits during, characterization by temperature-programmed oxidation, **156**, 295 transient catalytic behavior. **157**, 353

selective reduction of NO with NH<sub>3</sub>, support effects in monolayer catalysts, **155**, 171

-WO<sub>3</sub>

de-NO<sub>x</sub> catalysts, TiO<sub>2</sub>-supported, reactivity and physicochemical characterization, **155**, 117

TiO<sub>x</sub>/Al<sub>2</sub>O<sub>3</sub>-supported catalysts, solid-state <sup>1</sup>H, <sup>15</sup>N, and <sup>51</sup>V NMR studies, **156**, 1

Vanadium phosphorus oxide catalysts

for n-butane oxidation into maleic anhydride, role of VO(H<sub>2</sub>PO<sub>4</sub>)<sub>2</sub> precursor, **154**, 253

evolution in n-butane oxidation during activation time, 156, 28

precursor VO(HPO<sub>4</sub>) · 0.5H<sub>2</sub>O prepared by isobutanol reduction of V<sub>2</sub>O<sub>5</sub>, activation, role of Fe and Co dopants, *in situ* laser Raman spectroscopic study, **157**, 687

Vanadyl(IV) hydrogen phosphate hemihydrate

VPO catalyst precursor prepared by isobutanol reduction of  $V_2O_5$ , activation, role of Fe and Co dopants, in situ laser Raman spectroscopic study, 157, 687

Vanadyl(IV) phosphite

layered, as precursor to VPO catalysts for partial oxidation of *n*-butane to maleic anhydride, **156**, 298

Vanadyl pyrophosphate

layered vanadyl(IV) phosphite-derived catalysts, partial oxidation of *n*-butane to maleic anhydride, **156**, 298

Vanadyl sites

role in oxidation of methane to formaldehyde over V/SiO<sub>2</sub> catalysts, 156, 167

w

Wacker catalysts

SiO<sub>2</sub>-supported, oxidation of 1-butene

catalysis by Pd salts of heteropolyacids, 154, 187

heteropolyanions as catalyst redox components, 154, 175

Water

adsorbed to pure and lanthanide-modified ZrO<sub>2</sub> catalysts, dynamics, neutron scattering study, 157, 636

concentrations in presence and absence of O<sub>2</sub>, effect on selective reduction of NO with NH<sub>3</sub> over chromia catalysts, N-labeling studies, **154**, 107

effect on hydrocarbon conversion over Pt-promoted sulfated ZrO<sub>2</sub> catalysts, **151**, 292

electrolysis, electrocatalytic synthesis of propylene oxide on Pt black during, analysis, 157, 450

or H<sub>2</sub>, reaction with CO<sub>2</sub> and ethylene over PtSn/SiO<sub>2</sub> alloy catalysts, **156**, 139

impregnation of Co/SiO<sub>2</sub>, effects on prereduced and precalcined catalysts, 157, 25

photocatalytic cleavage over Pt-RuO<sub>2</sub>/TiO<sub>2</sub> catalysts, intrinsic rate, definition, **152**, 360

zeolitic, effect on rate of butadiene dimerization over Cu-exchanged zeolite Y, 151, 456

X

XAFS, see X-ray absorption fine structure

XANES, see X-Ray absorption near-edge structure Xenon

adsorption: direct determination of effective BET-area, 155, 163 XPS, see X-ray photoelectron spectroscopy

X-ray absorption fine structure

K-promoted Co catalysts in situ, 151, 17

X-ray absorption near-edge structure

RuK edge of Ru/NaY clusters, in analysis of impact of electronic structure on catalytic activity, **153**, 232

-temperature-programmed reduction, in analysis of reducibility of Re in Pt-Al<sub>2</sub>O<sub>3</sub> reforming catalysts, **154**, 222

titanium boralites with MFI structure: effect of H<sub>2</sub>O<sub>2</sub> on preparation, 157, 235

X-ray diffraction

titanium boralites with MFI structure: effect of H<sub>2</sub>O<sub>2</sub> on preparation, 157, 235

X-ray photoelectron spectroscopy

calcined Co-Rh/Nb<sub>2</sub>O<sub>5</sub> catalysts: determination of particle and phase thicknesses, **152**, 164

Co-Mo/y-Al<sub>2</sub>O<sub>3</sub> sulfided catalysts, 156, 243

multimetallic and multiphase catalysts on support particles, 157, 133 o-Xylene

oxidation to phthalic anhydride over V2O5/TiO2 catalysts

conversion and product selectivities, effects of catalyst composition, preparation method, and operating condition, 157, 344

formation of carbonaceous deposits during, characterization by temperature-programmed oxidation, **156**, 295

transient catalytic behavior, 157, 353

transformation on sulfided NiMo on Y zeolite during hydrocracking of *n*-heptane: characterization of hydrogenating and acid properties of industrial hydrocracking catalysts, **151**, 102

p-Xylene

gas-phase oxidation over chemical vapor deposition Fe/Mo/DBH molecular sieve catalysts, 151, 338

Z

Zeolites, see also Molecular sieves

acidic, C-C single bond cracking over, theoretical description, **153**, 94 Amberlyst-15, isobutene and methanol adsorption, effect on MTBE synthesis, **152**, 122

basic, catalysis of production of chalcones and flavanones of pharmaceutical interest by Claisen-Schmidt condensation, 151, 60

beta

liquid-phase alkylation of benzene with light olefins, 157, 227 methyl  $\alpha$ -hydroxyisobutyrate dehydration, 151, 10

Co-ZSM-5, selective reduction reactions

NO by methane in presence of oxygen, rate-determining step, 151, 356

NO<sub>x</sub> by hydrocarbons, comparison with homogeneous reactions, **153**, 265

CuH-ZSM-5

high-temperature calcination and steam aging, associated rearrangement of cationic sites and reactivity loss, 157, 603

in situ ESR up to 500°C in flowing dry mixtures of NO (NO<sub>2</sub>), C<sub>3</sub>H<sub>6</sub> (C<sub>2</sub>H<sub>3</sub>OH), and excess O<sub>2</sub>, **152**, 63

Cu ion-exchanged, liquid-phase oxidation of benzene to phenol with molecular oxgen, 155, 158

Cu-Na-ZSM-5, oxidation of benzyl alcohol, effect of alkali promoters, 153, 254

Cu-Y and Cu-ZSM-5, adsorption and reaction properties, comparison, 153, 190

Cu-ZSM-5

NO decomposition, IR study, 157, 592

NO reduction by ethylene under lean conditions, reaction dynamics, analysis by transient experimental techniques, **155**, 184 surface isocyanate complex, IR study, **156**, 75

ferrierite, see Ferrierite

Ga/H-ZSM-5, propane conversion in presence of co-fed NO, O<sub>2</sub>, and H<sub>2</sub>, **151**, 33

Ga-MFI, intrazeolitic Ga cation content, control, effects on C<sub>2</sub> dehydrogenation, 157, 66

H-beta, support of Pd catalysts, heptane cracking and isomerization, reaction mechanisms, 155, 141

H-form, Pt-promoted, skeletal isomerization of *n*-butane, effect of reaction pressure, **157**, 289

HY

isobutene and methanol adsorption, effect on MTBE synthesis, 152, 122

and mixtures with Pt/SiO<sub>2</sub> catalysts, n-hexane skeletal reactions, 155, 43

NiMo phases encaged in, characterization, 152, 275

steamed, 2-methylpentane cracking, effects of extraction of extraframework Al, 157, 209

H-ZSM-5

acid properties, alteration by Ga and Pt, 157, 283

Brønsted acid site in, condensation chemistry of acetaldehyde and acetone adsorbed at, <sup>13</sup>C NMR study, **151**, 373

n-heptane cracking under high hydrogen pressure, kinetics and mechanism, 152, 189

isobutene and methanol adsorption, effect on MTBE synthesis, 152, 122

monomolecular conversion of light alkanes, 157, 388

propane conversion in presence of co-fed NO, O<sub>2</sub>, and H<sub>2</sub>, **151**, 33 reaction of 2-propen-1-ol, role of propanal, **154**, 208

selective reduction of NO<sub>x</sub> by hydrocarbons, comparison with homogeneous reactions, **153**, 265

isomerization of aromatic amines to methyl-aza-aromatics, **155**, 268 KL, support of Pt catalysts, high sensitivity to sulfur poisoning, **157**, 550 K-LTL.

Ir clusters in, structure and catalytic selectivity for n-hexane aromatization. **155**, 131

support of Pt catalysts, methylcyclopentane ring opening, effect of hydrogen partial pressure, **151**, 330

L, support of Pt catalysts, *n*-hexane conversion, letter to editor. **156**, 301; reply, **156**, 304

medium pore ZSM-5 and ZSM-22 and EU-1, aromatization activities, comparison, **153**, 353

Mo/HZSM-5, methane dehydro-oligomerization to ethylene and aromatics, 157, 190

mordenite, see Mordenites

NaH-Y and H-mordenite, H-D exchange with perdeuterioisobutane, analysis, 151, 1

NaY

Fe-promoted Rh clusters in, characterization and performance in CO hydrogenation, 153, 144

with incorporated Au(I), preparation, characterization, and acidity generation, 152, 322

 $Pt_xIn_y$  bimetallic catalysts in, preparation and characterization, 152, 313

Pt<sub>x</sub>Sn<sub>y</sub> bimetallic catalysts in, preparation and characterization, 154, 345

Ru clusters in, effects of cluster size on catalytic activity for ethane hydrogenolysis and XANES, 153, 232

support of Mn-promoted Rh catalysts, CO hydrogenation: metalpromoter interaction, 154, 245

NaY-Pt, skeletal reactions, 155, 43

NCL-1, high-silica large-pore zeolite, isopropylation of benzene with 2-propanol, **154**, 216

Pt-ZSM-5, NO reaction with C<sub>2</sub>H<sub>4</sub> and O<sub>2</sub> under highly oxidizing conditions, autonomous kinetic oscillations during, analysis, **157**, 14

Ti-beta, olefin oxidation with H<sub>2</sub>O<sub>2</sub> and *tert*-butyl hydroperoxide, **152**, 18

USHY, 2-methylpentane cracking, formation of C<sub>6</sub> isomers during, analysis, **153**, 239

X

alkali-exchanged, microcalorimetric characterization, **157**, 266 methyl  $\alpha$ -hydroxyisobutyrate dehydration, **151**, 10

Y

Cu-exchanged, butadiene dimerization rate, effect of zeolitic water, 151, 456

disproportionation of 1,2,4-trimethylbenzene, stabilization of catalytic activities for, effect of spillover hydrogen, **154**, 41 isobutane cracking

catalytic cycles and reaction selectivity, **153**, 65 kinetic model, **153**, 54

methyl  $\alpha$ -hydroxyisobutyrate dehydration, 151, 10

sulfided NiMo on, catalysis of o-xylene transformation during hydrocracking of n-heptane: characterization of hydrogenating and acid properties of industrial hydrocracking catalysts. **151**, 102

ZSM-5

silylated, alkylation of ethylbenzene, coke-induced stabilization of catalytic activity during, analysis, **155**, 154

transition metal-containing, oxydehydrogenation of ethane, <sup>18</sup>O<sub>2</sub> temperature-programmed isotope exchange study, **154**, 24

ZSM-23 and ZSM-25, skeletal isomerization of 1-butene, **151**, 467 Ziegler-Natta catalysts

Ti/MgCl<sub>2</sub>-supported, quantum mechanical study, **157**, 145 Zinc

Zn(II)-Al(III) layered double hydroxide, Mo(VI)O<sub>2</sub> complex center intercalated at, mediation of catalytic air oxidation of thiols, 152, 237

Zinc oxide

-Al<sub>2</sub>O<sub>3</sub>, support of

Co-Cu catalysts, alcohol synthesis from CO/H<sub>2</sub>, effects of *in situ* addition of CH<sub>3</sub>NO<sub>2</sub>, **153**, 100

Cu polycrystalline catalysts, CO<sub>2</sub> decomposition, inverted temperature dependence, **157**, 153

and Cu, synergistic effects in hydrogenation of Cu- and ZnO-derived formates on Cu/ZnO catalysts, 157, 259

-CuO-Cr<sub>2</sub>O<sub>3</sub> catalysts, structural and surface properties, relationship to selectivity in higher alcohol synthesis, 156, 208

 CuO gradient composition heterocontact, modification of catalytic activity by applied bias, 153, 350

support of Cu catalysts, methanol synthesis from CO<sub>2</sub> and from CO, mechanisms, **157**, 403

Zinc phosphate

sodium carbonate-doped catalysts, gas-phase dehydrogenation-dehydration of cyclohexanol, selectivity, **151**, 44

Zirconia, see Zirconium oxide

Zirconium

-Cu catalyst, dehydrogenation of 2-propanol, comparison with amorphous Cu-Ti alloy catalyst, 153, 333

promotion of Co/SiO<sub>2</sub> catalysts for Fischer-Tropsch synthesis, 157, 35 Zirconium oxide

Al<sub>2</sub>O<sub>3</sub>-, SiO<sub>2</sub>-, and TiO<sub>2</sub>-supported catalysts, propene-deuterium addition and exchange reactions, mechanism, support effects, **154**, 306

Au-ZrO<sub>2</sub>-iron oxide and Au-Ag-ZrO<sub>2</sub> catalysts prepared in situ, CO oxidation, **151**, 407

-CeO<sub>2</sub> solid solutions, Rh-loaded, reduction behavior and oxygen storage capacity, dependence on structural properties, 151, 168

and lanthanide-modified ZrO<sub>2</sub>, crystal phases, defects, and dynamics of adsorbed hydroxyl groups and water, neutron scattering study, **157**, 636

-SiO<sub>2</sub>

aerogels, homogeneity, effects of prehydrolysis ratio variation, 153, 194

mixed oxide catalysts, 1-butene isomerization, relationship to catalyst proton affinity distributions, 157, 244

-SO<sub>4</sub><sup>2</sup>, support of Pt catalysts and cocatalyst in mechanical mixtures with Pt/Al<sub>2</sub>O<sub>3</sub>, n-butane isomerization, 153, 218

sulfated

acidic properties, IR spectroscopic study, 152, 341

acid site structure, role of penta-coordinated sulfur, 157, 755

catalysts with and without Pt, characterization by TGA/DTA/mass spectrometry, 153, 123

catalytic activity, effects of ZrO2 crystalline structure and sulfate ion concentation, 151, 96

crystal phase, spectral features, and catalytic activity, 157, 109 Fe- and Mn-promoted catalysts

cracking of n-butane, 153, 344

superacid catalysts, low-temperature conversion of n-butane.

and metal-promoted catalysts, n-butane isomerization; acid site analysis, 151, 364

Pt-promoted catalysts

hydrocarbon conversion activity, effect of water, 151, 292 skeletal isomerization of n-butane, effect of reaction pressure,

sulfuric acid-treated catalysts, skeletal rearrangement of labeled butanes, 151, 26

support of

Mo catalysts with high surface area, preparation by molten salt method and application to hydrodesulfurization, 153, 17

Pt catalysts, ethane oxidation in fluidized bed reactors: olefin production, 155, 403

supports, sol-gel synthesis: properties for generation of n-butane isomerization activity upon sulfate promotion, 157, 321

surface acid sites, energy distribution during NH3 adsorption, evaluation, 150, 274; errata, 152, 215, 157, 270

Statement of ownership, management, and circulation required by the Act of October 23, 1962, Section 4369, Title 39, United States Code: of

### JOURNAL OF CATALYSIS

Published monthly (semimonthly in April and September) by Academic Press, Inc., 6277 Sea Harbor Drive, Orlando, FL 32887-4900. Number of issues published annually: 14. Editors: Prof. W. Nicholas Delgass, School of Chemical Engineering, Purdue University, West Lafayette, IN 47907; Dr. Frank S. Stone, School of Chemistry, University of Bath, Bath BA2 7AY, England.

Owned by Academic Press, Inc., 525 B Street, San Diego, CA 92101-4495. Known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, and other securities: None.

None.

Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner. Names and addresses of individuals who are stockholders of a corporation which itself is a stockholder or holder of bonds, mortgages, or other securities of the publishing corporation have been included in paragraphs 2 and 3 when the interests of such individuals are equivalent to 1 percent or more of the total amount of the stock or securities of the publishing corporation.

individuals are equivalent to 1 percent or more of the total amount of the stock or securities of the publishing corporation.

Total no copies printed: average no copies each issue during preceding 12 months: 1696, single issue nearest to filing date: 1654. Paid circulation (a) to term subscribers by mail, carrier delivery, or by other means: average no copies each issue during preceding 12 months: 496; single issue nearest to filing date: 502. (b) Sales through agents, news dealers, or otherwise: average no copies each issue during preceding 12 months: 604; single issue nearest to filing date: 606. Free distribution (a) by mail average no copies each issue during preceding 12 months: 41; single issue nearest to filing date: 41. (b) Outside the mail: average no copies each issue during preceding 12 months: 16, single issue nearest to filing date: 16. Total no. of copies distributed: average no copies each issue during preceding 12 months: 157; single issue nearest to filing date: 1165. Percent paid and/or requested circulation: average percent each issue during preceding 12 months: 95%; single issue nearest to filing date: 95%.

(Signed) Evelyn Sasmor, Senior Vice President