

Cumulative Subject Index¹

Volumes 133–138

A

- Absorption**
 –desorption, CO and NO on Pt foil: surface reaction kinetics direct observation of absorbed species, **136**, 342
- Acetaldehyde**
 hydrogenation over CuO/SiO₂ catalysts, **135**, 81
- Acetone**
 conversion, coke deposition on H-ZSM-5 zeolite during, associated hydrogens, isotopic exchange for deuterium of organic compounds, **136**, 258
 gas-phase, heterogeneous photocatalytic oxidation for air purification, **136**, 554
- Acetonitrile**
 selective synthesis from CO–H₂–NH₃ over Mo/SiO₂ catalyst, **137**, 127
- Acid catalysis**
 12-molybdosilicic, SiO₂-supported, vibrational study of dispersion effect and nature of Mo species in interaction with support, **138**, 445
 strong, ¹³C NMR measurements: derivation of acidity function, **134**, 118
 TiO₂–SiO₂ modified with H₂SO₄, **136**, 267
- Acidity**
 BF₃–water systems, evaluation from ¹³C NMR measurements, **134**, 126
 in dealuminated mordenite, effect of nonframework Al, **138**, 115
- Lewis sites in**
 Sm-doped Al₂O₃ supports, **137**, 346
 transition aluminas, relationship to Al coordination, **133**, 263
- Nb₂O₅**
 catalysts on various supports, IR spectroscopic analysis, **135**, 186
 gels, characterization, **135**, 125
- SAPO-34, H-ZSM-5, and MeAPSO-34 (Me = Co, Cr, Mn), in methanol dehydration, 135, 518**
- SAPO-37 molecular sieves, dependence on Si content and heat treatment, 138, 90**
- soft–hard, zeolites, evaluation with molecular orbital calculations, implications for catalytic activity, 136, 521**
- strong**
 acid catalysts, ¹³C NMR measurements: derivation of acidity function, **134**, 118
 development in ammonium hexafluorosilicate-modified Y-type zeolites, **136**, 566
 surface
 Brønsted, correlation with alkylation and dealkylation activities of Ni-loaded Y zeolites, **138**, 164
 effect on piperidine denitrogenation on Al₂O₃, SiO₂, and SiO₂–Al₂O₃, **137**, 453
 SiO₂–TiO₂ mixed oxides, characterization, **135**, 505
 USY-based fluid catalytic cracking catalysts, analysis by microcalorimetry and IR spectroscopy, **136**, 392
- Acid sites**
 Brønsted and Lewis
 diffuse reflectance in crystalline and amorphous Cr₂O₃ catalysts, NH₃ desorption from, FTIR study, **133**, 431
 on Nb₂O₅ catalysts with various supports, IR spectroscopic analysis, **135**, 186
 generation by SiO₂ deposition on ZrO₂ and TiO₂, **134**, 340
 protonic, activation of molecular hydrogen into, over metal-free H-ZSM-5 catalyst, **138**, 750
 related properties, on Pt- and SO₄^{2–} promoted ZrO₂ catalysts, dynamic modification with hydrogen molecule, **135**, 609
 SiO₂–Al₂O₃ catalysts
 and Al₂O₃ catalysts, in coking reaction by anthracene, analysis, **138**, 474
 characterization, isopropylamine adsorption for, **138**, 714
- Active sites**
 ethylene hydrogenation in metal-free zeolites, analysis, **133**, 527
 hydrogenation and isomerization on sulfided Co catalysts, generation by temperature-programmed sulfiding of precursor cobalt oxide, **133**, 498
 methanol oxidation on molybdena monolayer supported on SnO₂, identification, **134**, 331
 on MgO catalysts, in hydrogen activation, analysis by H₂–D₂ exchange, **136**, 222
 oxidative coupling of methane on MgO/CaO mixed oxide catalysts, **134**, 422
- Adsorption**
 aliphatic alcohols on γ-Al₂O₃, TPD and FTIR study, **135**, 444
 allylamine and benzylamine on various oxides, thermal desorption and IR studies, **134**, 409

¹ Boldface numbers indicate appropriate volume; lightface numbers indicate pagination.

- CH₃O on Ni/Al₂O₃ catalysts, effect on CO desorption, **133**, 515
- CO
- and CO + H₂, over Ru–RuO_x/TiO₂ catalyst, transient species formed during, FTIR spectroscopic study, **137**, 473
 - on La–Ni/SiO₂ catalysts, FTIR study, **136**, 271
 - on Na-ZSM-5 zeolites, low-temperature, FTIR analysis, **137**, 179
 - on Pt–Sn/Al₂O₃ catalysts, FTIR study, **138**, 491
 - on Rh/SiO₂ catalysts, effects of potassium promotion, ¹³NMR analysis, **137**, 199
 - on sulfided Mo/Al₂O₃ catalysts unpromoted or promoted by metal carbonyls, FTIR study: site titration, **137**, 69
- CO₂ and pyridine on Sm-doped Al₂O₃ supports, **137**, 346
- displacement, in alcohol dehydration on Al₂O₃, steady-state and transient kinetics, **133**, 170
- ethylene on reduced and oxygen-covered Ag/η-Al₂O₃ surfaces, ¹³C NMR study, **138**, 223
- H₂ on unsupported Ru sulfide: thermodesorption and ¹H NMR studies, **138**, 409
- impregnation, Pd(II) cation on Al₂O₃ and SiO₂ and composite oxides, **138**, 38
- isopropylamine on SiO₂–Al₂O₃ catalysts for acid site characterization, **138**, 714
- molecular, in zeolites under conditions of single-file diffusion, analysis by Monte Carlo simulation, **136**, 283
- Mo-oxo species deposition on TiO₂ by, mechanism, **136**, 432
- NO on crystalline and amorphous Cr₂O₃ surfaces in NO reduction reaction, diffuse reflectance FTIR study, **138**, 306
- oxygen, on crystalline and amorphous Cr₂O₃ surfaces, diffuse reflectance FTIR study, **133**, 415
- Pd on γ-Al₂O₃, **138**, 400
- reversible, hydrogen on MoS₂, analysis by TPD and TRR, **137**, 385
- vanadium–oxo species on TiO₂, resulting state and localization, IR spectroscopic study, **134**, 299
- Aerogels
- Nb₂O₅, structural and acidic characterization, **135**, 125
- Aggregates
- Y-type zeolites, size, effects in ¹²⁹Xe NMR, **133**, 42
- Aging
- hydrothermal, cracking catalysts: vanadium passivation by rare earth compounds soluble in feedstock, **134**, 469
 - supported copper–alumina oxide system in oxidizing reaction media, microstructural and spectroscopic studies, **134**, 506
- Air purification
- heterogeneous photocatalytic oxidation of gas-phase oxidation for, **136**, 554
- Alcohols
- adsorption on γ-Al₂O₃, TPD and FTIR study, **135**, 444
 - dehydration on Al₂O₃, displacement adsorption and educt inhibition in, steady-state and transient kinetics, **133**, 170
 - higher, synthesis over
 - Cs-promoted Zn–Cr–O catalyst, kinetics, chain growth process in, **135**, 99
 - K₂O-promoted ZnCrO catalysts, mechanistic aspects, **135**, 400
 - mixed, synthesis from CO and H₂ over K₂CO₃/MoS₂ catalysts: room-temperature oxidation of catalysts and effects on alcohol synthesis, **138**, 525
- Alkali metals
- catalytic gasification of graphite by CO₂ and H₂O with, mechanism, electron microscopic study, **138**, 12
 - co-cation, effects on benzene ethylation and cumene dealkylation over Ni-loaded Y zeolites, **138**, 164
- Alkaline earth metals
- catalytic gasification of graphite by CO₂ and H₂O with, mechanism, electron microscopic study, **138**, 12
- Alkanes
- cracking over HZSM-5 zeolites, monomolecular and bimolecular mechanisms, **135**, 115
 - direct synthesis from syngas over zeolite catalysts, **134**, 226
 - isotopic exchange with deuterium on Rh/SiO₂ gel catalysts, **133**, 294
 - reactions on Te/NaX, H-ZSM-5, and Ga/ZSM-5: kinetic coupling and hydrogen surface fugacities in heterogeneous catalysts, **134**, 549
- Alkyl aromatics
- long chain, cracking on USY zeolite catalysts, **135**, 45
- Alkylation
- benzene with long-chain olefins over solid acid catalysts, isomer distribution in, **138**, 386
 - Meldrum's acid with ethyl bromoacetate, effect of hydrophilic recognition by polymer-supported phase transfer catalysts, **136**, 378
 - piperidine on Al₂O₃, SiO₂, and SiO₂–Al₂O₃, effects of surface acidity, **137**, 453
 - toluene with methanol over AlPO₄, AlPO₄/Al₂O₃, AlPO₄/TiO₂, and AlPO₄/ZrO₂ catalysts, **137**, 51
- Alloys
- amorphous Pd–Zr, Pd/ZrO₂ catalyst prepared from, in oxidation of CO: chemical nature of active surface, **137**, 139
 - Co–Ni, SiO₂-supported catalysts, CO hydrogenation over, **136**, 232
 - Pd–Co/NaY zeolites, CO hydrogenation over, analysis of metal phases and product selectivity, **138**, 721
 - PdNi_x, encaged in NaY zeolite, CO hydrogenation over, **136**, 182

- $c(2 \times 2)$ -Sn/Pd(100), steady-state CO oxidation over, comparison with Pd(100) single crystal surface, **133**, 179
- Allylamine
adsorbed on various oxides, thermal desorption and IR studies, **134**, 409
- Alumina, *see* Aluminum Oxide
- Aluminophosphates
AlPO₄-5
framework substitution with Mg and Mn, characterization, **138**, 377
molecular sieves, isomorphous substitution of Fe ions into, **133**, 159
- Aluminum
and Co, substituted in Y-Ba-Cu-O perovskites, oxidation of CO over, **138**, 562
coordination in transition aluminas, relationship to Lewis acidity, **133**, 263
-Cu-Co ternary catalysts, prepared by amorphous citrate process, effect of decomposition-calcination, **134**, 594
-Ni mixed oxides, obtained by thermal decomposition of hydrotalcite-type precursors, preparation and characterization, **133**, 231
nonframework, effect on acidity in dealuminated mordenite, **138**, 115
-silicates, and Ga- and Fe-silicates, ZSM-11 derivatives, in methylation of xylenes: selective formation of 1,2,4 isomer among trimethylbenzenes, **138**, 518
- Aluminum niobate
support of VO_x catalysts for hydrocarbon oxidation: physicochemical analysis, **137**, 257
- Aluminum oxide
acid site characterization, isopropylamine adsorption for, **138**, 714
and Al₂O₃-SiO₂ catalysts
piperidine denitrogenation on, effects of surface acidity, **137**, 453
varying acidities, coking reaction by anthracene on, **138**, 474
-CuO-ZnO catalysts for decomposition of 2-propanol, catalytic behavior and surface chemistry, **136**, 86
methylamine synthesis over, *in situ* ¹³C MAS NMR study, **136**, 202
modified with
La₂O₃, support of Mo catalysts, characterization, **136**, 361
sulfate and phosphate, effect on Mo/Al₂O₃ catalytic properties in hydrodesulfurization, **133**, 124
-MoO₃ interaction: effect of phosphorus on MoO₃ impregnation and reactivity in thiophene hydrodesulfurization, **136**, 478
powder, support of MoS₂ catalysts: catalyst morphology, **137**, 513
-SiO₂ catalysts
alkylation of benzene with long-chain olefins: isomer distribution, **138**, 386
amorphous, -zeolite composites, prepared with high-alumina and low organic template content gels, synthesis and cracking behavior, **133**, 28 and SiO₂ and composite oxides, Pd(II) cation adsorption/impregnation on, **138**, 38
Sm-doped, surface characterization: Lewis acidity, **137**, 346
structure, effect on surface sites for alcohol dehydration, **138**, 659
supported-Pt catalysts, in hydrogen reduction, effect of hydrogen H₂O and HCl vapor on Pt accessibility, **137**, 377
support of
AlPO₄ catalysts: alkylation of toluene with methanol, **137**, 51
catalysis in dehydration of alcohols, displacement adsorption and educt inhibition in, steady-state and transient kinetics, **133**, 170
Ce-Rh and Ce-Pt particles, microstructures, **138**, 283
CoMo catalysts in hydrodesulfurization, ⁵⁷Co Mössbauer emission spectroscopic study, **133**, 112
Fe catalysts
Fischer-Tropsch synthesis, associated deposition of carbonaceous materials, analysis, **136**, 96
during isothermal hydrogenation of adsorbed carbonaceous species: kinetic model and surface hydrogen concentration variation, **133**, 83
Mo catalysts
axial profiles, effects of impregnation parameters, **133**, 486
MoFe catalysts for heavy oil processing: catalyst preparation and characterization, **134**, 98
Mo-Ni catalysts with ultra-stable Y zeolite, in cleavage of biphenyl moieties: hydrocracking pathway, **137**, 504
sulfided, unpromoted or promoted by metal carbonyls, in CO adsorption; FTIR study: site titration, **137**, 69
MoO₃ catalysts
activation to metathesis reaction, **135**, 287
prepared by impregnation and solid/solid wetting methods, dispersion and activity, **136**, 50
reduction, XPS analysis, **135**, 269
surface structures under ambient conditions, **136**, 539
Nb₂O₅ catalysts, acidic properties, IR spectroscopic analysis, **135**, 186
Ni catalysts, CO desorption, effect of adsorbed CH₃O, **133**, 515
Ni-Mo catalysts: Ni-Mo-S structure examined with Ni EXAFS, **133**, 94

- Ni⁰ and NiO particles, sulfiding rate and mechanism, comparison, **137**, 92
- Pd catalysts, spillover on, rate measurement, **134**, 737
- perfluorinated resinsulfonic acid catalysts: 2-methylpropene oligomerization and 2,4,4-trimethyl-2-pentene transformation, **137**, 12
- Pt catalysts
- hydrocarbon-reforming reactions, comparison with high-specific-surface-area Mo₂C and WC catalysts, **134**, 383
 - in hydrogen reduction, effect of hydrogen and H₂O and HCl vapor on Pt accessibility, **137**, 377
 - modeling dynamic CO oxidation over: effects of intrapellet diffusion and site heterogeneity, **137**, 158
- PtMo₆ bimetallic catalysts characterization, **135**, 367
- Pt-Sn catalysts, FTIR study, **138**, 491
- Rh catalysts
- effect of particle size on reaction rate, ²H NMR study, **138**, 457
 - NO reduction by CO, role of intermediate N₂O + CO reaction, kinetic analysis, **138**, 255
 - oxidized, interaction with CO, IR spectroscopic study at high pressure, **134**, 378
- Ru catalysts
- Cl-free, preparation and promoter effect in NH₃ synthesis
 - alkali metal ion promoter, **136**, 110
 - La(NO₃)₃-promoted catalysts, **136**, 118
 - ethane hydrogenolysis, steady-state and transient kinetics, **134**, 134
- Ru and Co catalysts in Fischer-Tropsch synthesis: effects of support and metal dispersion on reaction rate and selectivity, **137**, 212
- ZnO-CuO catalysts, liquid-phase oxidation of phenol, kinetics, **135**, 345
- transitional
- Al coordination and Lewis acidity, relationship, **133**, 263
 - thermally stabilized, preparation with fume pyrolysis of boehmite sols, thermal stabilization, **134**, 87
- in 12% WO₃/Al₂O₃ composite, support of
- Co catalysts: effect of second-phase oxides on catalytic properties of dispersed metals, **135**, 200
 - Pd catalysts: effect of second-phase oxides on catalytic properties of dispersed metals, **138**, 55
 - ZnO, support of Cu catalysts, in methanol synthesis from H₂, CO, and CO₂, **136**, 59
- γ-Aluminum oxide
- adsorption of
 - aliphatic alcohols, TPD and FTIR study, **135**, 444
 - allylamine and benzylamine, thermal desorption and IR studies, **134**, 409
 - palladium, analysis, **138**, 400 - support of
 - CuCr₂O₄ and Pt catalysts, heterogeneous-homogeneous reactions involving free radicals in processes of total catalytic oxidation, **136**, 197
 - CuO catalysts, aging in oxidizing reaction media, microstructural and spectroscopic studies, **134**, 506
 - Ir catalysts, determination of metallic surface area by selective chemisorption, **136**, 598
 - Mo catalysts: γ-Al₂O₃ extrudates with different Mo profiles, **137**, 285
 - MoO₃ catalysts, XAFS study of support effects, **138**, 746
 - Pd catalysts, ethane oxidation over, *in situ* IR spectroscopic and catalytic studies, **136**, 613
 - Pt catalysts in methylcyclohexane dehydrogenation, particle size effect, **138**, 482
 - Pt-Rh-Ce catalysts, physicochemical properties and Ce effect on catalyst activity, **133**, 309
 - Rh catalysts, effects of La³⁺ incorporation, **134**, 702
- η-Aluminum oxide
- support of Ag catalyst, ethylene adsorbed on reduced and oxygen-covered Ag surfaces, ¹³C NMR study, **138**, 223
- Aluminum phosphate
- and AlPO₄/metal oxide systems, alkylation of toluene with methanol over, **137**, 51
- Ammonia
- CFC-12 reaction over metal powder catalysts, in formation of HCN, **136**, 617
 - CO-H₂, in selective acetonitrile synthesis over Mo/SiO₂ catalyst, **137**, 127
 - decomposition on vanadium nitride, kinetics, **133**, 358
 - desorption from Brønsted and Lewis acid sites: crystalline and amorphous Cr₂O₃ catalysts surfaces, **133**, 431
 - and nitrite, formation by nitrate reduction over photocatalysts, **135**, 300
 - in NO selective catalytic reduction over V₂O₅/TiO₂-SiO₂ mixed oxide gels, **133**, 1
 - oxidation over YBa₂Cu₃O₇(123) oxide systems, **135**, 335
 - photocatalytic reaction with NO on TiO₂ surfaces, **134**, 317
 - reduction of NO over
 - polycrystalline Pt foil catalysts in presence of O₂, **135**, 434
 - V₂O₅-TiO₂ catalysts, activity and selectivity of catalyst for, effect of structure, **134**, 492
 - V₂O₅ and V₂O₅-TiO₂ catalysts
 - and TiO₂ catalysts, temperature-programmed desorption/reaction and *in situ* spectroscopic studies, **135**, 246
 - and V₂O₅-TiO₂-SiO₂ catalysts, comparison, **134**, 75

- role in controlled dispersion of silica-supported MoO_3 , **133**, 55
- synthesis on Cl-free Ru catalysts, promoter effect
- Al_2O_3 -supported catalysts, **136**, 110
 - $\text{La}(\text{NO}_3)_3$ -promoted Ru/ Al_2O_3 catalyst, **136**, 118
 - MgO-supported Ru catalyst, **136**, 126
- Ammonium hexafluorosilicate
- modified Y-type zeolites, development of strong acidity in, **136**, 566
- Ammonoxidation
- toluene over $\text{V}_2\text{O}_5/\text{TiO}_2(\text{B})$ catalysts, coverage effects in, EPR study, **138**, 79
- Anatase, *see* Titanium dioxide, anatase
- Anisole
- formation by nucleophilic substitution reaction of chlorobenzene with methanol on ZSM-5 zeolites, analysis, **134**, 373
- Anthracene
- in coking on acidic Al_2O_3 and $\text{SiO}_2\text{-Al}_2\text{O}_3$, **138**, 474
- Antimony
- addition to dual function cracking catalyst mixtures, effect on performance, **135**, 325
 - Ni interaction over rare earth-exchanged Y-zeolite, analysis, **135**, 596
- Aqueous media
- catalytic oxidation of organics: phenol oxidation kinetics, **135**, 345
- Argon
- adsorption on zeolite crystals, molecular dynamics simulation: surface barrier concept in diffusion, **134**, 536
- Aromatization
- n*-hexane by Pt-containing molecular sieves
 - catalyst preparation by vapor phase impregnation method, **134**, 349
 - n*-hexane reactivity, **134**, 359
 - platinum aluminophosphate reactivity, **134**, 370
 - n*-octane over Pt-zeolite L catalyst, conversion of labeled *n*-propylcyclopentane during, ^{14}C tracer study, **134**, 269
- B**
- Barium
- catalysis of graphite gasification by CO_2 and H_2O , mechanism, electron microscopic study, **138**, 12
 - doped Y_2O_3 catalyst, for oxidative coupling of methane, oxygen XANES characterization, **136**, 16
 - exchanged BaK-LTL zeolite catalysts, effect of sulfur poisoning: hydrogen chemisorption and X-ray absorption spectroscopic analysis **138**, 675
 - $\text{PrBa}_2\text{Cu}_3\text{O}_{7-x}$ superconductors, NH_3 oxidation, **135**, 335
 - $\text{YBa}_2\text{Cu}_3\text{CoO}_{7+x}$ superconductors, NH_3 oxidation, **135**, 335
 - $\text{YBa}_2\text{Cu}_3\text{O}_{7-x}$ superconductors, systems, catalytic NH_3 oxidation, **135**, 335
 - Y-Cu-O perovskites, Co- and Al-substituted, CO oxidation over, **138**, 562
- Bases
- inorganic, promotion of polyvinylpyridine/Cu(II) catalysis of 2,6-di-*tert*-butylphenol oxidation, **138**, 24
- Basicity
- in alkaline cation faujasite zeolites, characterization by XPS with pyrrole as probe, **137**, 322
 - hydrotalcities, determination: condensation of benzaldehyde with ethyl acetoacetate, **134**, 58
- Beckmann rearrangement
- vapor-phase cyclohexanone oxime over Ti silicalites, **137**, 252
- Benzaldehyde
- condensation with ethyl acetoacetate: determination of base properties of hydrotalcites, **134**, 58
- Benzene
- alkylation with long-chain olefins over solid acid catalysts, isomer distribution in, **138**, 386
 - deuterium in, isotopic exchange of coke hydrogens for, on coke deposited on H-ZSM-5 zeolite in acetone conversion, **136**, 258
 - ethylation over Ni-loaded Y zeolites, analysis, **138**, 164
 - hydrogenation
 - reactor for, cyclic operation, analysis, **136**, 242
 - over sulfur-resistant Ir/carbon catalysts, **135**, 458
 - isomers, inside pores of ZSM-5 zeolite, dynamic behavior simulation, **136**, 141
- Benzylamine
- adsorbed on various oxides, thermal desorption and IR studies, **134**, 409
- Bimetallic clusters
- Pt-Ir, formation in NaY zeolite, analysis with ^{129}Xe NMR and ethane hydrogenolysis, **137**, 357
- Biphenyl, *see* Diphenyl
- Bismuth oxychloride
- $\text{Li}_2\text{CO}_3\text{-MgO}$ -supported catalyst, oxidative coupling of methane, **138**, 322
- Book reviews
- Catalytic Chemistry. B. C. Gates, 1992, **134**, 755
 - Chemistry of Microporous Crystals. T. Inui *et al.* (Eds.), Studies in Surface Science and Catalysis, Vol. 60, 1991, **133**, 544
 - Elements of Chemical Reaction Engineering, 2nd ed. H. S. Fogler, 1992, **135**, 332
 - Heterogeneous Catalysis in Industrial Practice, 2nd ed. C. N. Satterfield, 1991, **134**, 755
 - Studies in Inorganic Chemistry, Vol. 11, Chemistry of the Platinum Group Metals. F. R. Hartley (Ed.), 1991, **135**, 332
 - Studies in Surface Science and Catalysis 57: Spectroscopic Characterization of Heterogeneous Catalysts; Part A, Methods of Surface Analysis and Part B, Chemisorption of Probe Molecules. J. L. G. Fierro (Ed.), 1990, **136**, 281

Boron trifluoride

- water systems, acidity evaluation from ^{13}C NMR measurements, **134**, 126

Butadiene

- hydrogenation, highly active sites on sulfided Co catalysts for, generation by temperature-programmed sulfiding of precursor cobalt oxide, **133**, 498

Butane

- formation from methane by low-temperature two-step reaction, **138**, 101
- hydrogenolysis on Pt/TiO₂/SiO₂ catalysts, strong metal–support interactions, **134**, 751
- oxidative dehydrogenation on Mg₃(VO₄)₂ and Mg₃V₂O₇ catalysts, effects of potassium in catalyst preparation, **134**, 668

***n*-Butane**

- cracking over HZSM-5 zeolites, monomolecular and bimolecular mechanisms, **135**, 115
- hydrogenolysis over
 - Pt/SiO₂ catalysts, **137**, 462
 - Ru–Cu/SiO₂ catalysts, **138**, 617
- oxidation to maleic anhydride, vanadium phosphate catalysts for, *in situ* laser Raman spectroscopic study, **134**, 151

1-Butanol

- gas-phase, heterogeneous photocatalytic oxidation for air purification, **136**, 554

1-Butene

- isomerization, highly active sites on sulfided Co catalysts for, generation by temperature-programmed sulfiding of precursor cobalt oxide, **133**, 498

Butyraldehyde

- gas-phase, heterogeneous photocatalytic oxidation for air purification, **136**, 554

C**Calcination**

- decomposition, effect on ternary Cu/Co/Al catalysts prepared by amorphous citrate process, **134**, 594
- derived Ni/SiO₂ and Ni/TiO₂ catalysts prepared by ion exchange, Ni state, **136**, 415
- in preparation of Ni/SiO₂ catalysts, effect on thermal stability, EXAFS and TPR analysis, **138**, 195

Calcium

- catalysis of graphite gasification by CO₂ and H₂O, mechanism, electron microscopic study, **138**, 12

Calcium oxide

- adsorption of allylamine and benzylamine, thermal desorption and IR studies, **134**, 409
- CaO mixed oxide catalysts, methane oxidative coupling, analysis of active site, **134**, 422

- CeO₂ catalysts, oxidative coupling of methane: effect of oxygen-ion conductivity on C₂ selectivity, **135**, 317

comparison with solid acid zeolites in temperature-programmed 2-propylamine cracking, **138**, 391
as promoter of Ni-catalysts, role in hydrogenation reactions of CO and carbon, **134**, 107

support of NaOH catalyst: kinetics of oxidative coupling of methane, **135**, 467

surface sites, associated oxygen species formed on, during N₂O decomposition, reactivity, **138**, 686

Calorimetry

micro-, *see* Microcalorimetry

Carbide

intermediate, in methanation reaction of CO on Ni(100) and Ni(111) surfaces, role in structure-insensitive activity of catalyst, **133**, 461

Carbon

activated, surface chemistry, XPS–SIMS study, **133**, 467

activated, support of

Ni catalysts, vapor-phase methanol carbonylation, hydrogen effects, **133**, 370

Rh catalysts in ethylene hydroformylation, pentan-3-one and propionaldehyde formation during, comparison, **136**, 531

^{14}C , in tracer study of labeled *n*-propylcyclopentane conversion during *n*-octane aromatization with Pt–zeolite L catalyst, **134**, 269

–carbon linkages of olefins, rare-earth catalysts for: cyclic oligomerization of ethylene, **137**, 423

and carbon monoxide, hydrogenation over Ni catalysts, role of MgO and CaO promoters, **134**, 107

catalytic deposition, activation–deactivation model, **138**, 129

containing compounds

deactivating USHY zeolite during toluene disproportionation, composition, **134**, 286

transformation on graphimet catalysts: structural and catalytic study of Pt graphimet, **134**, 608

containing species, adsorbed on Fe/Al₂O₃ catalyst, isothermal hydrogenation: kinetic model and surface hydrogen concentration variation, **133**, 83

deposits containing, on Fischer–Tropsch oxide-supported Fe catalysts, effect of nature of catalytic supports, **136**, 96

filaments, produced by hydrocarbon decomposition over Cu–Ni and Ni catalysts, structure: role of interfacial phenomena, **134**, 253

formation from CH₄ + H₂ on Ni/SiO₂ catalysts, kinetics, **135**, 147

support of

K₂CO₃ catalysts, methane formation in H₂/CO mixtures, **134**, 525

Ni–Mo catalysts: Ni–Mo–S structure examined with Ni EXAFS, **133**, 94

- Pt catalysts, oxidation of glyoxal/glyoxylic acid, **133**, 479
- sulfided Ni–Mo hydrodesulfurization catalysts: synergistic participation of support, **138**, 145
- sulfur-resistant Ir catalysts: cyclohexane dehydrogenation and benzene hydrogenation, **135**, 458
- Carbon dioxide
- adsorption on Sm-doped Al_2O_3 supports, **137**, 346
- and H_2 and CO, in methanol synthesis over Cu/ZnO catalysts, **136**, 59
- and H_2O , in gasification of graphite over alkali and alkaline earth metal catalysts, mechanism, electron microscopic study, **138**, 12
- isotopically labeled, in transient studies of methanol synthesis over CeCu_2 -derived catalysts, **138**, 694
- methanation in presence of O_2 , in detection method for temperature programmed oxidation of coke deposits, **138**, 240
- Pt/CeY and Pt/LaY zeolites heated at high temperature in, changes in Pt dispersion, **136**, 334
- Carbon monoxide
- adsorption on
- La–Ni/ SiO_2 catalysts, FTIR study, **136**, 271
- Na-ZSM-5 zeolites at low temperature, FTIR analysis, **137**, 179
- Pt–Sn/ Al_2O_3 catalysts, FTIR study, **138**, 491
- Rh/ SiO_2 catalysts, effects of potassium promotion, ^{13}NMR analysis, **137**, 199
- Sm-doped Al_2O_3 supports, **137**, 346
- sulfided Mo/ Al_2O_3 catalysts unpromoted or promoted by metal carbonyls, FTIR study: site titration, **137**, 69
- and carbon, hydrogenation over Ni catalysts, role of MgO and CaO promoters, **134**, 107
- catalytic oxidation over superconducting and related cuprates, comparison, **134**, 731
- and $\text{CO} + \text{H}_2$, interaction, transient species formed in Ru– $\text{RuO}_x/\text{TiO}_2$ catalyst in, FTIR spectroscopic study, **137**, 473
- and CO_2 and H_2 , in methanol synthesis over Cu/ZnO catalysts, **136**, 59
- desorption from Ni/ Al_2O_3 , effect of adsorbed CH_3O , **133**, 515
- H_2
- at high temperature and pressure, exposed Rh/ SiO_2 catalysts, FTIR and MAS NMR studies, comparison, **135**, 358
- NH_3 , in selective acetonitrile synthesis over Mo/ SiO_2 catalyst, **137**, 127
- and hydrogen
- in alcohol synthesis over $\text{K}_2\text{CO}_3/\text{MoS}_2$ catalysts: room-temperature oxidation of catalysts and effects on alcohol synthesis, **138**, 525
- in direct ethylene glycol synthesis with Rh/ PH_3 catalyst, mechanistic analysis, **133**, 325
- Ru/*N*-methylbenzimidazole catalyst, mechanistic analysis, **133**, 332
- mixtures, methane formation over carbon-supported K_2CO_3 , **134**, 525
- formation on Ni film surface, limitation by oxygen diffusion, **134**, 311
- hydrogenation over
- Co–MnO catalysts, effects of potassium promoter, **134**, 186
- Gd-promoted Ni/ SiO_2 catalysts, **137**, 267
- Mn–Zr mixed oxide catalysts: structure and catalytic properties, **138**, 630
- PdCo/NaY catalysts, analysis of metal phases and product selectivity, **138**, 721
- PdNi, alloys encaged in NaY zeolite, **136**, 182
- Rh/ SiO_2 catalysts, effect of Ag promotion, **138**, 536
- Ru–Co/ SiO_2 bimetallic carbonyl cluster-derived catalysts, mechanism of oxygenate formation, **138**, 206
- Ru/metal oxide catalysts, electronic metal–support interactions in, **136**, 161
- Ru/ SiO_2 catalysts, promotion by potassium, steady-state isotopic transient kinetic analysis, **137**, 22
- SiO_2 -supported Co–Ni alloy catalysts, effect of alloying, **136**, 232
- supported Co and Ru catalysts in Fischer-Tropsch synthesis, structural sensitivity, **137**, 212
- insertion reaction
- insertion into CH_x surface intermediates on V-promoted Rh/ SiO_2 catalysts, transient response study, **134**, 13
- on reduced, oxidized, and sulfided Rh/ SiO_2 catalysts, IR spectroscopic study, **135**, 618
- interaction with oxidized Rh/ Al_2O_3 , IR spectroscopic study at high pressure, **134**, 378
- isotopically labeled, in transient studies of methanol synthesis over CeCu_2 -derived catalysts, **138**, 694
- methanation
- and coadsorption with H_2 , temperature-programmed spectra for Pd/ La_2O_3 catalysts, comparison, **138**, 294
- on Ni(100) and Ni(111) surfaces, structure-insensitive catalytic activity, rationalization, **133**, 461
- and methanol, formation by methyl formate decomposition over NaOH-doped MgO catalysts, **134**, 644
- NO reaction on
- Pt foil, kinetics, analysis by IR spectroscopy of absorbed species, **136**, 342
- square and hexagonal surfaces, Monte Carlo simulation, **131**, 369; letter to editor, **136**, 275; reply, 279
- oxidation over
- Al- and Co-substituted Y–Ba–Cu–O perovskites, **138**, 562
- Au/ ZrO_2 catalysts: activity, deactivation, and reaction mechanism, **137**, 306

- Pd(100) single crystal surface and $c(2 \times 2)$ -Sn/
Pd(100) bimetallic surface alloy, steady-state kinetics, **133**, 179
- Pd/ZrO₂ catalyst prepared from amorphous Pd-Zr alloy: chemical nature of active surface, **137**, 139
- Pt/Al₂O₃ catalysts, dynamic, modeling: effects of intrapellet diffusion and site heterogeneity, **137**, 158
- Rh(III) catalysts by N₂O, kinetics, **138**, 70
- two-dimensional catalyst, oscillations during, Monte Carlo simulation, **133**, 153
- reactivity on V-promoted Rh/SiO₂ catalysts, analysis with transient techniques, **134**, 1
- reduction of NO on Rh/Al₂O₃ catalyst, role of intermediate N₂O + CO reaction, kinetics, **138**, 255
- Carbon tetrachloride
- catalytic oxidation, modified transition metal-exchanged Y zeolite catalysts in, comparison, **138**, 179
- Carbonylation
- N*-chloroamines with Pd catalysts, **136**, 403
- Ni(isoquinoline)₄Cl₂-catalyzed, ethanol and *n*-propanol, promoting effects of metal iodides, **136**, 605
- vapor-phase, methanol on Ni catalysts, hydrogen effects, **133**, 370
- Carbonyls
- bimetallic clusters, derived Ru-Co/SiO₂ catalysts, mechanism of oxygenate formation during CO hydrogenation, **138**, 206
- metal, promoted sulfided Mo/Al₂O₃ catalysts, CO adsorption: site titration, **137**, 69
- Carboxylate complexes
- ×-oxotrinuclear mixed valence and mixed metal, in catalytic oxidation of styrene and cumene, **138**, 611
- Catalysts
- bimetallic particles, surface segregation in, *in situ* electron microscopic analysis, **136**, 584
- chemical reactions on, second-generation CAVERN apparatus for *in situ* solid-state NMR studies, **136**, 504
- non-metallic, reversible reactions over, analysis by transient isotopic tracing, **133**, 383
- Cations
- alkaline, faujasite zeolites with basicity, characterization by XPS with pyrrole as probe, **137**, 322
- CAVERN apparatus
- second-generation, application to study of reactions on catalysts with *in situ* solid-state NMR, **136**, 504
- Ceria, *see* Ceric oxide
- Ceric oxide
- CaO catalysts, in oxidative coupling of methane: effect of oxygen-ion conductivity on C₂ selectivity, **135**, 317
- catalysis of methane, ethane, and ethylene conversion in absence and presence of free oxygen, pulse microreactor studies, **135**, 310
- interaction with
- La₂O₃ in thin films, XPS analysis, **137**, 114
- Pt in Pt,Rh,Ce/γ-Al₂O₃ catalysts, effect on catalyst activity, **133**, 309
- support of Au catalysts derived from CeAu₂ alloy precursor, for methanol synthesis activity: role of Schottky barriers, **134**, 747
- water-gas shift reaction on, regulation of reaction intermediate by reactant in, **136**, 493
- Cerium
- CeCu₂-derived catalysts, in methanol synthesis: transient studies with isotopically labeled reactants, **138**, 694
- CeO₂ derived Au/CeO₂ catalysts, activity for methanol synthesis: role of Schottky barriers, **134**, 747
- Ce-Rh and Ce-Pt particles on γ-Al₂O₃ and SiO₂, microstructure, **138**, 283
- Pt-Rh γ-Al₂O₃-supported catalysts, physiochemical properties and Ce effect on catalyst activity, **133**, 309
- Rh particles on SiO₂, microstructure: Ce and SiO₂ interactions, **134**, 204
- Cerium dioxide
- support of Rh catalyst, hydrogen chemisorption, reversibility, **137**, 1
- Cesium
- exchanged NaX zeolites, transient sorption and desorption studies of cyclopropane and propylene, **135**, 236
- promoted Cu(110) catalysts, water-gas shift reaction, kinetics and mechanism, **136**, 24
- promoted Zn-Cr-O catalyst, higher alcohol synthesis, chain growth process in, kinetics, **135**, 99
- and Re, promoting effects on Ag catalysts in ethylene epoxidation, **138**, 395
- Cesium hydroxide
- promoter effect in NH₃ synthesis over Ru/Al₂O₃ catalysts, **136**, 110
- Ru/MgO catalysts, **136**, 126
- Cesium molybdate
- SiO₂-supported catalysts, partial oxidation of ethane, **135**, 563
- CFC-12, *see* Dichlorodifluoromethane
- Chain growth processes
- in higher alcohol synthesis over Cs-promoted Zn-Cr-O catalyst, kinetics, **135**, 99
- Chemical reactions
- on catalysts, second-generation CAVERN apparatus for *in situ* solid-state NMR studies, **136**, 504
- Chemisorption
- hydrogen, in catalytic and structural study of sulfur poisoning of Pt/BaK-LTL zeolites, **138**, 675
- hydrogen on
- Pt in Pt/ZSM-5 zeolites, **136**, 43

- Rh/CeO₂ catalyst, reversibility, **137**, 1
- Ru/SiO₂ catalysts, effect of
- adsorbed sulfur, NMR study, **134**, 572
 - chlorine, ¹H NMR study, **135**, 68
 - oxygen on Ag, NEMCA effect, **138**, 570
 - pulse, in studies of promoted solid-state HDS catalysts, **135**, 427
 - selective, on Ir/ α -Al₂O₃ catalysts, in determination of metallic surface area, **136**, 598
- Chlorination
- aromatic hydrocarbons with SO₂Cl₂, associated acidic degradation of NaX and ZF520 zeolites, **135**, 92
- Chlorine
- suppression of hydrogen chemisorption by Ru/SiO₂ catalysts, H NMR study, **135**, 68
- N-chloroamines
- carbonylation with Pd catalysts, **136**, 403
- Chlorobenzene
- nucleophilic substitution reaction with methanol on ZSM-5 zeolites, analysis, **134**, 373
- Chlorofluorocarbons
- CFC11 and CFC12, oxidative destruction by Y zeolite catalysts, **138**, 364
- 3-Chlorosalicylic acid
- photocatalytic degradation on pure and Nb-doped TiO₂ ceramic membranes, properties, **134**, 36
- Chromia, *see* Chromic oxide
- Chromic oxide
- amorphous and crystalline, for selective catalytic reduction of NO, surface structure characterization by TPRD, **133**, 397
 - diffuse reflectance FTIR studies
 - NH₃ desorption from Brønsted and Lewis acid sites, **133**, 431
 - NO adsorption and reaction, **138**, 306
 - thermal treatment and oxygen adsorption, **133**, 415 - catalysis of reversible reactions in isobutane–isobutene–hydrogen mixtures, transient isotopic tracing studies, **133**, 383
 - Ni catalysts, plain and hydrophobized, isotopic exchange between hydrogen and water, **134**, 399
 - SiO₂-supported catalysts, ²⁹Si MAS NMR study, **136**, 246
- Chromium
- Cu–Zn catalysts, Co-modified, in methanol synthesis, **135**, 386
 - SiO₂-supported catalyst, ethylene polymerization on, initiation mechanism, FTIR analysis, **137**, 368
 - Zn–O catalyst, Cs-promoted, higher alcohol synthesis chain growth process in, kinetics, **135**, 99
 - ZrCrO, K₂O-promoted oxide catalysts, higher alcohol synthesis over, mechanistic aspects, **135**, 400
- Chromium oxide
- Cr_xO_y · TiO₂ polycrystalline system, for photoreactions, structural and surface characterization, **134**, 434
- Chromium trioxide
- SiO₂-supported catalysts, surface structure and reactivity, **136**, 209
- Citrate process
- amorphous, ternary Cu/Co/Al catalysts prepared by, effect of decomposition–calcination, **134**, 594
- Coadsorption
- CO and H₂ on Pd/La₂O₃ and Pd/SiO₂ catalysts, temperature programmed spectra, comparison, **138**, 294
- Cobalt
- Al₂O₃-supported catalysts, in Fischer–Tropsch synthesis: effects of support and metal dispersion on reaction rate and selectivity, **137**, 212
 - and Al, substituted in Y–Ba–Cu–O perovskites, oxidation of CO over, **138**, 562
 - Cu–Al ternary catalysts, prepared by amorphous citrate process, effect of decomposition–calcination atmosphere, **134**, 594
 - MnO catalysts, in CO hydrogenation, effect of potassium promoter, **134**, 186
 - Mo, SiO₂- and Al₂O₃-supported hydrodesulfurization catalysts, ⁵⁷Co Mössbauer emission spectroscopic study, **133**, 112
 - Ni alloys, SiO₂-supported catalysts, CO hydrogenation on, effects of alloying, **136**, 232
 - Pd/NaY zeolites, CO hydrogenation over, analysis of metal phases and product selectivity, **138**, 721
 - poisoned Cu–Zn–Cr catalysts, in methanol synthesis, **135**, 386
 - powder catalyst, CFC-12–NH₃ reaction over, in formation of HCN, **136**, 617
 - promoted P₂, Mo_{1–x}S₂ catalysts, oxygen chemisorption studies with, **135**, 427
 - Pt, in catalyst particles, surface segregation, *in situ* electron microscopic analysis, **136**, 584
 - Ru, SiO₂-supported bimetallic carbonyl cluster-derived catalysts, mechanism of oxygenate formation during CO hydrogenation, **138**, 206
- SiO₂-supported catalysts
- in Fischer–Tropsch synthesis: effects of support and metal dispersion on reaction rate and selectivity, **137**, 212
 - Mg-promoted, precipitated: metal–support interactions, **134**, 615
 - sulfided catalysts, preparation by temperature-programmed sulfiding of precursor cobalt oxide: generation of highly active sites for hydrogenation and isomerization, **133**, 498
 - supported on 12% WO₃/Al₂O₃ composite: effect of second-phase oxides on catalytic properties of dispersed metals, **135**, 200

- TiO₂-supported catalysts
in Fischer–Tropsch synthesis: effects of support and metal dispersion on reaction rate and selectivity, **137**, 212
structure and activity, **135**, 173
YBa₂Cu₃CoO_{7+x} superconductors, NH₃ oxidation over, **135**, 335
ZnO-supported catalysts, Co reduction and state in, analysis: metal–support interaction, **135**, 263
- Cobalt chromium oxide
evaluation as catalyst in water–gas shift reaction, comparison with CoMn₃O₄ and CuMn₃O₄, **137**, 408
- Cobaltic-cobaltous oxide
LiCl-added catalysts, oxidative cross-coupling of methane and toluene over, kinetics, **137**, 487
- Cobalt manganese oxide
evaluation as catalyst in water–gas shift reaction, comparison with CoCr₂O₄ and CuMn₃O₄, **137**, 408
- Cobalt oxide
temperature programmed sulfiding: generation of highly active sites on sulfided Co catalyst for hydrogenation and isomerization, **133**, 498
- Cobalt sulfide
and MoS₂, based hydrodesulfurization catalysts prepared by homogeneous sulfide precipitation and impregnated thiosalt decomposition, TEM analysis, **137**, 232
- Coke
deposited on
commercial hydrocracking catalysts, effects on catalyst activity and deactivation during piperidine hydrogenolysis, **135**, 481
H-ZSM-5 zeolite in acetone conversion, hydrogens of, isotope exchange for deuterium of organic compounds, **136**, 258
Ru/zeolite 13X catalyst, temperature programmed oxidation, detection method: methanation of CO₂ in presence of O₂, **138**, 240
formation
by anthracene on acidic Al₂O₃ and SiO₂–Al₂O₃, **138**, 474
chemistry, relationship to catalyst deactivation, **138**, 343
on commercial hydrocracking catalyst NU-D during piperidine hydrogenolysis, effects of initial hydrogenolysis and hydrogen partial pressure, **135**, 27
on zeolites: composition of carbonaceous compounds deactivating USHY zeolite during toluene disproportionation, **134**, 286
- Computer techniques
dynamic behaviors of simple aromatic hydrocarbons inside pores of ZSM-5 zeolite, **136**, 141
molecular dynamics simulations, in analysis of surface barrier concept in diffusion in zeolites, **134**, 536
- Condensation
Knoevenagel, benzaldehyde with ethyl acetoacetate: determination of base properties of hydrocaltices, **134**, 58
- Coordination
Al in transition aluminas, relationship to Lewis acidity, **133**, 263
- Copper
–Ba–Y–O perovskite catalysts, Co- and Al-substituted, CO oxidation, **138**, 562
catalysts with Zn and Sn promoters, direct synthesis of methylchlorosilanes, steady-state and transient reaction kinetics, **134**, 168
CeCu₂-derived catalysts, in methanol synthesis: transient studies with isotopically labeled reactants, **138**, 694
–Co–Al ternary catalysts, prepared by amorphous citrate process, effect of decomposition–calcination atmosphere, **134**, 594
–Cr–Zn catalysts, Co-modified, methanol synthesis, analysis, **135**, 386
Cu(II), support of polyvinylpyridine catalyst during 2,6-di-*tert*-butylphenol oxidation in presence of inorganic base, **138**, 24
Cu(110) catalysts
Cs-promoted, water–gas shift reaction, kinetics and mechanism, **136**, 24
reverse water–gas shift reaction, kinetics, **134**, 66
ions in ZSM-5 zeolites, interaction with NO, EPR and FT–IR spectroscopic studies, **136**, 510
–Ni catalysts, graphite-supported, resulting carbon deposits, structure: role of interfacial phenomena, **134**, 253
PrBa₂Cu₃O_{7-x} superconducting catalysts, NH₃ oxidation, **135**, 335
–Pt NaY-supported bimetallic catalysts, ¹²⁹Xe NMR and EXAFS analysis, **133**, 191
–Ru, SiO₂-supported catalysts, *n*-butane hydrogenolysis, **138**, 617
YBa₂Cu₃CoO_{7+x} superconducting catalysts, NH₃ oxidation, **135**, 335
ZnO-supported catalysts
methanol synthesis, precursor preparation by coprecipitation methods, **138**, 754
methyl formate formation, mechanism, **136**, 609
reverse water–gas shift reaction, mechanism, **134**, 220
and ZnO–Al₂O₃-supported catalysts, methanol synthesis from H₂, CO, and CO₂, **136**, 59
ZnO/Al₂O₃-supported catalysts, 2-propanol decomposition, catalyst behavior and surface chemistry, **136**, 86
- Copper manganese oxide
as catalyst in water–gas shift reaction, comparison with CoCr₂O₄ and CoMn₃O₄, **137**, 408
- Coprecipitation
Na–Mn–Ni catalysts active for higher oxygenate

- synthesis from syngas, TPR and XPS study, **138**, 733
- preparation of precursors for Cu/ZnO methanol synthesis catalysts, **138**, 754
- Counterdiffusion
- in zeolites under conditions of single-file diffusion, Monte Carlo simulation, **136**, 283
- Cracking, *see also* Hydrocracking
- n*-butane over HZSM-5 zeolites, monomolecular and bimolecular mechanisms, **135**, 115
 - catalysis by Mo-promoted and unsupported vanadium sulfide species, characterization, **135**, 304
 - cumene on high-sodium HY zeolites, catalyst activity and selectivity, effect of deactivation, **134**, 583
 - n*-decane and *n*-hexane on H-ZSM-5 and HY zeolites in 500 to 780 K temperature range, kinetics, **137**, 437
 - n*-hexane over zeolite–amorphous silica–alumina composites prepared with high-alumina and low organic template content gels, **133**, 28
 - long-chain alkyl aromatics on USY zeolite catalysts, analysis, **135**, 45
 - n*-nonane, coke formation and catalyst deactivation in, relationship, **138**, 343
 - small alkane molecules on HY zeolites, mechanism, **136**, 446
 - temperature-programmed, 2-propylamine with solid acid zeolites and CaO, comparison, **138**, 391
- Cracking catalysts
- dual function mixtures, addition of Sn and Sb, effect on catalyst performance, **135**, 325
 - fluid catalytic, USY-based
 - acidity analysis by microcalorimetry and IR spectroscopy, **136**, 392
 - hydrothermal aging: vanadium passivation by rare earth compounds soluble in feedstock, **134**, 469
- Cross-coupling
- oxidative, *see* Oxidative cross-coupling
- Crotonic acid
- epoxidation with H₂O₂ over resin-supported vanadium(IV) catalysts, kinetics, **137**, 510
- Crystallite size
- effect on dealumination and residual octahedral Al content in large-pore mordenites, **138**, 150
- Crystals
- MoO₃, oxygen insertion, mechanistic study by SIMS and TPSR, **137**, 429
- Cumene
- catalytic oxidation by \times -oxotrinuclear mixed valence and mixed metal carboxylate complexes, **138**, 611
 - cracking on high-sodium HY zeolites, catalyst activity and selectivity, effect of deactivation, **134**, 583
 - dealkylation over
 - Ni-loaded Y zeolites, analysis, **138**, 164
 - TiO₂–SiO₂ catalysts modified with H₂SO₄, analysis, **136**, 267
- Cuprates
- superconducting and insulating catalysts, CO oxidation, comparison, **134**, 731
- Cupric chromite
- γ -Al₂O₃-supported catalysts, heterogeneous–homogeneous reactions involving free radicals in total catalytic oxidation processes, **136**, 197
- Cupric oxide
- γ -Al₂O₃-supported catalysts, aging in oxidizing reaction media, microstructural and spectroscopic studies, **134**, 506
 - SiO₂-supported catalysts prepared from mononuclear Cu complexes, properties, **135**, 81
 - ZnO catalysts, Al₂O₃-supported, liquid-phase oxidation of phenol, kinetics, **135**, 345
- Cyclic feeding
- effect on benzene hydrogenation reactor, **136**, 242
- Cyclization
- n*-hexane over Pt single-crystal catalysts, effects of Re and sulfur, **134**, 179
- Cyclohexane
- conversion reactions over Pt catalysts, effects on Re and sulfur, **134**, 179
 - dehydrogenation over sulfur-resistant Ir/carbon catalysts, **135**, 458
 - hydrogenation over
 - Pt graphimetric catalysts: characterization of catalyst, **134**, 608
 - unsupported FeMoS catalysts, and simultaneous thiophene hydrodesulfurization, analysis, **138**, 640
- Cyclohexanone oxime
- vapor-phase Beckmann rearrangement over Ti silicalites, **137**, 252
- Cyclopentadiene
- and methyl acrylate, Diels–Alder reaction between, K10 montmorillonite-catalyzed, influencing factors, **137**, 394
- Cyclopentane
- isotopic exchange with deuterium on Rh/SiO₂ gel catalysts, **133**, 294
- Cyclopropane
- conversion to propene in NaX zeolite, associated molecular diffusion, *in situ* measurement by pulsed-field gradient NMR, **137**, 243
 - isomerization
 - over EuNaX zeolites, effect of Eu³⁺ content, **138**, 1
 - to propylene in NaX and Eu/NaX zeolites, transient diffusion, desorption, and reaction studies, **135**, 223

D

Deactivation

- Au/ZrO₂ catalysts during CO oxidation, analysis, **137**, 306
- commercial hydrocracking catalyst during piperidine hydrogenolysis, effects of

- initial piperidine hydrogenolysis and hydrogen partial pressure, **135**, 27
- zeolite unit size, sulfur content, and coke deposition, **135**, 481
- high-sodium HY zeolites, effects on activity and selectivity, **134**, 583
- mordenite type catalysts in methylamine synthesis reaction *in situ*, ^{13}C MAS NMR spectroscopic study, **136**, 202
- and reactivation, Na/K₂CO₃ catalysts for propene dimerization, diffuse reflectance FTIR study, **136**, 76
- USHY zeolite during toluene disproportionation, carbonaceous compounds responsible for, composition, **134**, 286
- Dealkylation
- cumene over
 - Ni-loaded Y zeolites, **138**, 164
 - TiO₂-SiO₂ catalysts modified with H₂SO₄, **136**, 267
- Dealumination
- faujasite, analysis by Monte Carlo simulation, **135**, 635
 - large-pore mordenites, characterization, **138**, 150
- n*-Decane
- cracking on H-ZSM-5 and HY zeolites in 500 to 780 K temperature range, kinetics, **137**, 437
- Decomposition
- calcination, effect on ternary Cu/Co/Al catalysts prepared by amorphous citrate process, **134**, 594
 - ethanol and methanol over CuO, properties, **135**, 81
 - hydrocarbons over Ni and Cu-Ni catalysts, resulting carbon deposits, structure: role of interfacial phenomena, **134**, 253
 - impregnated thiosalt, hydrodesulfurization catalysts prepared by, TEM comparison with catalysts prepared by homogeneous sulfide precipitation, **137**, 232
 - isopropanol over VO_x/AlNbO catalysts, analysis, **137**, 257
 - methyl formate to CO and methanol over NaOH-doped MgO catalysts, analysis, **134**, 644
 - N₂O, oxygen species formation on CaO surface sites during, reactivity, **138**, 686
 - NH₃ on vanadium nitride, kinetics, **133**, 358
 - 2-propanol over
 - calcined hydrotalcites: surface structure and basic properties, **138**, 547
 - Cu/ZnO/Al₂O₃ catalysts, **136**, 86
 - thermal, hydrotalcite-type precursors of Ni-Al mixed oxides, in oxide preparation and characterization, **133**, 231
- Deethylation
- p*-ethyltoluene on MgO-modified H-ZSM-5 and ZSM-5 zeolites, **135**, 321
- Degradation
- acidic, zeolite catalysts during aromatic chlorination with SO₂Cl₂, **135**, 92
- Dehydration
- alcohols on Al₂O₃, displacement adsorption and educt inhibition in, steady-state and transient kinetics, **133**, 170
 - methanol on H-ZSM-5, SAPO-34, and MeAPSO-34 (Me = Co, Cr, Mn) molecular sieves, catalyst acidity and activity, **135**, 518
 - 2-propanol
 - surface sites for, effect of Al₂O₃ structure, **138**, 659
 - on TiO₂-SiO₂ catalysts modified with H₂SO₄, analysis, **136**, 267
- Dehydrocyclization
- n*-heptane on Te/NaX: kinetic coupling and hydrogen surface fugacities in heterogeneous catalysts, **134**, 549
- Dehydrocyclodimerization
- propane on H-ZSM-5 and Ga/H-ZSM-5: kinetic coupling and hydrogen surface fugacities in heterogeneous catalysts, **134**, 549
- Dehydrogenation
- 1-butene to 1,3-butadiene on K-promoted FeO₂/MgO catalysts, **135**, 548
 - cyclohexane over
 - Pt single-crystal catalysts, effects of Re and sulfur, **134**, 179
 - sulfur-resistant Ir/carbon catalysts, **135**, 458
 - ethane in catalytic membrane reactor, analysis, **134**, 713
 - ethylbenzene to styrene, iron oxide-based catalyst for, active phase surface chemistry, **138**, 413
 - methylcyclohexane over
 - Pt/ α -Al₂O₃ catalysts, effect of Pt particle size, **138**, 482
 - Te/NaX: kinetic coupling and hydrogen surface fugacities in heterogeneous catalysts, **134**, 549
 - oxidative, *see* Oxidative dehydrogenation
- Denitrogenation
- piperidine on Al₂O₃, SiO₂, and SiO₂-Al₂O₃, effects of surface acidity, **137**, 453
- Deposition
- catalytic, carbon, activation-deactivation model, **138**, 129
 - SiO₂ on ZrO₂ and TiO₂, generation of acid sites, **134**, 340
- Desorption
- adsorption, CO and NO on Pt foil, surface reaction kinetics by direct observation of adsorbed species, **136**, 342
 - CO from Ni/Al₂O₃ catalysts, effect of adsorbed CH₃O, **133**, 515
 - cyclopropane and propylene in NaX and Eu/NaX zeolites, analysis, **135**, 223
 - molecular, in zeolites under conditions of single-file diffusion, Monte Carlo simulation, **136**, 283
 - NH₃ from Brønsted and Lewis acid sites of crystalline and amorphous Cr₂O₃ catalysts, diffuse reflectance FTIR study, **133**, 415

- temperature-programmed, *see* Temperature-programmed desorption
- thermo-, *see* Thermodesorption
- transient, cyclopropane and propylene in Cs/NaX and Ni/NaX zeolites, analysis, **135**, 236
- Deuterium
- adsorbed onto Rh/Al₂O₃, ²H NMR study, effect of particle size, **138**, 457
 - exchange reaction with ethane, catalysed by Pt, and law of microscopic reversibility, theoretical model, letter to editor, **138**, 759; reply, **138**, 761
 - ions, location in Y zeolites, pulsed-neutron powder diffraction study, **138**, 405
 - isotopic exchange with
 - alkanes on Rh/SiO₂ gel catalysts, **133**, 294
 - 2,2-dimethylbutane on Rh/SiO₂ gel catalysts, **133**, 279
 - hydrogen
 - over MgO catalysts, in hydrogen activation analysis, **136**, 222
 - over plain and hydrophobized Ni-Cr₂O₃ catalysts, **134**, 399
 - in organic compounds, isotope exchange for coke hydrogens: analysis of coke deposited on H-ZSM-5 zeolite in acetone conversion, **136**, 258
 - tracing studies, in analysis of ethylene hydrogenation over Pt, **137**, 186
- 2,6-Di-*tert*-butylphenol
- liquid-phase oxidation over polyvinylpyridine/Cu(II) catalyst, promotion by inorganic base, **138**, 24
- Dichlorodifluoromethane
- conversion to HCN over Fe group metal catalysts, **136**, 617
- Diels-Alder reaction
- between methyl acrylate and cyclopentadiene, K10 montmorillonite-catalyzed, influencing factors, **137**, 394
- Diffuse reflectance spectroscopy
- physiochemical phenomena during Mo/SiO₂ catalyst preparation by grafting method, **135**, 156
- Diffusion
- counter-, *see* Counter diffusion
 - intrapellet, effects in model of dynamic CO oxidation over Pt/Al₂O₃ catalysts, **137**, 158
 - molecular, during catalytic reactions, *in situ* measurement by pulsed-field gradient NMR, **137**, 243
 - oxygen in Ni film surface, limiting effect on CO formation, **134**, 311
 - single-file, in zeolites, Monte Carlo simulation, **136**, 283
 - transient, cyclopropane and propylene in NaX and Eu/NaX zeolites, analysis, **135**, 223
 - two-component, in ZSM-5 zeolite, theoretical model, **136**, 263
 - in zeolites
 - Monte Carlo simulations and comparison with Maxwell-Stefan theory, **136**, 463
 - surface barrier concept in, molecular dynamics simulations, **134**, 536
- Dimerization
- propene, Na/K₂CO₃ catalysts for, deactivation and reactivation, diffuse reflectance FTIR study, **136**, 76
- 2,2-Dimethylbutane
- isotopic exchange with deuterium on Rh/SiO₂ gel catalysts, **133**, 279
- Dimethyl ether
- direct synthesis from syngas over zeolite catalysts, **134**, 226
- Dinitrogen
- photoreduction, polycrystalline system Cr_xO_y · TiO₂ for, structural and surface characterization, **134**, 434
- Diphenyl
- hydrogenation over Mo-promoted and unsupported vanadium sulfide catalysts, characterization, **135**, 304
- Dispersion
- controlled, MoO₃/SiO₂ catalysts, role of NH₃, **133**, 55
 - effect on surface state of SiO₂-supported 12-molybdosilicic acid catalysts, vibrational study, **138**, 445
 - metal
 - control in Pd/SiO₂ catalysts prepared for methanol synthesis, **138**, 500
 - effects on reaction rate and selectivity in Fischer-Tropsch synthesis on Co and Ru catalysts, **137**, 212
 - MoO₃-Al₂O₃ catalysts prepared by impregnation and solid/solid wetting methods, analysis, **136**, 50
 - Ni impregnated on SiO₂ gels, role of surface hydroxyls, **135**, 638
 - Pt in
 - Pt/CeY and Pt/LaY zeolites at high temperatures in gases, analysis, **136**, 334
 - Pt/ZSM-5 zeolites, characterization, **136**, 43
 - WS₂ catalysts, effect of ZrO₂ support, **133**, 146
- Disproportionation
- n-propylbenzene, as method for probing zeolites, **133**, 136
 - toluene, USHY zeolite deactivation during, carbonaceous compounds responsible for, composition, **134**, 286
- 1-Dodecene
- solid acid-catalyzed alkylation of benzene with, isomer distribution, **138**, 386
- Doping
- Al₂O₃ supports with Sm, effect on surface behavior: Lewis acidity, **137**, 346
- Dysprosium naphthenate
- soluble in feedstock, passivation of vanadium: hydrothermal aging of cracking catalysts, **134**, 469

E

- Educt inhibition
in dehydration of alcohols on Al_2O_3 , steady-state and transient kinetics, **133**, 170
- Electrochemistry
non-Faradaic modification of catalytic activity, *see* NEMCA effect
- Electron microscopy
in analysis of mechanism of alkali- and alkaline earth-catalyzed gasification of graphite by CO_2 and H_2O , **138**, 12
in situ analysis of surface segregation in bimetallic catalyst particles, **136**, 584
- Electron paramagnetic resonance
in analysis of
coverage effects in $\text{TiO}_2(\text{B})$ -supported V_2O_5 catalysts for toluene ammoxidation, **138**, 79
interaction between NO and Cu ions in ZSM-5 zeolites, **136**, 510
physicochemical phenomena during Mo/ SiO_2 catalyst preparation by grafting method, **135**, 156
- Embedded atom method
in calculation of equilibrium shape of small Pt clusters, **136**, 320
- Encapsulation
 H_2 at 1 atm in ion-exchanged A zeolites, analysis, **135**, 135
- Epoxidation
ethylene, on Ag catalysts
deposited on stabilized ZrO_3 electrolyte reactor: NEMCA effect, **138**, 588
promoting effects of Re and Cs, **138**, 395
maleic, fumaric, and crotonic acids with H_2O_2 over resin-supported vanadium(IV) catalysts, kinetics, **137**, 510
- EPR, *see* Electron paramagnetic resonance
- Etching
catalytic, Pt-Rh gauzes, **136**, 149
- Ethane
conversion over rare earth oxides in absence and presence of free oxygen, pulse microreactor studies, **135**, 310
dehydrogenation in catalytic membrane reactor, analysis, **134**, 713
exchange reaction with deuterium catalyzed by Pt, and law of microscopic reversibility, theoretical model, letter to editor, **138**, 759; reply, **138**, 761
formation from methane by low-temperature two-step reaction, **138**, 101
hydrogenolysis over
NaY zeolite, in analysis of Pt-Ir bimetallic cluster formation, **137**, 357
Pt/ SiO_2 catalysts, analysis, **137**, 462
Ru/ Al_2O_3 catalysts, steady-state and transient kinetics, **134**, 134
isotopic exchange with deuterium on Rh/ SiO_2 gel catalysts, analysis, **133**, 294
oxidation over
 $\text{M}_2\text{MoO}_4/\text{SiO}_2$ catalysts ($M = \text{Cs}, \text{K}, \text{Li}, \text{Na}, \text{Rb}$), analysis, **135**, 563
Pd/ γ - Al_2O_3 and Pd/ SiO_2 catalysts, *in situ* IR spectroscopic and catalytic studies, **136**, 613
- Ethanol
decomposition over CuO/ SiO_2 catalysts, properties, **135**, 81
Ni(isoquinoline) $_4\text{Cl}_2$ -catalyzed carbonylation, promoting effects of metal iodides, **136**, 605
reactions with titanium silicalite, **133**, 220
- Ethyl acetate
hydrogenation over Pd/ZnO catalysts, **135**, 420
- Ethyl acetoacetate
benzaldehyde condensation with, analysis: determination of base properties of hydrotalcites, **134**, 58
- Ethylamine
adsorption on AlPO_4 -5 molecular sieves, in analysis of Mn and Mg framework substitution, **138**, 377
- Ethylation
benzene over Ni-loaded Y zeolites, **138**, 164
toluene on MgO-modified H-ZSM-5 and ZSM-5 zeolites, **135**, 321
- Ethylbenzene
dehydrogenation to styrene, iron oxide-based catalyst for, active phase surface chemistry, **138**, 413
- Ethyl bromoacetate
alkylation of Meldrum's acid, effect of hydrophilic recognition by polymer-supported phase transfer catalysts, **136**, 378
- Ethylene
adsorbed on reduced and oxygen-covered Ag/ η - Al_2O_3 surfaces, ^{13}C NMR study, **138**, 223
conversion over rare earth oxides in absence and presence of free oxygen, pulse microreactor studies, **135**, 310
cyclic oligomerization by application of rare-earth catalysts for carbon-carbon linkages, **137**, 423
deuterium in, isotopic exchange of coke hydrogens for, on coke deposited on H-ZSM-5 zeolite in acetone conversion, **136**, 258
epoxidation on Ag catalysts
deposited on stabilized ZrO_3 electrolyte reactor: NEMCA effect, **138**, 588
promoting effects of Re and Cs, **138**, 395
hydroformylation over
reduced, oxidized, and sulfided Rh/ SiO_2 catalysts, **135**, 618
Rh/activated carbon catalysts, pentan-3-one and propionaldehyde formation during, comparison, **136**, 531
Rh/ SiO_2 catalysts, effect of Ag promotion, **138**, 536
hydrogenation
in metal-free zeolites, analysis of active sites, **133**, 527

- over Pt catalysts, D₂ tracing and microkinetic analyses, **137**, 186
 - oxidation on Pt with ZrO₂ pellet, NEMCA induction during, analysis, **137**, 278
 - polymerization on Cr/SiO₂ catalyst, initiation, FTIR analysis, **137**, 368
 - Ethylene glycol
 - direct synthesis from CO and hydrogen over Rh/PH₃ catalysts, mechanistic analysis, **133**, 325
 - Ru/*N*-methylbenzimidazole catalysts, mechanistic analysis, **133**, 332
 - 9-Ethyl fluorene
 - hydrocracking pathways and kinetics in presence of Ni–Mo/Al₂O₃ catalysts with ultra-stable Y zeolite, **137**, 504
 - p*-Ethyltoluene
 - transformation on MgO-modified H-ZSM-5 and ZSM-5 zeolites, **135**, 321
 - Europium
 - Eu³⁺/NaX zeolites, cyclopropane isomerization, effect of Eu³⁺ content, **138**, 1
 - Europium sesquioxide
 - catalysis of methane, ethane, and ethylene conversion in absence and presence of free oxygen, pulse microreactor studies, **135**, 310
 - EXAFS, *see* Extended X-ray absorption fine structure spectroscopy
 - Exchange reactions
 - ethane/deuterium, Pt-catalyzed, and law of microscopic reversibility, theoretical model, letter to editor, **138**, 759; reply, **138**, 761
 - ion, *see* Ion exchange
 - isotopic, *see* Isotope exchange
 - Exhaust gas
 - synthetic, performance of Pt,Rh,Ce/ γ -Al₂O₃ catalysts in, analysis: effect of Ce on catalytic activity, **133**, 309
 - Extended X-ray absorption fine structure spectroscopy
 - Ni–Mo–S structure in carbon- and Al₂O₃-supported Ni–Mo catalysts, **133**, 94
 - zeolite-supported Pt–Cu bimetallic catalysts, **133**, 191
 - Extrudates
 - γ -Al₂O₃, support of Mo catalysts with different profiles: preparation, characterization, and catalytic properties, **137**, 285
- F**
- Faujasites
 - alkali-cation zeolites, basicity characterization by XPS with pyrrole as probe molecule, **137**, 322
 - dealumination, analysis by Monte Carlo simulation, **135**, 635
 - SAPO-37, acidic properties, dependence on Si content and heat treatment, **138**, 90
 - Ferric oxide
 - MgO-supported K-promoted catalysts
 - 1-butene dehydrogenation to 1,3-butadiene, **135**, 548
 - preparation and characterization, **135**, 533
 - α -Ferric oxide
 - adsorption of allylamine and benzylamine, thermal desorption and IR studies, **134**, 409
 - Filaments
 - carbon, produced by hydrocarbon decomposition over Cu–Ni and Ni catalysts, structure: role of interfacial phenomena, **134**, 253
 - Films
 - thin, with noble metal, interactions with valence-invariant and reducible oxides, XPS analysis, **137**, 114
 - Fischer–Tropsch synthesis
 - acetonitrile from CO–H₂–NH₃ over Mo/SiO₂ catalysts, **137**, 127
 - on Co and Ru catalysts, reaction rate and selectivity, effects of supports and metal dispersion, **137**, 212
 - on oxide-supported Fe catalysts, associated carbonaceous deposition, support effects, **136**, 96
 - unsupported Fe catalysts in, dynamic X-ray diffraction study, **134**, 654
 - Formaldehyde
 - gas-phase, heterogeneous photocatalytic oxidation for air purification, **136**, 554
 - Formates
 - surface, properties and interaction with coadsorbed water on CeO₂ in relation to reactant-promoted reaction mechanism, **136**, 493
 - Fourier transform infrared spectroscopy
 - CO absorption on
 - La–Ni/SiO₂ catalysts, **136**, 271
 - Na-ZSM-5 zeolites at low-temperature, **137**, 179
 - sulfided Mo/Al₂O₃ catalysts unpromoted or promoted by metal carbonyls: site titration, **137**, 69
 - diffuse reflectance, in analysis of
 - deactivation and reactivation of Na/K₂CO₃ catalysts propene for dimerization, **136**, 76
 - NH₃ desorption from Brønsted and Lewis acid sites of crystalline and amorphous Cr₂O₃ catalyst surfaces, **133**, 431
 - NO adsorption and reaction: surface structure of crystalline and amorphous Cr₂O₃ catalysts for selective catalytic NO reduction, **138**, 306
 - oxygen adsorption on and thermal treatment of crystalline and amorphous Cr₂O₃ catalyst surfaces, **133**, 415
 - ethylene polymerization initiation on Cr/SiO₂ catalyst, **137**, 368
 - in identification of alcohol adsorption sites on γ -Al₂O₃, **135**, 444
 - and MAS NMR, comparative studies of Rh/SiO₂ catalysts exposed to CO/H₂ at high temperature and pressure, **135**, 358

- NO interaction with Cu ions in ZSM-5 zeolites, **136**, 510
 Pt-Sn/Al₂O₃ catalysts, **138**, 491
 sol-gel Pd/SiO₂ catalysts, **138**, 463
 transient species formed over Ru-RuO_x/TiO₂ catalysts in CO and CO + H₂ interaction, **137**, 473
 V₂O₅/TiO₂ catalysts doped with Na, **134**, 47
 Free energy
 reduction of imines over Pd/sepiolite catalyst, linear relationships, **133**, 21
 Free radicals
 formation in heterogeneous-homogeneous reactions on total catalytic oxidation catalysts Cu-Cr₂O₄/γ-Al₂O₃ and Pt/γ-Al₂O₃, **136**, 197
 FT-IR, *see* Fourier transform infrared spectroscopy
 Fugacity
 surface, hydrogen, and kinetic coupling in heterogeneous catalysis: alkane reactions on Te/NaX, H-ZSM5, and Ga/H-ZSM5 catalysts, **134**, 549
 Fumaric acid
 epoxidation with H₂O₂ over resin-supported vanadium(IV) catalysts, kinetics, **137**, 510

G

- Gadolinium
 promotion of Ni/SiO₂ catalysis for CO hydrogenation, **137**, 267
 Gallium
 H-ZSM-5-supported catalysts, alkane reactions: kinetic coupling and hydrogen surface fugacities in heterogeneous catalysis, **134**, 549
 -silicate analogs of ZSM-11 zeolites, methylation of xylenes: selective formation of 1,2,4 isomer among trimethylbenzenes, **138**, 518
 Gas
 synthesis, *see* Synthesis gas
 Gasification
 graphite by CO₂ and H₂O over alkali and alkaline earth metal catalysts, mechanism, electron microscopic study, **138**, 12
 Gasoline
 reaction on catalysts, second-generation CAVERN apparatus for *in situ* solid-state NMR studies, **136**, 504
 Gauzes
 Pt-Rh, catalytic etching, **136**, 149
 Gels
 high-alumina and low organic template content, zeolite-amorphous silica-alumina composites prepared with, synthesis and cracking behavior, **133**, 28
 TiO₂-SiO₂ mixed oxide, support of V₂O₅, dispersed phase structure and activity for catalytic reduction of NO with NH₃, **133**, 1
 V₂O₅, V₂O₅-TiO₂, and V₂O₅-TiO₂-SiO₂, structural genesis and catalytic behavior in reduction of NO with NH₃, **134**, 75
 Glyoxal
 oxidation to glyoxylic acid on Pt/C catalysts, **133**, 479
 Glyoxylic acid
 formation by oxidation of glyoxal on Pt/C catalysts, **133**, 479
 Gold
 amorphous ZrO₂-supported catalysts, CO oxidation: activity, deactivation, and reaction mechanism, **137**, 306
 CeO₂-supported catalysts derived from CeAu₂ alloy precursor, methanol synthesis activity: role of Schottky barriers, **134**, 747
 doped MgO catalysts, oxidative coupling of methane, relationship between morphology and performance, **135**, 576
 Graphite
 gasification by CO₂ and H₂O over alkali and alkaline earth metal catalysts, mechanism, electron microscopic study, **138**, 12
 support of Pt catalysts, crystallite size and morphology, scanning tunneling microscopic study, **135**, 13

H

- n*-Heptane
 dehydrocyclization on Te/NaX: kinetic coupling and hydrogen surface fugacities in heterogeneous catalysis, **134**, 549
 Heterogeneous-homogeneous reactions
 involving free radicals in total catalytic oxidation processes, analysis, **136**, 197
 Hexamolybdoplatinate(IV)
 ionic, derived Pt-Mo bimetallic catalysts: characterization of supported PtMo₆, **135**, 367
n-Hexane
 aromatization by Pt-containing molecular sieves
 catalyst preparation by vapor phase impregnation method, **134**, 349
 n-hexane reactivity, **134**, 359
 platinum aluminophosphate reactivity, **134**, 370
 conversion reactions over Pt catalysts, effects of Re and sulfur, **134**, 179
 cracking over
 SM-5 and HY zeolites in 500 to 780 K temperature range, kinetics, **137**, 437
 zeolite-amorphous silica-alumina composites prepared with high-alumina and low organic template content gels, analysis, **133**, 28
 isomerization over Pt/Al₂O₃ and high-specific-surface area Mo₂C and WC catalysts, comparison: catalyst activation and stabilization, **134**, 383
 Hydrocarbons
 aromatic
 chlorination with SO₂Cl₂, associated acidic degradation of NaX and ZF520 zeolites, **135**, 92

- inside pores of ZSM-5 zeolite, dynamic behavior simulation, **136**, 141
- C₂, formation by oxidative coupling of methane over CaO–CeO₂, effect on oxygen-ion conductivity, **135**, 317
- C₄, selective oxidation, synergy effects in catalysts for, analysis by *in situ* laser Raman spectroscopy and isotopic labeling, **134**, 24
- chlorinated, catalytic oxidation, modified transition metal-exchanged Y zeolite catalysts in, comparison, **138**, 179
- decomposition over Cu–Ni and Ni catalysts, resulting carbon deposits, structure: role of interfacial phenomena, **134**, 253
- formation from methane by low-temperature two-step reaction, analysis, **138**, 101
- liquid, formation from methane by direct partial oxidation over HZSM-5 zeolites, **136**, 578
- oxidation, VO_x/AlNbO catalysts for, physicochemical analysis, **137**, 257
- rare earth compounds soluble in, passivation of vanadium: hydrothermal aging of cracking catalysts, **134**, 469
- reforming reactions over Pt/Al₂O₃ and high-specific-surface area Mo₂C and WC catalysts, comparison: catalyst activation and stabilization, **134**, 383
- Hydrochloric acid
- vapor, effect on Pt accessibility in hydrogen reduction of Pt/Al₂O₃ catalysts, **137**, 377
- Hydrocracking, *see also* Cracking
- catalysts for, activity and deactivation during piperidine hydrogenolysis, effects of
 - initial piperidine concentration, temperature, catalyst presulfidation, coke deposition, and hydrogen partial pressure, **135**, 27
 - zeolite unit cell size, sulfur content, and coke deposition, **135**, 481
 - molecules with biphenyl moieties in presence of Ni–Mo/Al₂O₃ catalysts with ultra-stable Y zeolite, **137**, 504
- Hydrodenitrogenation
- unsupported Fe–Mo sulfide and Fe–W sulfide catalysts selective for, analysis, **138**, 351
- Hydrodesulfurization
- catalysts, prepared by homogeneous sulfide precipitation and impregnated thiosalt decomposition, TEM analysis, **137**, 232
 - Mo/Al₂O₃ catalytic properties in, effect of modification of Al₂O₃ with sulfate and phosphate, **133**, 124
 - by sulfided Ni–Mo/carbon catalysts, synergistic participation of support, **138**, 145
 - supported CoMo catalysts for, ⁵⁷Co Mössbauer emission spectrometric study, **133**, 112
- thiophene
- catalytic activity of unpromoted molybdenum sulfides prepared by elemental solid state reaction, **137**, 333
 - and simultaneous cyclohexene hydrogenation, on unsupported FeMoS catalysts, analysis, **138**, 640
- Hydroformylation
- ethylene over
 - reduced, oxidized, and sulfided Rh/SiO₂ catalysts, **135**, 618
 - Rh/activated carbon catalysts, pentan-3-one and propionaldehyde formation during, comparison, **136**, 531
 - Rh/SiO₂ catalysts, effect of Ag promotion, **138**, 536
- Hydrogen
- activation on MgO catalysts, analysis by H₂–D₂ exchange, **136**, 222
 - adsorption on unsupported Ru sulfide: thermodesorption and ¹H NMR studies, **138**, 409
 - and CO
 - coadsorption over Ru–RuO_x/TiO₂ catalysts, transient species formation during, FTIR spectroscopic study, **137**, 473
 - and CO₂, in methanol synthesis over Cu/ZnO catalysts, **136**, 59
 - in direct ethylene glycol synthesis over Rh/PH₃ catalysts, mechanistic analysis, **133**, 325
 - Ru/*N*-methylbenzimidazole catalysts, mechanistic analysis, **133**, 332
 - at high temperature and pressure, Rh/SiO₂ catalysts exposed to, FTIR and MAS NMR studies, **135**, 358
 - mixtures, methane formation over carbon-supported K₂CO₃, **134**, 525
 - NH₃ in selective acetonitrile synthesis over Mo/SiO₂ catalysts, **137**, 127
 - and CH₄, Ni/SiO₂ catalysts exposed to, formation of carbon, kinetics, **135**, 147
 - chemisorption on
 - Pt/BaK–LTL catalysts, in catalytic and structural study of sulfur poisoning, **138**, 675
 - Rh/CeO₂ catalysts, reversibility, **137**, 1
 - Ru/SiO₂ catalysts, effects of
 - adsorbed sulfur, NMR study, **134**, 572
 - chlorine, ¹H NMR study, **135**, 68
 - and deuterated water, isotopic exchange over plain and hydrophobized Ni–Cr₂O₃ catalysts, **134**, 399
 - effect on Ni-catalyzed vapor-phase methanol carbonylation, **133**, 370
 - isobutane–isobutene system, reversible reactions over Cr₂O₃ catalysts, transient isotopic tracing studies, **133**, 383
 - LaNi₃H_x, hydrided and dehydrided, behavior as hydrogenation catalysts, comparison, **137**, 102
 - molecular
 - activation into protonic acid sites over metal-free H-ZSM-5 catalyst, **138**, 750
 - and CO
 - in alcohol synthesis over K₂CO₃/MoS₂ cata-

- lysts: room-temperature oxidation of catalysts and effects on alcohol synthesis, **138**, 525
- coadsorption, temperature-programmed spectra for Pd/La₂O₃ catalysts, comparison, **138**, 294
- dynamic modification of surface acid properties on Pt- and SO₄²⁻-promoted ZrO₂ catalysts, **135**, 609
- encapsulation at 1 atm in ion-exchanged A zeolites, **135**, 135
- Pt/CeY and Pt/LaY zeolite heating at high temperatures in, changes in Pt dispersion during, analysis, **136**, 334
- reduction of Pt/Al₂O₃ catalysts, in analysis of effects of hydrogen and H₂O and HCl vapor on Pt accessibility, **137**, 377
- reversible adsorption on MoS₂, analysis by TPD and TPR, **137**, 385
- solubility in Pd/SiO₂ catalysts prepared for methanol synthesis, **138**, 500
- surface
- concentration variation in isothermal hydrogenation of adsorbed carbonaceous species on Fe/Al₂O₃ catalysts, **133**, 83
 - fugacities, and kinetic coupling, in heterogeneous catalysis: alkane reactions on Te/NaX, H-ZSM-5, and Ga/H-ZSM-5, **134**, 549
- Hydrogenation
- acetaldehyde over CuO/SiO₂ catalysts, properties, **135**, 81
 - benzene
 - single particle reactor for, cyclic operation, **136**, 242
 - over sulfur-resistant Ir/carbon catalysts, **135**, 458 - biphenyl over Mo-promoted and unsupported vanadium sulfide catalysts, characterization, **135**, 304
 - butadiene, highly active sites on sulfided Co catalysts for, generation by temperature-programmed sulfiding of precursor cobalt oxide, **133**, 498
 - carbon over Ni catalysts, role of MgO and CaO promoters, **134**, 107
- CO over
- Co-MnO catalysts, effect of potassium promoter, **134**, 186
 - Co-Ni/SiO₂ alloy catalysts, effect of alloying, **136**, 232
 - Gd-promoted Ni/SiO₂ catalysts, analysis, **137**, 267
 - Mn-Zr mixed oxide catalysts: catalyst structure and properties, **138**, 630
 - Ni catalysts, role of MgO and CaO promoters, **134**, 107
 - PdCo/NaY catalysts, analysis of metal phases and product selectivity, **138**, 721
 - PdNi_x alloys encaged in NaY zeolite, analysis, **136**, 182
 - Rh/SiO₂ catalysts, effect of Ag promotion, **138**, 536
 - Ru-Co/SiO₂ bimetallic carbonyl cluster-derived catalysts, mechanism of oxygenate formation, **138**, 206
 - Ru/metal oxide catalysts, electronic metal-support interactions, **136**, 161
 - Ru/SiO₂ catalysts, promotion by potassium, steady-state isotopic transient kinetic analysis, **137**, 22
 - supported Co and Ru catalysts in Fischer-Tropsch synthesis, structural sensitivity, **137**, 212
- cyclohexene
- over Pt graphimetric catalysts: characterization of catalyst, **134**, 608
 - and simultaneous thiophene hydrodesulfurization on unsupported FeMoS catalysts, analysis, **138**, 640
- enantioselective, methyl acetoacetate over (*R,R*)-tartaric acid-modified Ni/SiO₂ catalysts, **136**, 1
- esters over Pd/ZnO catalysts, analysis, **135**, 420
- ethylene
- in metal-free zeolites, analysis of active sites, **133**, 527
 - over Pt catalysts, D₂ tracing and microkinetic analyses, **137**, 186
- isothermal, carbonaceous species adsorbed on Fe/Al₂O₃ catalysts: kinetic model and surface hydrogen concentration variation, **133**, 83
- 1-undecene, LaNi₅H_x as catalyst for, analysis, **137**, 102
- Hydrogen cyanide
- formation from CCl₂F₂ (CFC12) over Fe group metal catalysts, **136**, 617
 - synthesis by partial oxidation of CH₄ and NH₃ mixtures over Pt catalysts, selectivity, role of boundary layer mass transfer, **136**, 300
- Hydrogen iodide
- promoting effect on Ni(isoquinoline)₄Cl₂-catalyzed carbonylation of ethanol and *n*-propanol, **136**, 605
- Hydrogenolysis
- butane over
 - Pt/TiO₂/SiO₂ catalysts, strong metal-support interactions, **134**, 751
 - Ru-Cu/SiO₂ catalysts, analysis, **138**, 617 - cyclohexane and *n*-hexane over Pt catalyst, effects of Re and sulfur, **134**, 179
 - ethane
 - in analysis of Pt-Ir bimetallic cluster formation in NaY zeolite, **137**, 357
 - on Pt/SiO₂ catalysts, analysis, **137**, 462
 - over Ru/Al₂O₃ catalysts, steady-state and transient kinetics, **134**, 134 - methyl acetate over CuO/SiO₂ catalysts prepared from mononuclear Cu complexes: catalytic properties, **135**, 81
 - piperidine on commercial hydrocracking catalysts,

- activity and deactivation of catalyst during, effects of
 - initial piperidine concentration, temperature, catalyst presulfidation, coke deposition, and hydrogen partial pressure, **135**, 27
 - zeolite unit cell size, sulfur content, and coke deposition, **135**, 481
 - propane over Co/ZnO catalysts, role of metal-support interaction, **135**, 263
 - Hydrogen peroxide
 - in epoxidation of maleic, fumaric, and crotonic acids over resin-supported vanadium(IV) catalysts, kinetics, **137**, 510
 - reactions with titanium silicalite, analysis, **133**, 220
 - Hydrophilic recognition
 - by polymer-supported phase transfer catalysts, effect on reaction activity and selectivity, **136**, 378
 - Hydroprocessing
 - heavy oil, Fe-Mo/Al₂O₃ catalysts for, preparation and characterization, **134**, 98
 - Hydrotalcites
 - base properties, determination: condensation of benzaldehyde with ethyl acetoacetate, **134**, 58
 - calcined, surface structure and basic properties, **138**, 547
 - related precursors of Ni-Al mixed oxides, thermal decomposition, in mixed oxide preparation and characterization, **133**, 231
 - Hydroxyl groups
 - role in dispersion of Ni impregnated on SiO₂ gels, **135**, 638
- I**
- Imines
 - R—C₆H₄—CH—N—C₆H₄—R', reduction over Pd/sepiolite catalyst, **133**, 21
 - Impregnation
 - adsorption, Pd(II) cation on Al₂O₃ and SiO₂ and composite oxides, **138**, 38
 - incipient wetness, and ion exchange, in PT/KL catalyst preparation, comparison, **133**, 342
 - MoO₃/Al₂O₃ catalysts prepared by, dispersion and activity, **136**, 50
 - MoO₃, in thiophene hydrodesulfurization, effect of phosphorus: MoO₃-Al₂O₃ interaction, **136**, 478
 - in preparation of Ru/SiO₂ catalysts, comparison with sol-gel method: synthesis, characterization, and catalytic properties, **133**, 247
 - related parameters, effects on axial Mo/γ-Al₂O₃ catalysts, **133**, 486
 - vapor phase, in catalyst preparation for *n*-hexane aromatization by Pt-containing molecular sieves, **134**, 349
 - Infrared spectroscopy
 - in acidity studies of USY-based fluid catalytic cracking catalysts, **136**, 392
 - allylamine and benzylamine adsorbed on various oxides, **134**, 409
 - CO insertion reaction on reduced, oxidized, and sulfided Rh/SiO₂ catalysts, **135**, 618
 - dynamic reflection, in analysis of kinetics of CO/NO surface reactions, **136**, 342
 - ethane oxidation over Pd/γ-Al₂O₃ and Pd/SiO₂ catalysts, *in situ* analysis, **136**, 613
 - Fourier transform, *see* Fourier transform infrared spectroscopy
 - at high pressure, in analysis of CO interaction with oxidized Rh/Al₂O₃, **134**, 378
 - NO reduction on V₂O₅, TiO₂, and V₂O₅/TiO₂ catalysts, **135**, 246
 - vanadium-oxo species adsorbed on TiO₂: state and localization, **134**, 299
 - Insertion reaction
 - CO on reduced, oxidized, and sulfided Rh/SiO₂ catalysts, IR spectroscopic study, **135**, 618
 - Interfacial energy
 - role in structure of carbon deposits formed by hydrocarbon decomposition over Ni and Cu-Ni catalysts, **134**, 253
 - Ion exchange
 - and incipient wetness impregnation, in Pt/KL catalyst preparation, comparison, **133**, 342
 - Ionic conductivity
 - oxygen, effect on C₂ selectivity in oxidative coupling of methane over CaO-CeO₂ catalysts, **135**, 317
 - Iridium
 - α-Al₂O₃-supported catalysts, metallic surface area determination by selective chemisorption, **136**, 598
 - Pt bimetallic clusters, formation in NaY zeolite, analysis with ¹²⁹Xe NMR and ethane hydrogenolysis, **137**, 357
 - sulfur-resistant carbon-supported catalysts, cyclohexane dehydrogenation and benzene hydrogenation, **135**, 458
 - Iron
 - Al₂O₃-supported catalysts, adsorbed carbonaceous species, isothermal hydrogenation: kinetic model and surface hydrogen concentration variation, **133**, 83
 - Fe(II), isomorphous substitution into aluminophosphate molecular sieve AlPO₄-5, **133**, 159
 - Fe-Mo sulfide and Fe-W sulfide unsupported catalysts, hydrodenitrogenation-selective, development, **138**, 351
 - Mo, Al₂O₃-supported catalysts for heavy oil processing, preparation and characterization, **134**, 98
 - MoS, unsupported catalysts, characterization: stability during reaction and effect of sulfiding temperature, **138**, 640
 - oxide-supported catalysts in Fischer-Tropsch synthesis, carbonaceous deposits, support effects, **136**, 96

- Pt catalyst particles, surface segregation in, *in situ* electron microscopic analysis, **136**, 584
 - powder catalysts, HCN formation from CFC-12-NH₃ reaction, **136**, 617
 - promoted P₂Mo_{1-x}S₂ catalysts, oxygen chemisorption studies, **135**, 427
 - silicate analogs of ZSM-11 zeolites, methylation of xylenes: selective formation of 1,2,4 isomer among trimethylbenzenes, **138**, 518
 - unsupported catalysts in Fischer-Tropsch synthesis, dynamic X-ray diffraction study, **134**, 654
 - Iron oxide
 - based catalyst for dehydrogenation of ethylbenzene to styrene, active phase surface chemistry, **138**, 413
 - ferric, *see* ferric oxide
 - Isobutane
 - cracking on HY zeolites, mechanism, **136**, 446
 - isobutene-hydrogen system, reversible reactions over Cr₂O₃ catalysts, transient isotopic tracing studies, **133**, 383
 - Isobutene
 - isobutane-hydrogen system, reversible reactions over Cr₂O₃ catalysts, transient isotopic tracing studies, **133**, 383
 - Isobutylene
 - oligomerization over Al₂O₃- and SiO₂-supported and unsupported perfluorinated resinsulfonic acid catalysts, **137**, 12
 - Isomerization
 - 1-butene, highly active sites on sulfided Co catalysts for, generation by temperature-programmed sulfiding of precursor cobalt oxide, **133**, 498
 - cyclopropane
 - over EuNaX zeolites, effect of Eu³⁺ content, **138**, 1
 - to propylene in NaX and Eu/NaX zeolites, transient diffusion, desorption, and reactions studies, **135**, 223
 - p*-ethyltoluene on MgO-modified H-ZSM-5 and ZSM-5 zeolites, analysis, **135**, 321
 - n*-hexane over Pt/Al₂O₃ and high-specific-surface area Mo₂C and WC catalysts, comparison: catalyst activation and stabilization, **134**, 383
 - Isooctane
 - transformation over Al₂O₃- and SiO₂-supported and unsupported perfluorinated resinsulfonic acid catalysts, **137**, 12
 - Isopropyl alcohol
 - adsorption on AlPO₄-5 molecular sieves, in analysis of Mn and Mg framework substitution, **138**, 377
 - decomposition over
 - calcined hydrotalcites, surface structure and basic properties, **138**, 547
 - Cu/ZnO/Al₂O₃ catalysts, analysis, **136**, 86
 - VO_x/AlNbO catalysts, analysis, **137**, 257
 - dehydration
 - surface sites for, effect of Al₂O₃ structure, **138**, 659
 - on TiO₂-SiO₂ catalysts modified with H₂SO₄, analysis, **136**, 267
 - Isopropylamine
 - adsorption on
 - AlPO₄-5 molecular sieves, in analysis of Mn and Mg framework substitution, **138**, 377
 - SiO₂-Al₂O₃ catalysts for acid site characterization, **138**, 714
 - Isopropylation
 - selective, naphthalene over H mordenites and Y zeolites, **136**, 487
 - Isotope exchange
 - alkanes and deuterium on Rh/SiO₂ gel catalysts, **133**, 294
 - coke hydrogens for deuterium of organic compounds: coke deposited on H-ZSM-5 zeolite in acetone conversion, **136**, 258
 - 2,2-dimethylbutane and deuterium on Rh/SiO₂ gel catalysts, **133**, 279
 - hydrogen and water over plain and hydrophobized Ni-Cr₂O₃ catalysts, **134**, 399
 - Isotopic labeling
 - and *in situ* laser Raman spectroscopy, in analysis of synergistic effects in selective oxidation catalysts, **134**, 24
 - Isotopic tracing
 - D₂, and microkinetics, in analysis of ethylene hydrogenation over Pt catalysts, **137**, 186
 - transient, in analysis of reversible reactions of isobutane-isobutene-hydrogen system over Cr₂O₃ catalysts, **133**, 383
- K**
- Kinetic coupling
 - and hydrogen surface fugacities, in heterogeneous catalysis: alkane reactions on Te/NaX, H-ZSM-5, and Ga/H-ZSM-5, **134**, 549
 - Kinetics
 - n*-butane over HZSM-5 zeolites: monomolecular and bimolecular mechanisms of paraffin cracking, **135**, 115
 - carbon formation from CH₄ + H₂ on Ni/SiO₂ catalyst, **135**, 147
 - chain growth process in higher alcohol synthesis over Cs-promoted Zn-Cr-O catalyst, mechanistic treatment, **135**, 99
 - CO insertion into CH_x surface intermediates on V-promoted Rh/SiO₂ catalysts, transient response study, **134**, 13
 - CO oxidation by N₂O over Rh(III) catalyst, **138**, 70
 - CO surface reactions with NO on Pt foil, analysis by IR spectroscopy of absorbed species, **136**, 342
 - generalized catalytic selective oxidation reaction, **134**, 691
 - isothermal hydrogenation of carbonaceous adsorbed species on Fe catalyst, model, **133**, 83
 - micro-, *see* Microkinetic analysis
 - NH₃ decomposition on vanadium nitride, **133**, 358

- NO reduction by CO on Rh/Al₂O₃ catalyst, role of intermediate N₂O + CO reaction, **138**, 255
- oxidative coupling of methane over NaOH/CaO catalysts, **135**, 467
- phenol liquid-phase oxidation over CuO–ZnO/Al₂O₃ catalysts, **135**, 345
- photocatalytic oxidation, role of reactor dynamics, **131**, 285; letter to editor, **136**, 626; reply, **136**, 629
- reverse water–gas shift reaction over Cu(100), **134**, 66
- steady-state
- CO oxidation over Pd(100) single crystal surface and c(2×2)-Sn/Pd(100) bimetallic surface alloy, **133**, 179
- steady-state isotopic transient
- in nonparametric determination of reactivity distributions, **134**, 678
 - potassium promotion of CO hydrogenation over Ru/SiO₂ catalysts, **137**, 22
- steady-state and transient
- direct synthesis of methylchlorosilanes over Cu catalysts promoted with Zn and Sn, **134**, 168
 - displacement adsorption and educt inhibition in alcohol dehydration on Al₂O₃, **133**, 170
 - ethane hydrogenolysis over Ru/Al₂O₃ catalysts, **134**, 134
- water–gas shift reaction, model, **134**, 445
- L**
- Lanthanide
- Ni, SiO₂-supported bimetallic catalysts, adsorbed CO, FTIR spectroscopic analysis, **136**, 271
- Lanthanide oxide
- promoted Ru/Al₂O₃ catalysts, Cl-free, preparation and characterization: promoter effect in NH₃ synthesis, **136**, 118
- Lanthanum
- La³⁺, effects of incorporation into Rh/γ-Al₂O₃ catalysts, **134**, 702
 - LaNi₃H_x, hydrided and dehydrided, behavior as hydrogenation catalysts, comparison, **137**, 102
 - modified Al₂O₃, support of Mo catalysts, characterization, **136**, 361
- Lanthanum octoate
- soluble in feedstock, passivation of vanadium: hydrothermal aging of cracking catalysts, **134**, 469
- Lanthanum trioxide
- catalysis of methane, ethane, and ethylene conversion in absence and presence of free oxygen, pulse microreactor studies, **135**, 310
 - interactions with reducible oxides in presence of Pd in thin film, XPS analysis, **137**, 114
 - support of Pd catalysts, temperature-programmed methanation, comparison with Pd/SiO₂ catalyst, **138**, 294
- Latex
- polystyrene, *see* Polystyrene latex
- Lead sulfide
- structure and location in Y zeolites, pulsed-neutron powder diffraction study, **138**, 405
- Lithium
- catalysis of graphite gasification by CO₂ and H₂O, mechanism, electron microscopic study, **138**, 12
 - doped MgO catalysts, oxidative coupling of methane, relationship between morphology and performance, **135**, 576
- Lithium carbonate
- MgO, support of BiOCl, SmCl₃, and MnCl₂ catalysts, oxidative coupling of methane, **138**, 322
- Lithium chloride
- added Co₃O₄ catalysts, oxidative cross-coupling of methane and toluene, kinetics, **137**, 487
- Lithium iodide
- promoting effect on Ni(isoquinoline)₄Cl₂-catalyzed carbonylation of ethanol and *n*-propanol, **136**, 605
- Lithium molybdate
- SiO₂-supported catalysts, partial oxidation of ethane, **135**, 563
- M**
- Magnesia, *see* Magnesium oxide
- Magnesium
- promoted Co/SiO₂ precipitated catalysts, metal–support interactions, **134**, 615
 - substitution into AlPO₄-5 structure, **138**, 377
- Magnesium orthovanadate
- catalysis of oxidative dehydrogenation of propane and butane, effect of potassium used in catalyst preparation, **134**, 668
- Magnesium oxide
- adsorption of allylamine and benzylamine, thermal desorption and IR studies, **134**, 409
 - Au- and Li-doped catalysts, oxidative coupling of methane, relationship between morphology and performance, **135**, 576
 - CaO mixed oxide catalysts, methane oxidative coupling, analysis of active site, **134**, 422
 - in hydrogen activation, analysis by H₂–D₂ exchange, **136**, 222
 - Li₂CO₃, support of BiOCl, SmCl₃, and MnCl₂ catalysts, oxidative coupling of methane, **138**, 322
 - modified H-ZSM-5 and ZSM-5 zeolites, ethylation of toluene and transformation of *p*-ethyltoluene, **135**, 321
 - NaOH-doped catalysts, methal formate decomposition to CO and methanol, **134**, 644
 - promoter of Ni catalysts, role in hydrogenation reactions of CO and carbon, **134**, 107
 - support of
 - FeO₂ catalysts promoted by potassium
 - 1-butene dehydrogenation to 1,3-butadiene, **135**, 548
 - catalyst preparation and characterization, **135**, 533

- MoO catalysts, surface structures under ambient conditions, **136**, 539
- MgO₃ catalysts
physicochemical properties, effect of preparation method, **135**, 1
XAFS study of support effects, **138**, 746
- Nb₂O₅ catalysts, acidic properties, IR spectroscopic analysis, **135**, 186
- Ru catalysts: preparation and characterization of Cl-free Ru catalysts and promoter effect in NH₃ synthesis, **136**, 126
- Magnesium pyrovanadate
catalysis of oxidative dehydrogenation of propane and butane, effect of potassium used in catalyst preparation, **134**, 668
- Magnesium trisilicate
sepiolite
interaction with V₂O₅, ⁵¹V solid-state NMR and Raman spectroscopic structural analysis, **137**, 36
support of Pd in reduction of imines, linear free energy relationships, **133**, 21
- Maleic acid
epoxidation with H₂O₂ over resin-supported vanadium(IV) catalysts, kinetics, **137**, 510
- Maleic anhydride
formation by *n*-butane oxidation, vanadium phosphate catalysts for, *in situ* laser Raman spectroscopic study, **134**, 151
- Manganese
-Na-Ni coprecipitated catalysts active for higher oxygenate synthesis from syngas, TPR and XPS study, **138**, 733
substitution into AlPO₄-5 structure, characterization, **138**, 377
-Zr mixed oxide catalysts, structure and properties in CO hydrogenation, **138**, 630
- Manganese chloride
Li₂CO₃-MgO-supported catalysts, oxidative coupling of methane, **138**, 322
- Manganese oxide
-Co catalysts, CO hydrogenation, effect of potassium promotor, **134**, 186
methane coupling catalysts, singly and doubly promoted, *in situ* XRD analysis, **134**, 242
- Mass transfer
boundary layer, role in partial oxidation selectivity, **136**, 300
- Meldrum's acid
alkylation with ethyl bromoacetate, effect of hydrophilic recognition by polymer-supported phase transfer catalysts, **136**, 378
- Metal catalysts
structure sensitivity, geometric aspects, **120**, 293; letter to editor, **136**, 631; reply, **136**, 633
- Metal iodides
promoting effects in Ni(isoquinoline)₄Cl₂-catalyzed carbonylation of ethanol and *n*-propanol, **136**, 605
- Metal oxides
-AlPO₄ catalytic systems, alkylation of toluene with methanol, **137**, 51
catalysts for 2-methylcyclohexanol conversion, product selectivities, **133**, 445
modified catalysts, propane reactions, **136**, 423
support of Ru catalysts, CO hydrogenation, electronic metal-support interactions, **136**, 161
- Metals
dispersed, catalytic properties, effects of second-phase oxides in
Co supported on 12% WO₃/Al₂O₃, **135**, 200
Pd supported on 12% WO₃/Al₂O₃, **138**, 55
dispersion, control in Pd/SiO₂ catalysts prepared for methanol synthesis, **138**, 500
Fe group, powder catalysts, HCN formation from CCl₂F₂, **136**, 617
- Metal-support interactions
in precipitated, Mg-promoted Co/SiO₂ catalysts, **134**, 615
role in reduction and state of Co in Co/ZnO catalysts, **135**, 263
strong, *see* Strong metal-support interactions
- Metathesis
MoO₃/Al₂O₃ catalysts for activation, **135**, 287
XPS analysis, **135**, 269
- Methanation
CO on
Ni(100) and Ni(111) surfaces, associated structure-insensitive catalytic activity, rationalization, **133**, 461
Pd/La₂O₃ and Pd/SiO₂ catalysts, temperature programmed spectra, comparison, **138**, 294
V-promoted Rh/SiO₂ catalysts, reactivity, analysis with transient techniques, **134**, 1
CO₂ in presence of O₂, in detection method for temperature programmed oxidation of coke deposits, **138**, 240
temperature-programmed, on Pd/La₂O₃ and Pd/SiO₂ catalysts, **138**, 294
- Methane
conversion
to hydrocarbons by low-temperature two-step reaction, **138**, 101
over rare earth oxides in absence and presence of free oxygen, pulse microreactor studies, **135**, 310
formation in H₂, CO mixtures over carbon-supported K₂CO₃ catalysts, **134**, 525
and H₂, formation of carbon on Ni/SiO₂ catalysts, kinetics, **135**, 147
oxidation
to CO and H₂ over Pt-Rh gauzes, selectivity, role of boundary layer mass transfer, **136**, 300
direct, over Pt monoliths, in synthesis gas formation, **138**, 267
direct partial, to liquid hydrocarbons over HZSM-5 zeolites, **136**, 578

- oxidative coupling over
 Au- and Li-doped MgO catalysts, relationship between morphology and performance, **135**, 576
 Ba-doped Y₂O₃ catalysts, oxygen XANES characterization, **136**, 16
 BiOCl, SmCl₃, and MnCl₂ catalysts supported on Li₂CO₃-MgO systems, **138**, 322
 CaO-CeO₂ catalysts: effect of oxygen-ion conductivity on C₂ selectivity, **135**, 317
 MgO/CaO mixed oxide catalysts, analysis of active site, **134**, 422
 NaOH/CaO catalysts, kinetics, **135**, 467
 singly and doubly promoted Mn₃O₄ catalysts, *in situ* XRD analysis, **134**, 242
and toluene, oxidative cross-coupling over LiCl-added Co₃O₄ catalysts, kinetic analysis, **137**, 487
- Methanol
 in alkylation of toluene over AlPO₄, AlPO₄/Al₂O₃, AlPO₄/TiO₂, and AlPO₄/ZrO₂ catalysts, **137**, 51
 catalytic reactions, second-generation CAVERN apparatus for *in situ* solid-state NMR studies, **136**, 504
 and CO, formation by methyl formate decomposition over NaOH-doped MgO catalysts, **134**, 644
 decomposition over CuO/SiO₂ catalysts, properties, **135**, 81
 dehydration on H-ZSM-5, SAPO-34, and MeAPSO-34 (Me = Co,Cr,Mn) molecular sieves, catalyst acidity and activity, **135**, 518
 nucleophilic substitution reaction with chlorobenzene on ZSM-5 zeolites, analysis, **134**, 373
 oxidation
 effect of CrO₃/SiO₂ catalyst surface structure and reactivity, **136**, 209
 on molybdena monolayer supported on SnO₂, active site identification, **134**, 331
 reaction with titanium silicalite, analysis, **133**, 220
 synthesis
 over Au/CeO₂ catalysts derived from CeAu₂ alloy precursor, activity, role of Schottky barriers, **134**, 747
 over CeCu₂-derived catalysts, transient studies with isotopically labeled reactants, **138**, 694
 over Co-modified Cu-Zn-Cr catalysts, analysis, **135**, 386
 direct, from syngas over zeolite catalysts, **134**, 226
 from H₂, CO, and CO₂ over Cu/ZnO catalysts, analysis, **136**, 59
 Pd/SiO₂ catalyst for, preparation: exposed metal fraction and hydrogen solubility, **138**, 500
 Raney Ru catalyst for, surface state related to methanol selectivity, analysis, **136**, 252
 vapor-phase carbonylation on Ni catalysts, hydrogen effects, **133**, 370
- Methoxyl radical
 adsorbed, effect on CO desorption from Ni/Al₂O₃ catalysts, **133**, 515
- Methyl acetate
 hydrogenation over Pd/ZnO catalysts, analysis, **135**, 420
 hydrogenolysis over CuO/SiO₂ catalysts prepared from mononuclear Cu complexes: catalytic properties, **135**, 81
- Methyl acetoacetate
 enantioselective hydrogenation over (*R,R*)-tartaric acid-modified Ni/SiO₂ catalysts, **136**, 1
- Methyl acrylate
 and cyclopentadiene, Diels-Alder reaction between, K10 montmorillonite-catalyzed, influencing factors, **137**, 394
- Methylamines
 synthesis, *in situ* ¹³C MAS NMR spectroscopic study, **136**, 202
- Methylation
 xylenes over Al-, Fe-, and Ga-silicates with MEL structure: selective formation of 1,2,4 isomer among trimethylbenzenes, **138**, 518
- N*-Methylbenzimidazole
 support of Ru catalysts, direct ethylene glycol synthesis from CO and hydrogen, mechanistic analysis, **133**, 332
- Methyl-*i*-butyrate
 hydrogenation over Pd/ZnO catalysts, **135**, 420
- Methyl-*n*-butyrate
 hydrogenation over Pd/ZnO catalysts, **135**, 420
- Methyl chloride
 direct reaction with Si in synthesis of methylchlorosilanes on Cu catalysts promoted with Zn and Sn, steady-state and transient kinetics, **134**, 168
- Methylchlorosilanes
 direct synthesis over Cu catalysts promoted with Zn and Sn, steady-state and transient kinetics, **134**, 168
- Methylcyclohexane
 dehydrogenation over
 Pt/ α -Al₂O₃ catalysts, effect of Pt particle size, **138**, 482
 Te/NaX catalysts: kinetic coupling and hydrogen surface fugacities in heterogeneous catalysts, **134**, 549
- 2-Methylcyclohexanol
 conversion over metal oxide catalysts, product selectivities, **133**, 445
- Methylene chloride
 catalytic oxidation, modified transition metal-exchanged Y zeolite catalysts in, comparison, **138**, 179
- Methyl formate
 decomposition to CO and methanol over NaOH-doped MgO catalysts, analysis, **134**, 644
 formation on Cu/ZnO catalysts, mechanism, **136**, 609
- 2-Methylpropene, *see* Isobutylene
- Methyl propionate
 hydrogenation over Pd/ZnO catalysts, **135**, 420

- Microcalorimetry
 heat flow, in acidity studies of USY-based fluid catalytic cracking catalysts, **136**, 392
- Microkinetic analysis
 and D₂ tracing studies, in analysis of ethylene hydrogenation over Pt catalysts, **137**, 186
- Microreactors
 flow, experiments with C₃, C₄, and C₅, in analysis of K₂O-promoted ZnCrO catalysts in higher alcohol synthesis, **135**, 400
 pulse, in analysis of methane, ethane, and ethylene conversion over rare earth oxides in absence and presence of free oxygen, **135**, 310
- Microscopy, *see specific techniques*
- Microscopic reversibility
 law of, and Pt-catalyzed ethane/deuterium exchange reaction, theoretical model, letter to editor, **138**, 759; reply, **138**, 761
- Microstructure
 equilibrium, Pt clusters, embedded atom calculations, **136**, 320
 Pt–Ce and Rh–Ce particles on γ -Al₂O₃ and SiO₂, **138**, 283
 Rh–Ce particles on SiO₂, characterization, **134**, 204
 supported copper–alumina oxide system: aging in oxidizing reaction media, **134**, 506
- Molecular dynamics
 simulations, in analysis of surface barrier concept in diffusion in zeolites, **134**, 536
- Molecular orbitals
 related calculation of soft–hard acidity of zeolites, implications for catalytic activity, **136**, 521
- Molecular sieves
 AlPO₄-5
 framework substitution with Mg and Mn, characterization, **138**, 377
 isomorphous substitution of Fe ions into, **133**, 159
 Pt-containing, *n*-hexane aromatization
 catalyst preparation by vapor phase impregnation method, **134**, 349
 n-hexane reactivity, **134**, 359
 platinum aluminophosphate reactivity, **134**, 370
 SAPO-34 and MeAPSO-34 (Me = Co, Cr, Mn), acidity and catalytic activity in methanol dehydration, comparison with H-ZSM-5, **135**, 518
 SAPO-37, acidic properties, dependence on Si content and heat treatment, **138**, 90
- Molybdates
 TiO₂-supported, deposited by adsorption, adsorption mechanism and characterization of calcined samples, **136**, 432
- Molybdenum
 Al₂O₃-supported catalysts
 modified with sulfate and phosphate, effect on hydrodesulfurization, **133**, 124
 sulfided, unpromoted or promoted by metal carbonyls, CO adsorption, FTIR study: site titration, **137**, 69
 γ -Al₂O₃-supported catalysts
 axial profiles, effects of impregnation parameters, **133**, 486
 extrudates with different Mo profiles: preparation, characterization, and catalytic properties, **137**, 285
 –Co hydrodesulfurization catalysts, SiO₂- and Al₂O₃-supported, ⁵⁷Co Mössbauer spectroscopic study, **133**, 112
 –Fe catalysts for heavy oil processing, Al₂O₃-supported, preparation and characterization, **134**, 98
 Fe–Mo sulfide
 and Fe–W sulfide unsupported hydrodenitrogenation-selective catalysts, development, **138**, 351
 unsupported catalysts, characterization: stability during reaction and effect of sulfiding temperature, **138**, 640
 incorporated SiO₂, TiO₂, and ZrO₂ catalysts, propane reactions on, **136**, 423
 La–Al₂O₃-supported catalysts, characterization, **136**, 361
 in 12-molybdosilicic acid, interaction with SiO₂ support, analysis, **138**, 445
 Mo_{1–x}S₂, Ni-promoted catalysts, oxygen chemisorption, **135**, 427
 –Ni carbon-supported sulfided hydrodesulfurization catalysts, synergistic participation of support in, **138**, 145
 –Ni catalysts
 Al₂O₃-supported with ultra-stable Y zeolite, in cleavage of biphenyl moieties: hydrocracking pathway, **137**, 504
 carbon- and Al₂O₃-supported, Ni–Mo–S structure, Ni EXAFS studies, **133**, 94
 PtMo₆ bimetallic catalysts, Al₂O₃- and SiO₂-supported, characterization, **135**, 367
 P_{2x}Mo_{1–x}S₂, Co- and Fe-promoted catalysts, oxygen chemisorption, **135**, 427
 promoted vanadium sulfide catalysts, preparation, characterization, and catalytic properties, **135**, 304
 –Ru catalysts, SiO₂-supported, syngas reaction to oxygenates, characterization, **137**, 77
 SiO₂-supported catalysts
 acetonitrile synthesis from CO–H₂–NH₃, analysis, **137**, 127
 preparation by grafting method, physicochemical phenomena during, EPR and diffuse reflectance studies, **135**, 156
- Molybdenum carbide
 high-specific-surface-area catalysts, hydrocarbon-reforming reactions, comparison with Pt/Al₂O₃: catalyst activation and stabilization in reaction of *n*-hexane, **134**, 383
- Molybdenum disulfide
 oxide-supported catalysts, morphology, **137**, 513
 support of K₂CO₃ catalysts, room-temperature oxidation and effects on alcohol synthesis from CO and H₂, **138**, 525

- Molybdenum molybdate
and MoO_3 , synergistic effects in selective oxidation of C_4 hydrocarbons, analysis by *in situ* laser Raman spectroscopy and isotopic labeling, **134**, 24
- Molybdenum oxide
 $\gamma\text{-Al}_2\text{O}_3$ -, SiO_2 -, MgO -, and TiO_2 -supported catalysts, structure, support effects, XAFS study, **138**, 746
monolayer, SnO_2 -supported catalyst, methanol oxidation, identification of active sites, **134**, 331
- Molybdenum sulfides
and CoS , hydrodesulfurization catalysts prepared by homogeneous sulfide precipitation and impregnated thiosalt decomposition, TEM analysis, **137**, 232
reversible hydrogen adsorption, analysis by TPD and TPR, **137**, 385
unpromoted, prepared by elemental solid state reaction, characterization and hydrodesulfurization activity, **137**, 333
- Molybdenum trioxide
- Al_2O_3 interaction: effect of phosphorus on MoO_3 impregnation and reactivity in thiophene hydrodesulfurization, **136**, 478
 Al_2O_3 -supported catalysts
activation, **135**, 287
prepared by impregnation and solid/solid wetting methods, dispersion and activity, **136**, 50
XPS analysis, **135**, 269
crystals, oxygen insertion, mechanistic study by SIMS and TPSR, **137**, 429
 MgO supported-catalysts, physicochemical properties, effect of preparation method, **135**, 1
and MnMoO_4 , synergistic effects in selective oxidation of C_4 hydrocarbons, analysis by *in situ* laser Raman spectroscopy and isotopic labeling, **134**, 24
[100]-oriented unsupported catalysts, propylene oxidation, structure sensitivity in, analysis, **134**, 542
 SiO_2 -supported catalysts, controlled dispersion, role of NH_3 , **133**, 55
- 12-Molybdosilicic acid
 SiO_2 -supported catalysts, dispersion effect and nature of Mo species in interaction with support, vibrational study, **138**, 445
- Monolayers
molybdena, SnO_2 -supported, identification of active sites for methanol oxidation, **134**, 331
- Monoliths
 Pt - and Pt-Rh -coated, direct oxidation of methane over, in synthesis gas formation, **138**, 267
- Mononuclear complexes
 CuO/SiO_2 catalysts prepared from, properties, **135**, 81
- Monte Carlo simulations
catalytic reactions with widely varying time scales, **136**, 309
diffusion in zeolites, comparison with generalized Maxwell-Stefan theory, **136**, 463
faujasite dealuminization process, **135**, 635
 NO-CO reaction on square and hexagonal surfaces, **131**, 369; letter to editor, **136**, 275, reply, 279
oscillations during CO oxidation, **133**, 153
- Montmorillonite
K10, catalyzed Diels-Alder reaction of methyl acrylate and cyclopentadiene, influencing factors, **137**, 394
- Mordenites
dealuminated, acidity, effect of nonframework Al , **138**, 115
 H , naphthalene isopropylation, analysis, **136**, 487
large-pore dealuminated, characterization, **138**, 150
related catalysts, loaded with NH_3 and methanol, methylamine synthesis, *in situ* ^{13}C MAS NMR spectroscopic study, **136**, 202
- Morphology
 Li - and Au -doped MgO catalysts, and performance in oxidative coupling of methane, relationship, **135**, 576
oxide-supported MoS_2 catalysts, **137**, 513
 Pt/graphite catalysts, scanning tunneling microscopy study, **135**, 13
- Mössbauer spectroscopy
 ^{57}Co , emission studies, in analysis of supported CoMo hydrodesulfurization catalysts, **133**, 112
 $\text{FeMo/Al}_2\text{O}_3$ catalysts for heavy oil processing, **134**, 98
- N**
- Naphthalene
isopropylation over H mordenites and Y zeolites, **136**, 487
- NEMCA effect
in single-catalytic reactor: ethylene oxidation on Pt with stabilized ZrO_2 , **137**, 278
in solid electrolyte reactor
catalytic, ethylene epoxidation on Ag deposited on stabilized ZrO_2 , **138**, 588
oxygen chemisorption on Ag , **138**, 570
- Neutron diffraction
powder, *see* Powder neutron diffraction
- Nickel
activated carbon-supported catalysts, vapor-phase methanol carbonylation over, hydrogen effects, **133**, 370
- Al mixed oxides, obtained by thermal decomposition of hydrotalcite-type precursors, preparation and characterization, **133**, 231
 Al_2O_3 - and carbon-supported catalysts, Ni-Mo-S structure Ni EXAFS studies, **133**, 94
 Al_2O_3 -supported catalysts, CO desorption, effect of adsorbed CH_3O , **133**, 515
 Al_2O_3 -supported particles, and $\text{NiO/Al}_2\text{O}_3$ particles, sulfiding rate and mechanism, comparison, **137**, 92

- catalysis of carbon deposition, activation–deactivation model, **138**, 129
- catalyzed hydrogenation reactions of CO and carbon, role of MgO and CaO promoters, **134**, 107
- cations, reduction in Y zeolites, effect of environment, **136**, 170
- Co alloys, SiO₂-supported catalysts, CO hydrogenation on, **136**, 232
- Cr₂O₃ catalysts, plain and hydrophobized, isotopic exchange between hydrogen and water, **134**, 399
- Cu catalysts, graphite-supported, resulting carbon deposits, structure: role of interfacial phenomena, **134**, 253
- exchanged NaX zeolites, transient sorption and desorption studies of cyclopropane and propylene, **135**, 236
- film surface, CO formation, limitation by oxygen diffusion, **134**, 311
- impregnated on SiO₂ gels, dispersion, role of surface hydroxyls, **135**, 638
- incorporated SiO₂, TiO₂, and ZrO₂ catalysts, propane reactions on, **136**, 423
- LaNi₅H_x, hydrided and dehydrided, behavior as hydrogenation catalyst, comparison, **137**, 102
- La SiO₂-supported catalysts, adsorbed CO, FTIR spectroscopic analysis, **136**, 271
- loaded Y zeolites, benzene ethylation and cumene dealkylation over, **138**, 164
- Mo
Al₂O₃-supported catalysts, with ultra-stable Y zeolite, in cleavage of biphenyl moieties: hydrocracking pathway, **137**, 504
carbon-supported sulfided hydrodesulfurization catalysts, synergistic participation of support in, **138**, 145
- Na–Mn coprecipitated catalysts active for higher oxygenate synthesis from syngas, TPR and XPS study, **138**, 733
- Ni(isoquinoline)₄Cl₂, catalyzed carbonylation of ethanol and *n*-propanol, promoting effects of metal iodides, **136**, 605
- Ni(100) and Ni(111) surfaces, structure-insensitive catalytic activity for methanation reaction of CO, rationalization, **133**, 461
- PdNi_x alloys encaged in NaY zeolites, CO hydrogenation over, **136**, 182
- powder catalyst, CFC-12–NH₃ reaction over, in formation of HCN, **136**, 617
- promoted, Mo_{1–x}S₂ catalysts, oxygen chemisorption, **135**, 427
- Pt catalyst particles, surface segregation in, *in situ* electron microscopic analysis, **136**, 584
- Sb interaction over rare earth-exchanged Y-zeolite, analysis, **135**, 596
- SiO₂-supported catalysts
carbon formation from CH₄ + H₂, kinetics, **135**, 147
CO hydrogenation on, Gd promoting effects, **137**, 267
(*R,R*)-tartaric acid-modified, enantioselective hydrogenation of methyl acetoacetate, **136**, 1
SiO₂- and TiO₂-calcined catalysts prepared by ion exchange, Ni state, **136**, 415
- Nickel monoxide
and Ni⁰, Al₂O₃-supported particles, sulfiding rate and mechanism, comparison, **137**, 92
SiO₂-supported catalysts, thermal stability, effect of preparation method, EXAFS and TPR analysis, **138**, 195
- Niobia, *see* Niobium pentoxide
- Niobium
doped TiO₂ ceramic membranes catalyzing photodegradation of 3-chlorosalicylic acid, properties, **134**, 36
- Niobium oxide
supported catalysts, acidic properties, IR spectroscopic analysis, **135**, 186
- Niobium pentoxide
aerogels, structural and acidic characterization, **135**, 125
interaction with La₂O₃ in thin films, XPS analysis, **137**, 114
- Nitrate
reduction to nitrite and NH₃ over photocatalysts, **135**, 300
- Nitric oxide
and CO, reactions
role of intermediate N₂O + CO reaction, kinetic analysis, **138**, 255
on square and hexagonal surfaces, Monte Carlo simulation, **131**, 369; letter to editor, **136**, 275, reply, 279
on surfaces of Pt foils, kinetics, analysis by IR spectroscopy of absorbed species, **136**, 342
interaction with Cu/ZSM-5 zeolites at room temperature, EPR and FT–IR spectroscopic studies, **136**, 510
photocatalytic reaction with NH₃ on TiO₂ surfaces, **134**, 317
reduction by NH₃ over
polycrystalline Pt foil catalysts in presence of O₂, **135**, 434
TiO₂, V₂O₅, and V₂O₅/TiO₂ catalysts, temperature-programmed desorption/reaction and *in situ* spectroscopic studies, **135**, 246
V₂O₅/TiO₂ catalysts, activity and selectivity of catalyst, structural effects, **134**, 492
V₂O₅, V₂O₅–TiO₂, V₂O₅–TiO₂–SiO₂ catalysts, comparison, **134**, 75
- selective catalytic reduction
crystalline and amorphous Cr₂O₃ catalysts for, surface structure
characterization by TPRD, **133**, 397
NH₃ desorption from Brønsted and Lewis acid sites, diffuse reflectance FTIR study, **133**, 431

- NO adsorption and reaction, diffuse reflectance FTIR study, **138**, 306
 thermal treatment and oxygen adsorption, diffuse reflectance FTIR study, **133**, 415
 with NH_3 over $\text{V}_2\text{O}_5/\text{TiO}_2\text{-SiO}_2$ mixed oxide gel catalysts, **133**, 1
- Nitrite
 and NH_3 , formation by nitrate reduction over photocatalysts, **135**, 300
- Nitrogen dioxide
 oxidation of CO over Rh(111) catalyst, kinetics, **138**, 70
- Nitrogen oxides
 NO_x reduction on $\text{V}_2\text{O}_5/\text{TiO}_2$ catalysts, reactivity, effect of water, **134**, 742
- Nitrous oxide
 decomposition, oxygen species formed on CaO surface sites during, reactivity, **138**, 686
 N_2O + CO reaction, mechanistic importance as intermediate reaction in NO + CO reaction system, kinetic analysis, **138**, 255
 in partial oxidation of ethane over $\text{M}_2\text{MoO}_4/\text{SiO}_2$ catalysts ($M = \text{Cs, K, Li, Na, Rb}$), **135**, 563
- n*-Nonane
 cracking, coke formation, and catalyst deactivation in, relationship, **138**, 343
- Nuclear magnetic resonance
 ^{13}C
 CO adsorption on Rh/SiO₂ catalysts, effects of potassium promotion, **137**, 199
 ethylene adsorbed on reduced and oxygen-covered Ag/get-Al₂O₃ surfaces, **138**, 223
 in evaluation of strong acid catalyst acidity acidity function derivation, **134**, 118
 $\text{BF}_3\text{-H}_2\text{O}$ systems, **134**, 126
 magic-angle spinning
 and FTIR, comparative studies of Rh/SiO₂ catalysts exposed to CO/H₂ at high temperature and pressure, **135**, 358
in situ, in analysis of methylamine synthesis, **136**, 202
 solid-state, with second-generation CAVERN apparatus, for studies of catalytic reactions *in situ*, **136**, 504
- ^1H
 H_2 adsorption on unsupported Ru sulfide, **138**, 409
 hydrogen chemisorption by Ru/SiO₂ catalysts, effects of
 adsorbed sulfur, **134**, 572
 chlorine, **135**, 68
 MAS, and FTIR, comparative studies of Rh/SiO₂ catalysts exposed to CO/H₂ at high temperature and pressure, **135**, 358
 particle size effect in Rh/Al₂O₃ catalysts, **138**, 457
 pulsed-field gradient, in *in situ* measurement of molecular diffusion during catalytic reaction, **137**, 243
- ^{29}Si , magic angle spinning, Phillips catalysts, **136**, 246
- ^{51}V , solid-state, in structural analysis of V_2O_5 interaction with sepiolite, **137**, 36
- ^{129}Xe
 Pt-Ir bimetallic cluster formation in NaY zeolite, **137**, 357
 Y-type zeolites, effect of aggregate size, **133**, 42
 zeolite-supported Pt-Cu bimetallic catalyst, **133**, 191
- Nucleophilic reactions
 substitution of chlorobenzene with methanol on ZSM-5 zeolites, analysis, **134**, 373
- O**
- n*-Octane
 aromatization over Pt-zeolite L catalyst, *n*-propylcyclopentane conversion during, ^{14}C tracer study, **134**, 269
- Oils
 heavy, processing, FeMo/Al₂O₃ catalysts for, preparation and characterization, **134**, 98
- Olefins
 carbon-carbon linkages, rare-earth catalysts for, analysis: cyclic oligomerization of ethylene, **137**, 423
 long-chain, solid acid-catalyzed alkylation of benzene with, over isomer distribution in, **138**, 386
- Oligomerization
 cyclic, ethylene by rare-earth catalysts for carbon-carbon linkages, **137**, 423
 2-methylpropene over Al₂O₃- and, SiO₂-supported and unsupported perfluorinated resinsulfonic acid catalysts, **137**, 12
- Organic compounds
 gas-phase, heterogeneous photocatalytic oxidation for air purification, **136**, 554
 halogenated, 3-chlorosalicylic acid as model for, photocatalytic degradation, catalyzing pure and Nb-doped TiO₂ ceramic membranes, properties, **134**, 36
- Oxidation
 associated destruction of chlorofluorocarbons by Y zeolites, analysis, **138**, 364
n-butane to maleic anhydride, vanadium phosphate catalysts for, *in situ* laser Raman spectroscopic study, **134**, 151
 chlorinated hydrocarbons, modified transition metal-exchanged Y zeolite catalysts in, comparison, **138**, 179
- CO over
 Al- and Co-substituted Y-Ba-Cu-O perovskites, **138**, 562
 Au/ZrO₂ catalysts: activity, deactivation, and reaction mechanism, **137**, 306
 Pd(100) single crystal surface and $c(2\times 2)\text{-Sn/Pd}$ (100) bimetallic surface alloy, steady-state kinetics, **133**, 179
 Pd/ZrO₂ catalyst prepared from amorphous Pd-

- Zr alloy: chemical nature of active surface, **137**, 139
- Pt/Al₂O₃ catalysts, dynamic, modeling: effects of intrapellet diffusion and site heterogeneity, **137**, 158
- Rh(111) catalysts via reaction with N₂O, kinetics, **138**, 70
- superconducting and related cuprates, comparison, **134**, 731
- two-dimensional catalyst surfaces, oscillations during, Monte Carlo simulation, **133**, 153
- cumene and styrene by \times -oxotrinuclear mixed valence and mixed metal carboxylate complexes, **138**, 611
- direct, methane over Pt monoliths, in synthesis gas formation, **138**, 267
- ethane over Pd/ γ -Al₂O₃ and Pd/SiO₂ catalysts, *in situ* IR spectroscopic and catalytic studies, **136**, 613
- ethane, ethylene, and methane over rare earth oxides in absence and presence of free oxygen, pulse microreactor studies, **135**, 310
- ethylene on Pt with ZrO₂ pellet, NEMCA effect, **137**, 278
- glyoxal to glyoxylic acid on Pt/C catalysts, **133**, 479
- hydrocarbons, VO_x/AlNbO catalysts for, physicochemical analysis, **137**, 257
- liquid-phase, 2,6-di-*tert*-butylphenol over polyvinylpyridine/Cu(II) catalyst, promotion by inorganic base, **138**, 24
- methanol over
- CrO₃/SiO₂ catalysts, effects of catalyst surface properties, **136**, 209
- molybdena monolayer supported on SnO₂, active site identification, **134**, 331
- NH₃ over YBa₂Cu₃O₇(123) oxide systems, analysis, **135**, 335
- partial
- direct, methane to liquid hydrocarbons over HZSM-5 zeolites, **136**, 578
- ethane over M₂MoO₄/SiO₂ catalysts (*M* = Cs, K, Li, Na, Rb), **135**, 563
- selectivity, role of boundary layer mass transfer, **136**, 300
- phenol over CuO–ZnO/Al₂O₃ catalysts in aqueous solution, **135**, 345
- photocatalytic, *see* Photooxidation
- propylene on unsupported [100]-oriented MoO₃ catalysts, structure sensitivity, **134**, 542
- room-temperature, K₂CO₃/MoS₂ catalysts, and effects on alcohol synthesis from CO and H₂, **138**, 525
- selective
- C₄ hydrocarbons, synergistic effects in catalysts for, analysis by *in situ* laser Raman spectroscopy and isotopic labeling, **134**, 24
- generalized catalytic reaction, kinetic analysis, **134**, 691
- propylene over MoO₃ crystals, oxygen species involved, SIMS and TPSR mechanistic analysis, **137**, 429
- total catalytic, in heterogeneous–homogenous reactions involving free radicals: CuCr₂O₄/ γ -Al₂O₃ and Pt/ γ -Al₂O₃ catalysts, **136**, 197
- Oxidative coupling
- Ba-doped Y₂O₃ catalyst for, oxygen XANES characterization, **136**, 16
- methane over
- BiOCl, SmCl₃, and MnCl₂ catalysts supported on Li₂CO₃–MgO systems, **138**, 322
- CaO–CeO₂ catalysts: effect of oxygen-ion conductivity on C₂ selectivity, **135**, 317
- MgO catalysts
- Au- and Li-doped, relationship between morphology and performance, **135**, 576
- CaO-supported, analysis of active site, **134**, 422
- NaOH/CaO catalyst, kinetics, **135**, 467
- singly and doubly promoted Mn₃O₄ catalysts, *in situ* XRD analysis, **134**, 242
- methane and toluene over LiCl-added Co₃O₄ catalysts, kinetic analysis, **137**, 487
- Oxidative dehydrogenation
- butane and propane over Mg₃(VO₄)₂ and Mg₂V₂O₇ catalysts, effects of potassium in catalyst preparation, **134**, 668
- propane over VO_x/AlNbO catalysts, analysis, **137**, 257
- Oxides
- AlNbO, support of VO_x catalysts for hydrocarbon oxidation, physicochemical analysis, **137**, 257
- Mn–Zr mixed oxide catalysts, structure and catalytic properties in CO hydrogenation, **138**, 630
- Ni–Al, mixed, obtained by thermal decomposition of hydrotalcite-type precursors, preparation and characterization, **133**, 231
- PrBa₂Cu₃O_{7–x} superconductors, NH₃ oxidation, **135**, 335
- rare earth, catalysis of methane, ethane, and ethylene conversion in absence and presence of free oxygen, pulse microreactor studies, **135**, 310
- second phase, effect on catalytic properties of dispersed metals in
- Co supported on 12% WO₃/Al₂O₃, **135**, 200
- Pd supported on 12% WO₃/Al₂O₃, **138**, 55
- support of MoS₂ catalysts: catalyst morphology, **137**, 513
- valence-invariant and reducible, interaction in presence of Pd in thin film, XPS analysis, **137**, 114
- YBa₂Cu₃CoO_{7+x} superconductors, NH₃ oxidation, **135**, 335
- ZnCrO, K₂O-promoted catalysts, higher alcohol synthesis, mechanistic aspects, **135**, 400
- Oxygen
- adsorption on crystalline and amorphous Cr₂O₃ surfaces, diffuse reflectance FTIR study, **133**, 415
- Ba–Cu–Y perovskites, Co- and Al-substituted catalysts, CO oxidation, **138**, 562
- chemisorption on Ag film: NEMCA effect, **138**, 570

- CO₂ methanation in presence of, in detection method for temperature programmed oxidation of coke deposits, **138**, 240
- Cr–Zn catalysts, Cs-promoted, higher alcohol synthesis, chain growth process in, kinetics, **135**, 99
- diffusion in Ni film surface, limiting effect on CO formation, **134**, 311
- ethane, ethylene, and methane conversion over rare earth oxides in presence or absence of, pulse microreactor studies, **135**, 310
- insertion into MoO₃ crystals, mechanistic study by SIMS and TPSR, **137**, 429
- isotopically labeled, in transient studies of methanol synthesis over CeCu₂-derived catalysts, **138**, 694
- K-edge X-ray absorption edge in Ba-doped Y₂O₃ catalyst, analysis, **136**, 16
- polycrystalline Pt catalysts in presence of, catalysis of NO reduction by NH₃, **135**, 434
- Pt/CeY and Pt/LaY zeolites in, heating at high temperature, associated changes in Pt dispersion, **136**, 334
- species formed on CaO surface sites by N₂O decomposition, reactivity, **138**, 686
- Oxygenates
- C₂₊, synthesis from syngas, Na–Mn–Ni coprecipitated catalysts selective for, TPR and XPS study, **138**, 733
- C₃, C₄, and C₅, TPR and flow experiments: mechanistic aspects of K₂O-promoted ZnCrO catalysts in higher alcohol synthesis, **135**, 400
- formation on Ru–Co/SiO₂ bimetallic carbonyl cluster-derived catalysts, mechanism, **138**, 206
- synthesis from syngas, RuMo/SiO₂ catalysts for, characterization, **137**, 77
- Oxygen ions
- conductivity, effect on C₂ selectivity in oxidative coupling of methane over CaO–CeO₂ catalysts, **135**, 317
- P**
- Palladium
- adsorption on γ -Al₂O₃, **138**, 400
- γ -Al₂O₃- and SiO₂-supported catalysts, ethane oxidation, *in situ* IR spectroscopic and catalytic studies, **136**, 613
- Al₂O₃-supported catalysts, spillover on, rate measurement, **134**, 737
- cation adsorption/impregnation on Al₂O₃ and SiO₂ and composite oxides, **138**, 38
- compounds with, catalysis of *N*-chloroamine carbonylation, **136**, 403
- Co/NaY zeolites, CO hydrogenation, analysis of metal phases and product selectivity, **138**, 721
- incorporated SiO₂, TiO₂, and ZrO₂ catalysts, propane reactions, analysis, **136**, 423
- La₂O₃- and SiO₂-supported catalysts, temperature-programmed methanation on, **138**, 294
- PdNi_x alloys encaged in NaY zeolites, CO hydrogenation, analysis, **136**, 182
- Pd(100) single crystal surface and *c*(2×2)-Sn/Pd(100) bimetallic surface alloy catalysts, CO oxidation, steady-state kinetics, **133**, 179
- sepiolite-supported catalyst, imine reduction, linear free energy relationships, **133**, 21
- SiO₂-supported catalysts
- preparation for methanol synthesis: exposed metal fraction and hydrogen solubility, **138**, 500
- synthesized by sol–gel method, UV–VIS and FTIR spectroscopic analysis, **138**, 463
- supported on 12% WO₃/Al₂O₃ composite: effect of second-phase oxides on catalytic properties of dispersed metals, **138**, 55
- thin film catalysts, La₂O₃ interaction with reducible oxides, XPS analysis, **137**, 114
- zeolite-supported catalysts, direct synthesis of methanol, dimethyl ether, and paraffins from syngas, **134**, 226
- ZnO-supported catalysts, hydrogenation of esters, analysis, **135**, 420
- ZrO₂-supported catalyst prepared from amorphous Pd–Zr alloy, CO oxidation: chemical nature of active surface, **137**, 139
- Paraffins, *see* Alkanes
- Particles
- bimetallic catalysts, surface segregation in, *in situ* electron microscopic analysis, **136**, 584
- geometric properties, role in metal catalyst structure sensitivity, **120**, 293; letter to editor, **136**, 631; reply, **136**, 633
- Pt
- α -Al₂O₃-supported catalysts, size effects in methylcyclohexane dehydrogenation, **138**, 482
- clusters, equilibrium shape, embedded atom calculations, **136**, 320
- Pt–Ce on γ -Al₂O₃ and SiO₂, microstructures, **138**, 283
- Rh, Al₂O₃-supported catalysts, size effects on reaction rate, ²H NMR study, **138**, 457
- Rh–Ce on
- γ -Al₂O₃ and SiO₂, microstructures, **138**, 283
- SiO₂, microstructure: Ce and SiO₂ interactions, **134**, 204
- Passivation
- dual function cracking catalyst mixtures by Sb, analysis, **135**, 325
- vanadium by rare earth compounds soluble in feedstock: hydrothermal aging of cracking catalysts, **134**, 469
- Pentane
- cracking on HY zeolites, mechanism, **136**, 446
- formation from methane by low-temperature two-step reaction, **138**, 101
- isotopic exchange with deuterium on Rh/SiO₂ gel catalysts, **133**, 294

- Pentan-3-one
and propionaldehyde, formation during ethylene hydroformylation over Rh/activated carbon catalysts, comparison, **136**, 531
- 2-Phenyl naphthalene
hydrocracking pathways and kinetics in presence of Ni-Mo/Al₂O₃ catalysts with ultra-stable Y zeolite, **137**, 504
- Perovskites
Y-Ba-Cu-O, Co- and Al-substituted catalysts, CO oxidation, **138**, 562
- Phase-transfer catalysts
polymer-supported, hydrophilic recognition activity and effect on reaction activity and selectivity, **136**, 378
- Phenol
liquid-phase oxidation over CuO-ZnO/Al₂O₃ catalysts, kinetics, **135**, 345
photodegradation, polycrystalline system Cr_xO_y · TiO₂ for, structural and surface characterization, **134**, 434
- 9-Phenyl anthracene
hydrocracking pathways and kinetics in presence of Ni-Mo/Al₂O₃ catalysts with ultra-stable Y zeolite, **137**, 504
- 1-Phenylheptane
cracking on USY zeolite catalysts, analysis, **135**, 45
- Phillips catalysts
²⁹Si MAS NMR study, **136**, 246
- Phosphate
modification of Al₂O₃, effect on Mo/Al₂O₃ catalytic properties in hydrodesulfurization, **133**, 124
- Phosphine
promoted Rh catalysts, direct ethylene glycol synthesis from CO and hydrogen, mechanistic analysis, **133**, 325
- Phosphorus
effect on MoO₃ impregnation and reactivity in thiophene hydrodesulfurization: Al₂O₃-MoO₃ interaction, **136**, 478
- Photocatalysis
NH₃-NO reaction on TiO₂ surfaces, **134**, 317
water cleavage over Pt-RuO₂/TiO₂ catalysts, effects of catalyst parameters and operational variables, **134**, 629
- Photodegradation
3-chlorosalicylic acid, pure and Nb-doped TiO₂ ceramic membranes catalyzing, properties, **134**, 36
phenol, polycrystalline system Cr_xO_y · TiO₂ for, structural and surface characterization, **134**, 434
- Photooxidation
gas-phase organics over heterogeneous catalysts for air purification, **136**, 554
kinetics, role of reactor dynamics, **131**, 285; letter to editor, **136**, 626; reply, **136**, 629
- Photoreduction
dinitrogen, polycrystalline system Cr_xO_y · TiO₂ for, structural and surface characterization, **134**, 434
nitrate to nitrite and NH₃, **135**, 300
- Piperidine
denitrogenation on Al₂O₃, SiO₂, and SiO₂-Al₂O₃, effects of surface acidity, **137**, 453
hydrogenolysis on commercial hydrocracking catalysts, activity and deactivation of catalyst during, effects of
initial piperidine concentration, temperature, catalyst presulfidation, coke deposition, and hydrogen partial pressure, **135**, 27
zeolite unit cell size, sulfur content, and coke deposition, **135**, 481
- Platinum
Al₂O₃-supported catalysts
dynamic CO oxidation, modeling: effects of intra-pellet diffusion and site heterogeneity, **137**, 158
hydrocarbon-reforming reactions, comparison with high-specific-surface-area Mo₂C and WC catalysts: catalyst activation and stabilization in reaction of *n*-hexane, **134**, 383
reduction, effects of hydrogen and H₂O and HCl vapor on Pt accessibility, **137**, 377
 α -Al₂O₃-supported catalysts, methylcyclohexane dehydrogenation, particle size effect, **138**, 482
 γ -Al₂O₃-supported catalysts, heterogeneous-homogeneous reactions involving free radicals in processes of total catalytic oxidation, **136**, 197
BaK-LTL-supported catalysts, effect of sulfur poisoning: hydrogen chemisorption and X-ray absorption spectroscopic analysis **138**, 675
carbon-supported catalysts, oxidation of glyoxal/glyoxylic acid, **133**, 479
catalysis of
ethylene hydrogenation, D₂ tracing and microkinetic analyses, **137**, 186
partial oxidation of CH₄, selectivity, effect of mass transfer, **136**, 300
catalyzed ethane/deuterium exchange reaction, and law of microscopic reversibility, theoretical model, letter to editor, **138**, 759; reply, **138**, 761
-Ce particles on γ -Al₂O₃ and SiO₂, microstructure, **138**, 283
clusters, equilibrium shape, embedded atom calculations, **136**, 320
-Cu, NaY-supported bimetallic catalysts, ¹²⁹Xe NMR and EXAFS analysis, **133**, 191
deposited on CeY and LaY during heating at high temperatures in different gases, associated changes in dispersion, **136**, 334
dispersion in Pt/ZSM-5 zeolites, **136**, 43
graphite-supported catalysts, crystallite size and morphology, scanning tunneling microscopy study, **135**, 13
-Ir bimetallic clusters, formation in NaY zeolite, analysis by ¹²⁹Xe NMR and ethane hydrogenolysis, **137**, 357
KL-supported catalysts prepared by ion exchange

- or incipient wetness impregnation, comparison, **133**, 342
- modification with Co, Fe, or Ni, effect on surface segregation in bimetallic catalyst particles, *in situ* electron microscopic analysis, **136**, 584
- molecular sieves containing, *n*-hexane aromatization
 - catalyst preparation by vapor phase impregnation method, **134**, 349
 - n*-hexane reactivity, **134**, 359
 - platinum aluminophosphate reactivity, **134**, 370
- n*-octane aromatization with Pt-zeolite L catalyst, *n*-propylcyclopentane conversion during, ^{14}C tracer study, **134**, 269
- polycrystalline foil catalysts, NO reduction by NH_3 in presence of O_2 , **135**, 434
- PtMo_6 bimetallic catalysts supported on Al_2O_3 and SiO_2 , characterization, **135**, 367
- and Pt-Rh, coated monoliths, direct oxidation of methane over, in synthesis gas formation, **138**, 267
- and Pt-Ru catalysts, SiO_2 -supported, pretreatment chemistry in preparation, **133**, 202
- rhodium
 - Ce, $\gamma\text{-Al}_2\text{O}_3$ -supported catalysts, physicochemical properties and Ce effect on catalyst activity, **133**, 309
 - gauzes, catalytic etching, **136**, 149
- RuO_2 , TiO_2 -supported catalysts, photocatalytic cleavage of water, effects of catalytic parameters and operational variables, **134**, 629
- single-crystal catalysts, reactivity and selectivity, effects of Re and sulfur, **134**, 179
- SiO_2 -supported catalyst EUROPT-1, hydrogenolysis of ethane, propane, and *n*-butane, **137**, 462
- Sn, Al_2O_3 -supported catalysts, FTIR study, **138**, 491
- and SO_4^{2-} , promoted ZrO_2 catalysts, surface acid properties, dynamic modification with hydrogen molecule, **135**, 609
- SO_4^{2-} - ZrO_2 -supported catalysts, *in situ* XPS study, **135**, 60
- $\text{TiO}_2/\text{SiO}_2$ -supported catalysts, butane hydrogenolysis, strong metal-support interactions, **134**, 751
- zeolite L catalysts, *n*-octane aromatization, conversion of labeled *n*-propylcyclopentane during, ^{14}C tracer study, **134**, 269
- with ZrO_2 pellet, ethylene oxidation, NEMCA effect, **137**, 278
- Platinum graphimet
 - transformation of carbon compounds on, structural and catalytic study, **134**, 608
- Polymerization
 - ethylene on Cr/ SiO_2 catalysts, initiation mechanism, FTIR analysis, **137**, 368
- Polymers
 - supported phase transfer catalysts, hydrophilic recognition activity and effect on reaction activity and selectivity, **136**, 378
- Polyoxomolybdates
 - SiO_2 -supported, structure and catalytic properties: dispersion effect and nature of Mo species interacting with support in 12-molybdosilicic acid catalysts, **138**, 445
- Polystyrene latex
 - supported phase transfer catalysts, hydrophilic recognition activity and effect on reaction activity and selectivity, **136**, 378
- Polyvinylpyridine
 - Cu(II)-supported catalysts, 2,6-di-*tert*-butylphenol oxidation in presence of inorganic base, **138**, 24
- Pores
 - ZSM-5 zeolite, dynamic behaviors of simple aromatic hydrocarbons inside, simulation, **136**, 141
- Potassium
 - catalysis of graphite gasification by CO_2 and H_2O , mechanism, electron microscopic study, **138**, 12
 - LTL zeolite, Ba-exchanged, effect of sulfur poisoning: hydrogen chemisorption and X-ray absorption spectroscopic analysis, **138**, 675
 - in preparation of $\text{Mg}_3(\text{VO}_4)_2$ and $\text{Mg}_2\text{V}_2\text{O}_7$ catalysts, effect on oxidative dehydrogenation of propane and butane, **134**, 668
 - promotion of
 - Co-MnO catalysts, effect on CO hydrogenation, **134**, 186
 - FeO_2/MgO catalysts
 - 1-butene dehydrogenation to 1,3-butadiene, **135**, 548
 - preparation and characterization, **135**, 533
 - Rh/ SiO_2 catalysts, CO adsorption, ^{13}NMR analysis, **137**, 199
 - Ru/ SiO_2 catalysts, CO hydrogenation, steady-state isotopic transient kinetic analysis, **137**, 22
- Potassium carbonate
 - carbon-supported catalysts, methane formation in H_2/CO mixtures, **134**, 525
- MoS_2 -supported catalysts, room-temperature oxidation and effect on alcohol synthesis from CO and H_2 , **138**, 525
- supported Na catalysts for propene dimerization, deactivation and reactivation, diffuse reflectance FTIR study, **136**, 76
- Potassium hydroxide
 - promotion of polyvinylpyridine/Cu(II) catalyst in 2,6-di-*tert*-butylphenol oxidation, **138**, 24
- Potassium molybdate
 - SiO_2 -supported catalysts, partial oxidation of ethane, **135**, 563
- Potassium oxide
 - promoted ZnCrO catalysts, higher alcohol synthesis, mechanistic aspects, **135**, 400
- Powder neutron diffraction
 - pulsed, in location of deuterium ions in Y zeolites, **138**, 405
- Praseodymium
 - $\text{PrBa}_2\text{Cu}_3\text{O}_{7-x}$ superconductors, NH_3 oxidation, **135**, 335

- Precipitation
co-, *see* Coprecipitation
homogeneous sulfide, hydrodesulfurization catalysts prepared by, TEM comparison with catalysts prepared by impregnated thiosalt decomposition, **137**, 232
- Pressure
partial, hydrogen, effects on catalyst activity, deactivation, and coke formation during piperidine hydrogenolysis on commercial hydrocracking catalyst, **135**, 27
- Presulfidation
effects on catalyst activity, deactivation, and coke formation during piperidine hydrogenolysis on commercial hydrocracking catalyst, **135**, 27
- Propane
dehydrocyclodimerization on H-ZSM-5 and Ga/H-ZSM-5: kinetic coupling and hydrogen surface fugacities in heterogeneous catalysts, **134**, 549
formation from methane by low-temperature two-step reaction, **138**, 101
hydrogenolysis over
Co/ZnO catalysts, role of metal-support interaction, **135**, 263
Pt/SiO₂ catalysts, analysis, **137**, 462
oxidative dehydrogenation over
Mg₃(VO₄)₂ and Mg₂V₂O₇ catalysts, effects of potassium in catalyst preparation, **134**, 668
VO_x/AlNbO catalysts, analysis, **137**, 257
reactions on modified metal oxides, analysis, **136**, 423
- 1-Propanol
Ni(isoquinoline)₄Cl₂-catalyzed carbonylation, promoting effects of metal iodides, **136**, 605
- 2-Propanol, *see* Isopropyl alcohol
- Propene, *see* Propylene
- Propionaldehyde
and pentan-3-one, formation during ethylene hydroformylation over Rh/activated carbon catalysts, comparison, **136**, 531
- 2-Propylamine
temperature-programmed cracking with solid acid zeolites and CaO, comparison, **138**, 391
- n*-Propylbenzene
disproportionation, in analysis of zeolite intrinsic reaction mechanisms and internal pore systems, **133**, 136
- n*-Propylcyclopentane
¹⁴C-labeled, conversion during *n*-octane aromatization with Pt-L zeolite catalyst, tracer study, **134**, 269
- Propylene
adsorption on AlPO₄-5 molecular sieves, in analysis of Mn and Mg framework substitution, **138**, 377
cyclopropane conversion to, in NaX zeolite, associated molecular diffusion, *in situ* measurement by pulsed-field gradient NMR, **137**, 243
deuterium in, isotopic exchange of coke hydrogens for, on coke deposited on H-ZSM-5 zeolite in acetone conversion, **136**, 258
dimerization, Na/K₂CO₃ catalysis for, deactivation and reactivation, diffuse reflectance FTIR study, **136**, 76
formation by cyclopropane isomerization in NaX and Eu/NaX zeolites, transient diffusion, desorption, and reaction studies, **135**, 223
oxidation over
MoO₃ crystals, oxygen species involved in, SIMS and TPSR mechanistic analyses, **137**, 429
unsupported [100]-oriented MoO₃ catalysts, structure sensitivity, **134**, 542
- Protic molecules
reactions with titanium silicalite, **133**, 220
- Pyridine
adsorption on Sm-doped Al₂O₃ supports, **137**, 346
- Pyrolysis
fume, boehmite sols, in preparation of thermally stabilized transitional Al₂O₃, **134**, 87
- Pyrrole
chemisorption, in XPS study of basicity in alkaline cation faujasite zeolites, **137**, 322
- R**
- Raman spectroscopy
laser, *in situ*
and isotopic labeling, in analysis of synergistic effects in selective oxidation catalysts, **134**, 24
vanadium phosphate catalysts for *n*-butane oxidation to maleic anhydride, **134**, 151
in structural analysis of V₂O₅ interaction with sepiolite, **137**, 36
- Raney catalysts
Ru, for methanol synthesis, surface state related to methanol selectivity, **136**, 252
- Rare-earth catalysts
for carbon-carbon linkage of olefins: cyclic oligomerization of ethylene, **137**, 423
- Reactivity distributions
nonparametric determination from steady-state isotopic transient kinetic data, **134**, 678
- Reactors
dynamics in, role in kinetics of photocatalytic oxidation, **131**, 285; letter to editor, **136**, 626; reply, **136**, 629
membrane, catalytic, ethane dehydrogenation in, analysis, **134**, 713
micro-, *see* Microreactors
single-particle, for benzene hydrogenation, cyclic operation, **136**, 242
single-pellet catalytic, NEMCA effect in, analysis, **137**, 278
solid electrolyte
ethylene epoxidation on Ag deposited on Y₂O₃-doped ZrO₂, NEMCA effect, **138**, 588
oxygen chemisorption on Ag films in, NEMCA effect, **138**, 570
- Reduction
Co in Co/ZnO catalysts: metal-support interaction, **135**, 263

- imines over Pd/sepiolite catalyst, linear free energy relationships, **133**, 21
- MoO₃/Al₂O₃ catalysts
- activation for metathesis reactions, **135**, 287
 - XPS analysis, **135**, 269
- Ni²⁺ cations in Y zeolites, effect of environment, **136**, 170
- nitrate to nitrite and NH₃ over photocatalysts, **135**, 300
- NO by NH₃ over
- polycrystalline Pt foil catalysts in presence of O₂, **135**, 434
 - V₂O₅, V₂O₅-TiO₂, and V₂O₅-TiO₂-SiO₂ gel catalysts, comparison, **134**, 75
- NO_x on V₂O₅/TiO₂ catalysts, reactivity, effect of water, **134**, 742
- photocatalytic, *see* Photoreduction
- Pt/Al₂O₃ catalysts by hydrogen: effects of hydrogen and H₂O and HCl vapor on Pt accessibility, **137**, 377
- selective catalytic, NO
- crystalline and amorphous Cr₂O₃ catalysts for, surface structure characterization by TPRD, **133**, 397
 - NH₃ desorption from Brønsted and Lewis acid sites, diffuse reflectance FTIR study, **133**, 431
 - NO adsorption and reaction, diffuse reflectance FTIR study, **138**, 306
 - thermal treatment and oxygen adsorption, diffuse reflectance FTIR study, **133**, 415
 - with NH₃ by vanadia supported on TiO₂-SiO₂ mixed oxide gels, **133**, 1
 - temperature-programmed, *see* Temperature-programmed reduction
- Reforming reactions
- Pt/Al₂O₃ and high-specific-surface area Mo₂C and WC catalysts for, comparison: activation and stabilization in reaction of *n*-hexane, **134**, 383
- Resin
- support of vanadium(IV) catalysts: catalyst synthesis and kinetics of epoxidation of maleic, fumaric, and crotonic acids with H₂O₂, **137**, 510
- Resinsulfonic acids
- perfluorinated, Al₂O₃- and SiO₂- supported and unsupported catalysts, 2-methylpropene oligomerization and 2,4,4-trimethyl-2-pentene transformation, **137**, 12
- Rhenium
- and Cs, promoting effects on Ag catalyst in ethylene epoxidation, analysis, **138**, 395
 - and sulfur, effects on reactivity and selectivity of Pt single-crystal catalysts, **134**, 179
- Rhodium
- active carbon-supported catalysts, ethylene hydroformylation, pentan-3-one and propionaldehyde formation during, comparison, **136**, 531
 - Al₂O₃-supported catalysts
 - effect of particle size on reaction rate, ²H NMR study, **138**, 457
 - NO reduction by CO, role of intermediate N₂O + CO reaction, kinetic analysis, **138**, 255
 - oxidized, interaction with CO, IR spectroscopic study at high pressure, **134**, 378
- γ-Al₂O₃-supported catalysts, effects of La³⁺ incorporation, **134**, 702
- CeO₂-supported catalysts, hydrogen chemisorption, reversibility, **137**, 1
- Ce particles on
- γ-Al₂O₃ and SiO₂, microstructure, **138**, 283
 - SiO₂, microstructure: Ce and SiO₂ interactions, **134**, 204
- PH₃-promoted catalysts, direct ethylene glycol synthesis from CO and hydrogen, mechanistic analysis, **133**, 325
- Pt-Ce, γ-Al₂O₃-supported catalysts, physiochemical properties and Ce effect on catalyst activity, **133**, 309
- Pt-coated and Pt-coated monoliths, direct oxidation of methane over, in synthesis gas formation, **138**, 267
- Pt gauzes
- catalysis of partial oxidation of CH₄ to CO and H₂, selectivity, effect of mass transfer, **136**, 300
 - catalytic etching, **136**, 149
- Rh(111) catalysts, CO oxidation by N₂O, kinetics, **138**, 70
- SiO₂ gel-supported catalysts, isotopic exchange of deuterium and alkanes, **133**, 294
- 2,2-dimethylbutane, **133**, 279
- SiO₂-supported catalysts
- CO adsorption, effects of potassium promotion, ¹³NMR analysis, **137**, 199
 - CO hydrogenation and ethylene hydroformylation, effect of Ag promotion, **138**, 536
 - exposed to CO/H₂ at high temperature and pressure, FTIR and MAS NMR studies, **135**, 358
 - oxidized, reduced, and sulfided forms, CO insertion reaction, IR spectroscopic study, **135**, 618
- V-promoted
- CO insertion into CH_x surface intermediates, transient response study, **134**, 13
 - CO reactivity, analysis with transient techniques, **134**, 1
- Rietveld analysis
- titanium silicalite-1 framework composition, **137**, 497
- Rubidium molybdate
- SiO₂-supported catalysts, partial oxidation of ethane, **135**, 563
- Ruthenium
- Al₂O₃-supported catalysts
 - Cl-free, preparation and characterization and promoter effect in NH₃ synthesis analysis, **136**, 110
 - La(NO₃)₃-promoted catalysts, **136**, 118
- ethane hydrogenolysis, steady-state and transient kinetics, **134**, 134

S

- in Fischer–Tropsch synthesis: effects of support and metal dispersion on reaction rate and selectivity, **137**, 212
- Co, SiO₂-supported bimetallic carbonyl cluster-derived catalysts, mechanism of oxygenate formation during CO hydrogenation, **138**, 206
- Cu, SiO₂-supported catalysts, *n*-butane hydrogenolysis over, **138**, 617
- metal oxide-supported catalysts, CO hydrogenation, electronic metal–support interactions, **136**, 161
- N*-methylbenzimidazole-supported catalysts, direct ethylene glycol synthesis from CO and hydrogen, mechanistic analysis, **133**, 332
- MgO-supported catalysts, Cl-free, preparation and characterization and promoter effect in NH₃ synthesis, **136**, 126
- Mo, SiO₂-supported catalysts, syngas reaction to oxygenates, characterization, **137**, 77
- Pt, SiO₂-supported catalysts, pretreatment chemistry in preparation, **133**, 202
- Raney catalysts, methanol synthesis, surface state related to methanol selectivity, **136**, 252
- RuO₄, TiO₂-supported catalysts, transient species formed in CO and CO + H₂ interaction, FTIR spectroscopic study, **137**, 473
- SiO₂-supported catalysts
- CO hydrogenation, promotion by potassium, steady-state isotopic transient kinetic analysis, **137**, 22
- in Fischer–Tropsch synthesis: effects of support and metal dispersion on reaction rate and selectivity, **137**, 212
- hydrogen chemisorption, effect of adsorbed sulfur, ¹H NMR study, **134**, 572
- Cl, ¹H NMR study, **135**, 68
- impregnated and sol-gel-prepared, synthesis, characterization, and catalytic properties, **133**, 247
- sol-gel-prepared, mechanical stability, evaluation, **136**, 621
- TiO₂-supported catalysts, Fischer–Tropsch synthesis: effects of support and metal dispersion on reaction rate and selectivity, **137**, 212
- zeolite 13X-supported catalysts, coke deposits, temperature programmed oxidation, detection: methanation of CO₂ in presence of O₂, **138**, 240
- Ruthenium dioxide
- Pt, TiO₂-supported catalysts, photocatalytic cleavage of water, effects of catalytic parameters and operational variables, **134**, 629
- Ruthenium oxide
- Ru, TiO₂-supported catalysts, transient species formed in CO and CO + H₂ interaction, FTIR spectroscopic study, **137**, 473
- Ruthenium sulfide
- unsupported, H₂ adsorption, ¹H NMR analysis, **138**, 409
- Samarium
- doped Al₂O₃ supports, surface characterization: Lewis acidity, **137**, 346
- Samarium chloride
- Li₂CO₃–MgO-supported catalysts, oxidative coupling of methane, **138**, 322
- Samarium naphthenate
- soluble in feedstock, passivation of vanadium: hydrothermal aging of cracking catalysts, **134**, 469
- Samarium oxide
- catalysis of methane, ethane, and ethylene conversion in absence and presence of free oxygen, pulse microreactor studies, **135**, 310
- Scanning tunneling microscopy
- Pt/graphite catalysts, size and morphology analysis, **135**, 13
- Schottky barriers
- role in methanol synthesis activity of Au/CeO₂ catalysts derived from CeAu₂ alloy precursor, **134**, 747
- Secondary ion mass spectrometry
- in mechanistic study of oxygen insertion into MoO₃ crystals, **137**, 429
- and XPS, in analysis of surface chemistry of activated carbons, **133**, 467
- Sepiolite, *see* Magnesium trisilicate
- Silica, *see* Silicon dioxide
- Silicalites
- Ti, TS-1, in vapor-phase Beckmann rearrangement of cyclohexanone oxime, **137**, 252
- Silicates
- Al–, Fe–, and Ga–, ZSM-11 derivatives, methylation of xylenes: selective formation of 1,2,4 isomer among trimethylbenzenes, **138**, 518
- vanadium, *see* Vanadium silicates
- Silicon
- content in SAPO-37 molecular sieve, effect on acidic properties, **138**, 90
- direct reaction with methyl chloride in synthesis of methylchlorosilanes on Cu catalysts promoted with Zn and Sn, steady-state and transient reaction kinetics, **134**, 168
- Silicon dioxide
- adsorption of allylamine and benzylamine, thermal desorption and IR studies, **134**, 409
- Al₂O₃ catalysts
- acid site characterization: isopropylamine adsorption studies, **138**, 714
- alkylation of benzene with long-chain olefins, isomer distribution in, **138**, 386
- amorphous, –zeolite composites prepared with gels of high-alumina and low organic template content, synthesis and cracking behavior, **133**, 28
- with varying acidities, coking reaction by anthracene, analysis, **138**, 474

- and Al_2O_3 and composite oxides, Pd(II) cation adsorption/impregnation on, **138**, 38
deposition on ZrO_2 and TiO_2 , generation of acid sites, **134**, 340
gels
 Ni impregnated on, dispersion, role of surface hydroxyls, **135**, 638
 support of Rh catalysts, isotopic exchange of deuterium and alkanes, **133**, 294
 2,2-dimethylbutane, **133**, 279
powder, support of MoS_2 catalysts: catalyst morphology, **137**, 513
Rh–Ce particles on, microstructure: Ce and SiO_2 interactions, **134**, 204
and SiO_2 – Al_2O_3 , piperidine denitrogenation on, effects of surface acidity, **137**, 453
support of
 calcined Ni catalysts, thermal stability, effect of preparation method, EXAFS and TPR analysis, **138**, 195
 Ce–Rh and Ce–Pt particles, microstructures, **138**, 283
Co catalysts
 in Fischer–Tropsch synthesis, reaction rate and selectivity, effects of support and metal dispersion, **137**, 212
 Mg-promoted, precipitated, metal–support interactions, **134**, 615
CoMo catalysts in hydrodesulfurization, ^{57}Co Mössbauer spectroscopic study, **133**, 112
Co–Ni alloy catalysts, effect of alloying on CO hydrogenation, **136**, 232
Cr catalysts, ethylene polymerization, initiation mechanism, FTIR analysis, **137**, 368
 CrO_3 catalysts
 ^{29}Si MAS NMR study, **136**, 246
 surface structure and reactivity, **136**, 209
CuO prepared from mononuclear Cu complexes, properties, **135**, 81
Fe catalysts, Fischer–Tropsch synthesis, associated deposition of carbonaceous materials, analysis, **136**, 96
LaNi catalysts, adsorbed CO, FTIR spectroscopic analysis, **136**, 271
Mo catalysts
 acetonitrile synthesis from CO – H_2 – NH_3 , **137**, 127
 M_2MoO_4 ($M = \text{Cs}, \text{K}, \text{Li}, \text{Na}, \text{Rb}$), partial oxidation of ethane, **135**, 563
 Ni-, Pd-, and Zr-incorporated catalysts, propane reactions, **136**, 423
 preparation by grafting method, physicochemical phenomena during, EPR and diffuse reflectance studies, **135**, 156
12-molybdosilicic acid catalysts, dispersion effect and nature of Mo species in interaction with support, vibrational study, **138**, 445

MoO₃ catalysts
 controlled dispersion, role of NH_3 , **133**, 55
 surface structures under ambient conditions, **136**, 539
 XAFS study of support effects, **138**, 746
 Nb_2O_5 catalysts, acidic properties, IR spectroscopic analysis, **135**, 186
Ni catalysts
 calcined, prepared by ion exchange: characterization of Ni state, **136**, 415
 carbon formation from $\text{CH}_4 + \text{H}_2$, kinetics, **135**, 147
 for CO hydrogenation, Gd promoting effects, **137**, 267
 (*R,R*)-tartaric acid-modified catalysts, enantioselective hydrogenation of methyl acetoacetate, analysis, **136**, 1
Pd catalysts
 ethane oxidation, *in situ* IR spectroscopic and catalytic studies, **136**, 613
 for methanol synthesis, preparation: exposed metal fraction and hydrogen solubility, **138**, 500
 synthesized by sol–gel method, spectroscopic analysis and catalytic properties, **138**, 463
 in temperature-programmed methanation, comparison with Pd/La₂O₃ catalyst, **138**, 294
perfluorinated resinsulfonic acid catalysts, 2-methylpropene oligomerization and 2,4,4-trimethyl-2-pentene transformation, **137**, 12
Pt catalysts
 for ethane, propane, and *n*-butane hydrogenolysis: EUROPT-1, **137**, 462
 pretreatment chemistry in catalyst preparation, **133**, 202
PtMo₆ bimetallic catalysts, characterization, **135**, 367
Pt–Ru catalysts, pretreatment chemistry in catalyst preparation, **133**, 202
Rh catalysts
 CO adsorption, effects of potassium promotion, ^{13}NMR analysis, **137**, 199
 CO hydrogenation and ethylene hydroformylation, effect of Ag promotion, **138**, 536
 exposed to CO/H_2 at high temperature and pressure, FTIR and MAS NMR studies, **135**, 358
 oxidized, reduced, and sulfided forms, CO insertion reaction, IR spectroscopic study, **135**, 618
 V-promoted, CO insertion into CH_x surface intermediates transient response study, **134**, 13
 V-promoted, CO reactivity, analysis with transient techniques, **134**, 1
Ru catalysts
 CO hydrogenation, promotion effects of potassium, steady-state isotopic transient kinetic analysis, **137**, 22

- in Fischer–Tropsch synthesis, reaction rate and selectivity, effects of support and metal dispersion, **137**, 212
hydrogen chemisorption, effect of adsorbed sulfur, NMR study, **134**, 572
hydrogen chemisorption, effect of Cl, ^1H NMR study, **135**, 68
preparation by impregnation and sol-gel preparation methods, comparison: synthesis, characterization, and catalytic properties, **133**, 247
prepared by sol-gel method: variables resulting in improved mechanical stability, **136**, 621
pretreatment chemistry in catalyst preparation, **133**, 202
- Ru–Co bimetallic carbonyl cluster-derived catalysts, mechanism of oxygenate formation during CO hydrogenation, **138**, 206
- Ru–Cu catalysts, *n*-butane hydrogenolysis, **138**, 617
- Ru–Mo catalysts, syngas reaction to oxygenates, **137**, 77
- TiO_2
 H_2SO_4 -modified catalysts, characterization and acid catalytic activity, **136**, 267
mixed oxide gels, support of vanadia: dispersed phase structure and activity for catalytic reduction of NO with NH_3 , **133**, 1
support of Pt catalysts, butane hydrogenolysis, strong metal–support interactions, **134**, 751
surface acidity, characterization, **135**, 505
- V_2O_5 – TiO_2 gels: structural genesis and catalytic behavior in reduction of NO with NH_3 , **134**, 75
- Silver
 η - Al_2O_3 -supported catalyst, ethylene adsorbed on reduced and oxygen-covered Ag surfaces, ^{13}C NMR study, **138**, 223
deposited on stabilized ZrO_3 electrolyte reactor, ethylene epoxidation on, NEMCA effect, **138**, 588
electrolytic catalysts, ethylene epoxidation, promoting effects of Re and Cs, **138**, 395
films, oxygen chemisorption: NEMCA effect, **138**, 570
promotional effect on CO hydrogenation and ethylene hydroformylation over Rh/ SiO_2 catalysts, **138**, 536
- SIMS *see* Secondary ion mass spectrometry
- Sintering
Pt deposited on CeY and LaY during heating at high temperatures in different gases, **136**, 334
- Sodium
catalysis of graphite gasification by CO_2 and H_2O , mechanism, electron microscopic study, **138**, 12
 K_2CO_3 -supported catalysts for propene dimerization, deactivation and reactivation, diffuse reflectance FTIR study, **136**, 76
–Mn–Ni coprecipitated catalysts active for higher oxygenate synthesis from syngas, TPR and XPS study, **138**, 733
- Sodium hydroxide
CaO-supported catalysts, oxidative coupling of methane, kinetics, **135**, 467
doped MgO catalysts, methyl formate decomposition to CO and methanol, analysis, **134**, 644
- Sodium molybdate
 SiO_2 -supported catalysts, partial oxidation of ethane, **135**, 563
- Sol-gel method
Pd/ SiO_2 catalysts synthesized by, spectroscopic characterization and catalytic properties, **138**, 463
in preparation of Ru/ SiO_2 catalysts
comparison with impregnation: synthesis, characterization, and catalytic properties, **133**, 247
variables resulting in improved mechanism of stability, **136**, 621
- Solid-state reactions
elemental, unpromoted molybdenum sulfides prepared by, characterization and hydrodesulfurization activity, **137**, 333
- Sols
boehmite, fume pyrolysis, in preparation of transitional Al_2O_3 , **134**, 87
- Solubility
hydrogen in Pd/ SiO_2 catalysts prepared for methanol synthesis, **138**, 500
- Solvent effects
in K10 montmorillonite-catalyzed Diels–Alder reaction of methyl acrylate and cyclopentadiene, **137**, 394
- Sorption
transient, cyclopropane and propylene in Cs/NaX and Ni/NaX zeolites, analysis, **135**, 236
- Spectroscopy, *see also specific techniques*
supported copper–alumina oxide system: nature of aging in oxidizing reaction media, **134**, 506
temperature-programmed surface reaction, in analysis of CO reactivity on V-promoted Rh/ SiO_2 catalysts, **134**, 1
- Spillover
on Pd/ Al_2O_3 catalysts, rate measurement, **134**, 737
- Stability
FeMoS catalysts during simultaneous thiophene hydrodesulfurization and cyclohexene hydrogenation, **138**, 640
mechanical, improvement in Ru/ SiO_2 catalysts prepared by sol-gel method, analysis, **136**, 621
thermal, calcined Ni/ SiO_2 catalysts, effect of preparation method, **138**, 195
- Stabilization
amorphous ZrO_2 by Au during CO oxidation, analysis, **137**, 306
thermal, transitional Al_2O_3 prepared by fume pyrolysis of boehmite sols, evaluation, **134**, 87

Strong metal-support interactions

in Pt/TiO₂/SiO₂ catalysts, analysis in butane hydrogenolysis, **134**, 751

Structure

Al₂O₃, effect on surface sites for alcohol dehydration, **138**, 659

calcined hydrotalcites during 2-propanol decomposition, **138**, 547

Co/TiO₂ catalysts, analysis, **135**, 173

Cu/ZnO methanol synthesis catalyst precursors prepared by coprecipitation, effects of preparation conditions, **138**, 754

dispersed vanadia species in TiO₂(anatase)-supported V₂O₅ catalysts, quantitative analysis, **134**, 479

MEL, crystalline and microporous vanadium silicates with, synthesis and catalytic properties, **137**, 225

micro-, *see* Microstructure

Mn-Zr mixed oxide catalysts in CO hydrogenation, **138**, 630

molecular, hydrated surfaces of supported MoO catalysts under ambient conditions, **136**, 539

Nb₂O₅ gels, characterization, **135**, 125

PbS in Y zeolites, analysis by pulsed-neutron powder diffraction, **138**, 405

polycrystalline system Cr_xO_y · TiO₂ utilized for photoreactions, characterization, **134**, 434

Pt graphimet catalysts, analysis, **134**, 608

PtMo₆/Al₂O₃ and PtMo₆/SiO₂ catalysts derived from [PtMo₆O₂₄]⁸⁻, characterization, **135**, 367

related sensitivity of metal catalysts, geometric aspects, **120**, 293; letter to editor, **136**, 631; reply, **136**, 633

surface

CrO₃/SiO₂ catalysts, **136**, 209

crystalline and amorphous Cr₂O₃ catalysts for selective reduction of NO, analysis by NH₃ desorption from Brønsted and Lewis acid sites, diffuse reflectance FTIR study, **133**, 431

NO adsorption and reaction, diffuse reflectance FTIR study, **138**, 306

temperature-programmed reaction and desorption, **133**, 397

thermal treatment and oxygen adsorption, diffuse reflectance FTIR study, **133**, 415

V₂O₅/TiO₂ catalysts, effects on activity and selectivity for NO reduction by NH₃, **134**, 492

V₂O₅, V₂O₅-TiO₂, V₂O₅-TiO₂-SiO₂, genesis, **134**, 75

Styrene

catalytic oxidation by π -oxotrinuclear mixed valence and mixed metal carboxylate complexes, **138**, 611

dehydrogenation of ethylbenzene to, iron oxide-based catalyst for, active phase surface chemistry, **138**, 413

Sulfate

modification of Al₂O₃, effect on Mo/Al₂O₃ catalytic properties in hydrodesulfurization, **133**, 124

and Pt, promoted ZrO₂ catalysts, surface acid properties, dynamic modification with hydrogen molecule, **135**, 609

-ZrO₂, support of Pt catalysts, *in situ* XPS study, **135**, 60

Sulfiding

NiO/Al₂O₃ and Ni⁰/Al₂O₃ particles, rate and mechanism, comparison, **137**, 92

temperature, effect on unsupported FeMoS catalysts, **138**, 640

temperature-programmed, *see* Temperature-programmed sulfiding

Sulfur

adsorbed, effect on hydrogen chemisorption on Ru/SiO₂ catalysts, NMR study, **134**, 572

content of commercial hydrocracking catalysts effects on catalyst activity and deactivation during piperidine hydrogenolysis, **135**, 481

Fe-MoS, unsupported catalysts, characterization: stability during reaction and effect of sulfiding temperature, **138**, 640

-Ni-Mo structure in carbon- and Al₂O₃-supported Ni-Mo catalysts, Ni EXAFS studies, **133**, 94

P₂xMo_{1-x}S₂, Co- and Fe-promoted catalysts, oxygen chemisorption, **135**, 427

poisoning of Pt/BaK-LTL catalysts: hydrogen chemisorption and X-ray absorption spectroscopic analysis, **138**, 675

and Re, effects on reactivity and selectivity of Pt single-crystal catalysts, **134**, 179

resistant Ir/carbon catalysts: cyclohexane dehydrogenation and benzene hydrogenation, **135**, 458

Sulfuric acid

modified TiO₂/SiO₂ catalysts, characterization and acid catalytic activity, **136**, 267

Sulfuryl chloride

chlorination of aromatic hydrocarbons with SO₂Cl₂, associated acidic degradation of NaX and ZF520 zeolites, **135**, 92

Superconductors

cuprate and insulating cuprates, catalytic oxidation of CO, comparison, **134**, 731

YBa₂Cu₃O₇(123) systems, NH₃ oxidation, **135**, 335

Surface area

metallic, Ir/ α -Al₂O₃ catalysts, determination by selective chemisorption, **136**, 598

Surface barrier

in diffusion in zeolites, molecular dynamics simulations, **134**, 536

Surface chemistry

activated carbons as catalyst supports, XPS and SIMS correlation, **133**, 467

active phase of iron oxide-based catalyst for dehydrogenation of ethylbenzene to styrene, **138**, 413

- Cu/ZnO/Al₂O₃ catalysts for decomposition of 2-propanol, **136**, 86
- Surfaces
- acidity, effect on piperidine denitrogenation on Al₂O₃, SiO₂, and SiO₂-Al₂O₃, **137**, 453
 - Al₂O₃, sites for alcohol dehydration, structural effects, **138**, 659
 - Ag, reduced and oxygen-covered, in Ag/ η -Al₂O₃ catalyst, adsorbed ethylene, ¹³C NMR study, **138**, 223
 - bimetallic alloy, c(2 \times 2)-Sn/Pd(100), steady-state CO oxidation over, comparison with Pd(100) single crystal surface, **133**, 179
 - bimetallic catalyst particles, segregation, *in situ* electron microscopic analysis, **136**, 584
 - calcined hydrotalcites, structure, **138**, 547
 - CaO, oxygen species formed by N₂O decomposition on, reactivity, **138**, 686
 - CrO₃/SiO₂ catalysts, structure, **136**, 209
 - crystalline and amorphous Cr₂O₃ catalysts for selective reduction of NO
 - characterization by TPRD, **133**, 397
 - diffuse reflectance FTIR study of
 - NH₃ desorption from Brønsted and Lewis acid sites, **133**, 431
 - NO adsorption and reaction, **138**, 306
 - thermal treatment and oxygen adsorption, **133**, 415
- heterogeneous catalysts, kinetic coupling and hydrogen surface fugacities in, analysis: alkane reactions on Te/NaX, H-ZSM-5, and Ga/H-ZSM-5, **134**, 549
- Ni film, CO formation, limitation by oxygen diffusion, **134**, 311
- Ni(100) and Ni(111), structure-insensitive catalytic activity for methanation reaction of CO, rationalization, **133**, 461
- polycrystalline system Cr_xO_y · TiO₂ utilized for photoreactions, characterization, **134**, 434
- Pt foil, CO/NO reactions on, analysis by IR spectroscopy of absorbed species, **136**, 342
- Pt- and SO₄²⁻-promoted ZrO₂ catalysts, associated acidic properties, dynamic modification with hydrogen molecule, **135**, 609
- SiO₂ gels, hydroxyl groups on, role in dispersion of impregnated Ni, **135**, 638
- SiO₂-TiO₂, acidity characterization, **135**, 505
- square and hexagonal, NO-CO reaction on, Monte Carlo simulation, **131**, 369; letter to editor, **136**, 275; reply, 279
- Sm-doped Al₂O₃ supports: Lewis acidity, **137**, 346
- supported MoO catalysts, molecular structure under ambient conditions, **136**, 539
- V-promoted Rh/SiO₂ catalysts, CH_x species on, CO insertion, transient response study, **134**, 13
- Synthesis
- alcohol from CO and H₂ over K₂CO₃/MoS₂ catalysts: room-temperature oxidation of catalysts and effects on alcohol synthesis, **138**, 525
 - C₂₊ oxygenates from syngas, TPR and XPS study of Na-Mn-Ni coprecipitated catalysts selective for, TPR and XPS study, **138**, 733
 - direct
 - ethylene glycol from CO and hydrogen with Rh/PH₃ catalyst, mechanism, **133**, 325
 - Ru/*N*-methylbenzimidazole catalyst, mechanism **133**, 332
 - methanol, dimethyl ether, and paraffins from syngas over zeolite catalysts, **134**, 226
 - methylchlorosilanes over Cu catalysts promoted with Zn and Sn, steady-state and transient reaction kinetics, **134**, 168 - HCN from CH₄, NH₃, and air over Pt-coated monoliths, effect of mass transfer, **136**, 300
 - higher alcohols over K₂O-promoted ZnCrO catalysts, mechanistic aspects, **135**, 400
 - methanol over
 - Au/CeO₂ catalysts derived from CeAu₂ alloy precursor, activity: role of Schottky barriers, **134**, 747
 - CeCu₂-derived catalysts: transient studies with isotopically labeled reactants, **138**, 694
 - Co-modified Cu-Zn-Cr catalysts, **135**, 386
 - from H₂, CO, and CO₂ over Cu/ZnO catalysts, **136**, 59
 - Pd/SiO₂ catalysts, catalyst preparation: exposed metal fraction and hydrogen solubility, **138**, 500
 - Raney Ru catalysts, selectivity, surface state related to methanol, **136**, 252 - methylamines, *in situ* ¹³C MAS NMR spectroscopic study, **136**, 202
 - NH₃ on Cl-free Ru catalysts, promoter effects in Al₂O₃-supported catalysts, **136**, 110
 - La(NO₃)₃-promoted Ru/Al₂O₃ catalysts, **136**, 118
 - MgO-supported Ru catalysts, **136**, 126
 - vanadium silicates, crystalline, microporous compounds with MEL structure, **137**, 225
 - zeolite-amorphous silica-alumina composites prepared from high-alumina and low organic template content gels, **133**, 28
- Synthesis gas
- conversion to ethylene glycol with
 - Rh/PH₃ catalyst, mechanistic analysis, **133**, 325
 - Ru/*N*-methylbenzimidazole catalyst, mechanistic analysis, **133**, 332 - in direct synthesis of methanol, dimethyl ether, and paraffins over zeolite catalysts, **134**, 226
 - formation by direct oxidation of methane over Pt monoliths, **138**, 267
 - higher oxygenate synthesis from, Na-Mn-Ni coprecipitated catalysts selective for, TPR and XPS studies, **138**, 733
 - reaction to oxygenates on Mo-Ru/SiO₂ catalysts, analysis, **137**, 77

T

- (*R,R*)-Tartaric acid
 modified Ni/SiO₂ catalysts, enantioselective hydrogenation of methyl acetoacetate, **136**, 1
- Tellurium
 NaX-supported catalysts, alkane reactions: kinetic coupling and hydrogen surface fugacities in heterogeneous catalysts, **134**, 549
- TEM, *see* Transmission electron microscopy
- Temperature
 effects on catalyst activity, deactivation, and coke formation during piperidine hydrogenolysis on commercial hydrocracking catalyst NU-D, **135**, 27
 high, Pt/CeY and Pt/LaY zeolites heated in different gases at, effect of Pt sintering, **136**, 334
 low, in
 CO adsorption on Na-ZSM-5 zeolites, FTIR analysis, **137**, 179
 two-step conversion of methane to hydrocarbons, analysis, **138**, 101
 pretreatment, effect on acidic properties of SAPO-37 molecular sieve, **138**, 90
 sulfiding, effect on unsupported FeMoS catalysts, **138**, 640
- Temperature-programmed desorption
 in analysis of
 alcohol adsorption sites on γ -Al₂O₃, **135**, 444
 allylamine and benzylamine adsorbed on various oxides, **134**, 409
 isopropylamine adsorption for characterization of acid sites in SiO₂-Al₂O₃ catalysts, **138**, 714
 NH₃ oxidation over YBa₂Cu₃O₇(123) oxide systems, **135**, 335
 reversible hydrogen adsorption on MoS₂, **137**, 385
 V₂O₅, TiO₂, and V₂O₅/TiO₂ catalysts for NO reduction, **135**, 246
 based 2-propylamine cracking, solid acid zeolites and CaO in, comparison, **138**, 391
- Temperature-programmed oxidation
 coke deposits on Ru/zeolite 13X catalyst, detection method: methanation of CO₂ in presence of O₂, **138**, 240
- Temperature-programmed reaction
 in analysis of
 coprecipitated Na-Mn-Ni catalysts active for higher oxygenate synthesis from syngas, **138**, 733
 V₂O₅, TiO₂, and V₂O₅/TiO₂ catalysts for catalytic NO reduction, **135**, 246
 C₃, C₄, and C₅ oxygenates, in analysis of higher alcohol synthesis over K₂O-promoted ZnCrO catalysts, **135**, 400
 in mechanistic study of oxygen insertion into MoO₃ crystals, **137**, 429
- Temperature-programmed reaction and desorption
 in characterization of surface structure of crystalline and amorphous Cr₂O₃ catalysts for selective NO reduction, **133**, 397
- Temperature-programmed reduction
 in analysis of
 reversible hydrogen adsorption on MoS₂, **137**, 385
 V₂O₅/TiO₂ catalysts doped with Na, **134**, 47
- Temperature-programmed sulfiding
 precursor cobalt oxide for preparation of sulfided Co catalysts: generation of highly active sites for hydrogenation and isomerization, **133**, 498
- Thermal analysis
 differential, V₂O₅/TiO₂ catalysts doped with Na, **134**, 47
- Thermodesorption
 in analysis of H₂ adsorption on unsupported Ru sulfide, **138**, 409
- Thermodynamics
 irreversible, diffusion in zeolites, analysis by Maxwell-Stefan theory: comparison with Monte Carlo simulation, **136**, 463
- Thermogravimetric analysis
 in analysis of isopropylamine adsorption for characterization of acid sites in SiO₂-Al₂O₃ catalysts, **138**, 714
 V₂O₅/TiO₂ catalysts doped with Na, **134**, 47
- Thiophene
 hydrosulfurization
 catalytic activity of unpromoted molybdenum sulfides prepared by elemental solid state reaction, **137**, 333
 over Mo/Al₂O₃ and P-Mo/Al₂O₃ catalysts, MoO₃ impregnation and reactivity in, effect of phosphorus, **136**, 478
 and simultaneous cyclohexene hydrogenation, on unsupported FeMoS catalysts, **138**, 640
- Tin
 addition to dual function cracking catalyst mixtures, effect on performance, **135**, 325
 -Pd bimetallic surface alloy, c(2×2)-Sn/Pd(100), and Pd(100) single crystal surface, steady-state CO oxidation kinetics over, **133**, 179
 -Pt/Al₂O₃ catalysts, FTIR study, **138**, 491
 and Zn-promoted Cu catalysts, direct synthesis of methylchlorosilanes, steady-state and transient reaction kinetics, **134**, 168
- Tin oxide
 support of molybdenum oxide monolayer, methanol oxidation, identification of active sites, **134**, 331
- Titania, *see* Titanium dioxide
- Titanium dioxide
 anatase
 and rutile, support of MoO catalysts: surface structures under ambient conditions, **136**, 539
 support of V₂O₅ catalysts, dispersed vanadia species in, quantitative structural analysis, **134**, 479
 vanadium-oxo species adsorbed on, state and localization, IR spectroscopic study, **134**, 299
 B polymorph, support of V₂O₅ catalysts, toluene

- ammoxidation, coverage effects in, EPR study, **138**, 79
- $\text{Cr}_x\text{O}_y \cdot \text{TiO}_2$ polycrystalline system, for photoreactions, structural and surface characterization, **134**, 434
- interaction with La_2O_3 in thin films, XPS analysis, **137**, 114
- photocatalysis of NH_3 -NO reaction, **134**, 317
- pure and Nb-doped ceramic membranes catalyzing photodegradation of 3-chlorosalicylic acid, properties, **134**, 36
- SiO_2
- catalysts modified with H_2SO_4 , characterization and acid catalytic activity, **136**, 267
 - mixed gels, support of vanadia: dispersed phase structure and activity for catalytic reduction of NO with NH_3 , **133**, 1
 - support of Pt catalysts, butane hydrogenolysis, strong metal-support interactions, **134**, 751
 - surface acidity, characterization, **135**, 505
- SiO_2 deposition, generation of acid sites, **134**, 340
- support of
- AlPO_4 catalysts, alkylation of toluene with methanol, **137**, 51
 - Co catalysts, structure and activity, **135**, 173
 - Fe catalysts, in Fischer-Tropsch synthesis, associated carbonaceous deposits, effect of support, **136**, 96
 - Mo-, Ni-, Pd- and Zr-incorporated catalysts, propane reactions, **136**, 423
 - MoO_3 catalysts, XAFS study of support effects, **138**, 746
 - Mo-oxo species deposited by absorption: adsorption mechanism and characterization of calcined samples, **136**, 432
 - MoS_2 catalysts: morphology, **137**, 513
 - Nb_2O_5 catalysts, acidic properties, IR spectroscopic analysis, **135**, 186
 - Ni-calcined catalysts prepared by ion exchange: characterization of Ni state, **136**, 415
 - Pt- $\text{RuO}_2/\text{TiO}_2$ catalysts, photocatalytic cleavage of water, catalytic parameters and operational variables, effects of, **134**, 629
 - Ru and Co catalysts in Fischer-Tropsch synthesis: effects of support and metal dispersion on reaction rate and selectivity, **137**, 212
 - Ru- RuO_x catalysts, transient species formed over in CO and CO + H_2 interaction, FTIR spectroscopic study, **137**, 473
 - V_2O_5 catalysts, Na-doped, **134**, 47
 - V_2O_5 catalysts for NO reduction by NH_3 , catalytic activity and selectivity effects of structure, **134**, 492
 - NO_x reduction reactivity, effect of water, **134**, 742
 - temperature-programmed desorption/reaction and *in situ* spectroscopic studies, **135**, 246
 - thin film catalysts, temperature-programmed desorption/reaction and *in situ* spectroscopic studies, **135**, 246
 - V_2O_5 and - V_2O_5 - SiO_2 gels: structural genesis and catalytic behavior in NO reduction with NH_3 , **134**, 75
- Titanium silicalite
- reactions with protic molecules and H_2O_2 , **133**, 220
 - TS-1, framework composition and Ti content, **137**, 497
- Titration
- Mo sites on sulfided Mo/ Al_2O_3 catalysts, in FTIR study of CO adsorption, **137**, 69
- Toluene
- alkylation with methanol over AlPO_4 , $\text{AlPO}_4/\text{Al}_2\text{O}_3$, $\text{AlPO}_4/\text{TiO}_2$, and $\text{AlPO}_4/\text{ZrO}_2$ catalysts, **137**, 51
 - ammoxidation over $\text{V}_2\text{O}_5/\text{TiO}_2(\text{B})$ catalysts, coverage effects in, EPR study, **138**, 79
 - disproportionation, USHY zeolite deactivation during, composition of carbonaceous compounds responsible for, **134**, 286
 - ethylation on MgO-modified H-ZSM-5 and ZSM-5 zeolites, **135**, 321
 - isomers, inside pores of ZSM-5 zeolite, dynamic behavior simulation, **136**, 141
 - and methane, oxidative cross-coupling over LiCl-added Co_3O_4 catalysts, kinetic analysis, **137**, 487
- TPD, *see* Temperature-programmed desorption
- TPRD, *see* Temperature-programmed reaction and desorption
- TPS *see* Temperature-programmed sulfiding
- TPSR, *see* Temperature-programmed surface reaction
- Tracer exchange
- in zeolites under conditions of single-file diffusion, analysis by Monte Carlo simulation, **136**, 283
- Transformation
- 2,4,4-trimethyl-2-pentene over Al_2O_3 - and SiO_2 -supported and unsupported perfluorinated resin-sulfonic acid catalysts, **137**, 12
- Transient species
- formed over Ru- $\text{RuO}_x/\text{TiO}_2$ catalyst during CO and CO + H_2 interaction, FTIR spectroscopic study, **137**, 473
- Transition metal catalysts
- group VIII, in low-temperature two-step hydrocarbon formation from methane, **138**, 101
- Transition metal sulfides
- Fe-Mo and Fe-W, unsupported hydrodenitrogenation-selective catalysts, development, **138**, 351
- Transmission electron microscopy
- in comparison of hydrosulfurization catalysts prepared by homogeneous sulfide precipitation and impregnated thiosalt decomposition, **137**, 232
- Trichloroethylene
- catalytic oxidation, modified transition metal-exchanged Y zeolite catalysts in, comparison, **138**, 179

1,2,4-Trimethylbenzene

selective formation among trimethylbenzenes during methylation of xylenes over Al-, Fe-, and Ga-silicates with MEL structure, **138**, 518

2,4,4-Trimethyl-2-pentene, *see* Isooctane

Triphenylphosphine

enhancement of Pd-catalyzed carbonylation of N-chloroamines, **136**, 403

Tungsten

-Fe sulfide and Fe-Mo sulfide unsupported hydrodenitrogenation-selective catalysts, development, **138**, 351

Tungsten carbide

high-specific-surface-area catalysts, hydrocarbon-reforming reactions, comparison with Pt/Al₂O₃: catalyst activation and stabilization in reaction of *n*-hexane, **134**, 383

Tungsten sulfide

ZrO₂-supported catalysts, catalytic functionalities, **133**, 146

Tungsten trioxide

in 12% WO₃/Al₂O₃ composite, support of

Co catalysts: effect of second-phase oxides on catalytic properties of dispersed metals, **135**, 200

Pd catalysts: effect of second-phase oxides on catalytic properties of dispersed metals, **138**, 55

U

Ultraviolet-visible spectroscopy

in situ diffuse reflectance, in analysis of pretreatment chemistry in preparation of SiO₂-supported Pt, Ru, and Pt-Ru catalysts, **133**, 202

Na-doped V₂O₅/TiO₂ systems, **134**, 47

sol-gel Pd/SiO₂ catalysts, **138**, 463

V

Vanadia, *see* Vanadium pentoxide

Vanadium

-oxo species adsorbed on TiO₂, state and localization, IR spectroscopic study, **134**, 299

passivation by rare earth compounds soluble in feedstock: hydrothermal aging of cracking catalysts, **134**, 469

promoted Rh/SiO₂ catalysts

CO insertion into CH_x surface intermediates, transient response study, **134**, 13

CO reactivity on, analysis with transient techniques, **134**, 1

V(IV), resin-supported catalysts: catalyst synthesis and kinetics of epoxidation of maleic, fumaric, and crotonic acids with H₂O₂, **137**, 510

Vanadium nitride

NH₃ decomposition on, kinetics, **133**, 358

Vanadium oxide

VO_x, AlNbO-supported catalysts for hydrocarbon oxidation, physicochemical analysis, **137**, 257

Vanadium pentoxide

interaction with sepiolite, ⁵¹V solid-state NMR and Raman spectroscopic structural analysis, **137**, 36

pure gel, and in mixed oxide gel matrix with TiO₂ and TiO₂-SiO₂: structural genesis and catalytic behavior in NO reduction with NH₃, **134**, 75

TiO₂-supported catalysts

anatase, dispersed vanadia species in, quantitative structural analysis, **134**, 479

Na-doped, analysis, **134**, 47

NO reduction by NH₃, catalytic activity and selectivity, effects of structure, **134**, 492

NO_x reduction reactivity, effect of water, **134**, 742

toluene ammoxidation, coverage effects in, EPR study, **138**, 79

-SiO₂-supported mixed oxide gel catalysts, dispersed phase structure and selective catalytic reduction of NO with NH₃, **133**, 1

and unsupported catalysts, NO reduction, temperature-programmed desorption/reaction and *in situ* spectroscopic studies, **135**, 246

Vanadium phosphates

for *n*-butane oxidation to maleic anhydride catalysts, *in situ* laser Raman spectroscopic study, **134**, 151

Vanadium silicates

crystalline and microporous, with MEL structure, synthesis and catalytic properties, **137**, 225

Vanadium sulfides

Mo-promoted and unsupported catalysts, preparation, characterization, and catalytic properties, **135**, 304

W

Water

-BF₃ systems, acidity, evaluation from ¹³C NMR measurements, **134**, 126

and CO₂, gasification of graphite over alkali and alkaline earth metal catalysts, mechanism, electron microscopic study, **138**, 12

effect on reactivity of V₂O₅/TiO₂ for catalytic reduction of NO_x, **134**, 742

exclusion, role in acidic degradation of zeolite catalysts during aromatic chlorination with SO₂Cl₂, **135**, 92

photocatalytic cleavage over Pt-RuO₂/TiO₂ catalysts, effects of catalyst parameters and operational variables, **134**, 629

reactions with titanium silicalite, **133**, 220

Water-gas shift reaction

on CeO₂, regulation of reaction intermediate by reactant, **136**, 493

CoCr₂O₄, CoMn₃O₄, and CuMn₃O₄ as catalysts for, comparison, **137**, 408

over Cs-promoted Cu(110) catalysts, kinetics and mechanism, **136**, 24

kinetic model, **134**, 445

- reverse, over
 Cu(110), kinetics, **134**, 66
 Cu/ZnO catalyst, mechanism, **134**, 220
- Water vapor
 effect on Pt accessibility in hydrogen reduction of
 Pt/Al₂O₃ catalysts, **137**, 377
 Pt/CeY and Pt/LaY zeolites heated at high tempera-
 ture in, changes in Pt dispersion, **136**, 334
- Wetting
 solid/solid, MoO₃/Al₂O₃ catalysts prepared by, dis-
 persion and activity, **136**, 50

X

- XANES, *see* X-ray absorption near-edge structure
- Xenon
 adsorption on zeolite crystals, molecular dynamics
 simulation: surface barrier concept in diffusion,
134, 536
- XPS, *see* X-ray photoelectron spectroscopy
- X-ray absorption
 near-edge structure, V₂O₅/TiO₂ catalysts doped with
 Na, **134**, 47
- X-ray absorption fine structure
 MoO₃ catalysts on various supports, **138**, 746
- X-ray absorption near-edge structure
 oxygen K-edge, Ba-doped Y₂O₃ oxidative coupling
 catalyst, **136**, 16
- X-ray absorption spectroscopy
 in catalytic and structural study of sulfur poisoning
 of Pt/BaK-LTL catalysts, **138**, 675
- X-ray diffraction
 in analysis of unsupported Fe catalysts in Fischer-
 Tropsch synthesis, **134**, 654
 FeMo/Al₂O₃ catalysts, for heavy oil processing, **134**,
 98
in situ, singly and doubly promoted Mn₃O₄ methane
 coupling catalysts, **134**, 242
 V₂O₅/TiO₂ catalysts doped with Na, **134**, 47
- X-ray photoelectron spectroscopy
 in analysis of
 coprecipitated Na-Mn-Ni catalysts active for
 higher oxygenate synthesis from syngas, **138**,
 733
 interactions of valence-invariant and reducible
 oxides in thin films containing Pd, **137**, 114
 MoO₃/Al₂O₃ catalysts after reduction, **135**, 269
 Pt/SO₄²⁻-ZrO₂ catalysts *in situ*, **135**, 60
 with pyrrole as probe, in study of basicity in alkaline
 cation faujasite zeolites, **137**, 322
 and SIMS, in analysis of surface chemistry of acti-
 vated carbons, **133**, 467
- X-ray powder diffraction
 titanium silicalite-1 framework composition and Ti
 content, **137**, 497
- m*-Xylene
 gas-phase, heterogeneous photocatalytic oxidation
 for air purification, **136**, 554

Xylenes

- isomers, inside pores of ZSM-5 zeolite, dynamic be-
 havior simulation, **136**, 141
 methylation over Al-, Fe-, and Ga- silicates with
 MEL structure: selective formation of 1,2,4 iso-
 mer among trimethylbenzenes, **138**, 518

Y

- Ytterbium oxide
 catalysis of methane, ethane, and ethylene conver-
 sion in absence and presence of free oxygen,
 pulse microreactor studies, **135**, 310
- Yttria, *see* Yttrium oxide
- Yttrium
 -Ba-Cu-O perovskites, Co- and Al-substituted, CO
 oxidation over, **138**, 562
 doped ZrO₂ in solid electrolyte reactor
 Ag films deposited on, chemisorptive properties:
 NEMCA effect, **138**, 570
 ethylene epoxidation on Ag deposited on:
 NEMCA effect, **138**, 588
 YBa₂Cu₃CoO_{7+x} superconductors, NH₃ oxidation,
135, 335
- Yttrium oxide
 Ba-doped catalyst for oxidative coupling of meth-
 ane, oxygen XANES characterization, **136**, 16

Z

Zeolites

- A, ion-exchanged, H₂ encapsulation at 1 atm, **135**,
 135
- acid, soft-hard acidity, molecular orbital calculation
 and implications for catalytic activity, **136**, 521
- BaK-LTL, in support of Pt catalysts, effect of sul-
 fur poisoning: hydrogen chemisorption and X-
 ray absorption spectroscopic analysis, **138**, 675
- based catalysts, alkylation of benzene with long-
 chain olefins, isomer distribution in, **138**, 386
- cell size units, effects on catalyst activity and deacti-
 vation in commercial hydrocracking catalysts
 during piperidine hydrogenolysis, **135**, 481
- CeY and LaY, support of Pt catalysts, Pt dispersion
 changes at high temperatures in various gases,
136, 334
- Cu/ZSM-5, interaction between NO and Cu ions,
 EPR and FT-IR spectroscopic studies, **136**, 510
- diffusion in, Monte Carlo simulations and compari-
 son with Maxwell-Stefan theory, **136**, 463
- Eu/NaX, cyclopropane isomerization
 effect of Eu³⁺ content, **138**, 1
 to propylene, transient diffusion, desorption, and
 reactions studies, **135**, 223
- Faujasite, *see* Faujasites
- H-ZSM-5
 acidity and catalytic activity in methanol dehydra-
 tion, comparison with SAPO-34 and MeAPSO-
 34 (Me = Co, Cr, Mn), **135**, 518

- alone and in support of Ga catalysts, alkane reactions: kinetic coupling and hydrogen surface fugacities in heterogeneous catalysts, **134**, 549
- n*-butane cracking monomolecular and bimolecular mechanisms, **135**, 115
- chemical reaction on, second-generation CAV-ERN apparatus for *in situ* solid-state NMR studies, **136**, 504
- coke deposited in acetone conversion, hydrogens of, isotope exchange for deuterium of organic compounds, **136**, 258
- direct partial oxidation of methane to liquid hydrocarbons over, **136**, 578
- and HY, *n*-decane and *n*-hexane cracking on, in 500 to 780 K temperature range, kinetics, **137**, 437
- metal-free catalyst, activation of molecular hydrogen into protonic acid sites over, **138**, 750
- and ZSM-5, MgO-modified, ethylation of toluene and transformation of *p*-ethyltoluene, **135**, 321
- HY
- cracking of *i*-butane and *n*-pentane on, mechanism, **136**, 446
- high-sodium, activity and selectivity, effects of deactivation, **134**, 583
- NaY, support of Pd catalysts, direct synthesis of methanol, dimethyl ether, and paraffins from syngas, **134**, 226
- intrinsic reaction mechanisms and internal pore systems, probing with *n*-propylbenzene disproportionation process, **133**, 136
- KL, support of Pt catalysts prepared by ion exchange or incipient wetness impregnation, comparison, **133**, 342
- L, –Pt catalyst, *n*-octane aromatization, conversion of labeled *n*-propylcyclopentane during ¹⁴C tracer study, **134**, 269
- metal-free, ethylene hydrogenation, analysis of active sites, **133**, 527
- MFI- and MOR-type crystals, surface concept in diffusion in, molecular dynamics simulations, **134**, 536
- NaHY, beta, and dealuminated Y, comparison with CaO in temperature-programmed 2-propylamine cracking, **138**, 391
- NaX
- Cs⁺- and Ni²⁺-exchanged, studies of transient sorption and desorption cyclopropane and propylene, **135**, 236
- cyclopropane isomerization to propylene associated molecular diffusion, *in situ* measurement by pulsed-field gradient NMR, **137**, 243
- transient diffusion, desorption, and reactions studies, **135**, 223
- support of Te catalysts, alkane reactions: kinetic coupling and hydrogen surface fugacities in heterogeneous catalysts, **134**, 549
- and ZF520, acidic degradation during aromatic chlorination with SO₂Cl₂, **135**, 92
- NaY
- encaged PdNi_x alloys, CO hydrogenation over, **136**, 182
- encapsulated Pd–Co catalysts, CO hydrogenation over, analysis of metal phases and product selectivity, **138**, 721
- Pt–Ir clusters formed in, analysis with ¹²⁹Xe NMR and ethane hydrogenolysis, **137**, 357
- support of Pt–Cu bimetallic catalysts, ¹²⁹Xe NMR and EXAFS analysis, **133**, 191
- NaZSM-5
- low-temperature CO adsorption, FTIR analysis, **137**, 179
- methylamine synthesis, *in situ* ¹³C MAS NMR study, **136**, 202
- single-file diffusion and chemical reactions in, analysis by Monte Carlo simulation, **136**, 283
- TS-1, in vapor-phase Beckmann rearrangement of cyclohexanone oxime, catalytic properties, **137**, 252
- USHY
- deactivation during toluene disproportionation, carbonaceous compounds causing, composition, **134**, 286
- n*-nonane cracking, coke formation and catalyst deactivation in, relationship, **138**, 343
- USY
- based fluid catalytic cracking catalysts, acidity studies by microcalorimetry and IR spectroscopy, **136**, 392
- cracking of alkyl aromatics, analysis, **135**, 45
- 13X, support of Ru catalyst, coke deposits, detection method for temperature programmed oxidation: methanation of CO₂ in presence of O₂, **138**, 240
- Y
- aggregate size effects in ¹²⁹Xe NMR, **133**, 42
- ammonium hexafluorosilicate modified, development of strong acidity in, **136**, 566
- deuterium ions in, location, pulsed-neutron powder diffraction study, **138**, 405
- isopropylation of naphthalene over, **136**, 487
- oxidative destruction of chlorofluorocarbons, analysis, **138**, 364
- modified transition metal-exchanged, chlorinated hydrocarbon oxidation, comparison, **138**, 179
- Ni-loaded, benzene ethylation and cumene dealkylation, analysis, **138**, 164
- rare earth-exchanged, Ni–Sb interactions in, **135**, 596
- reduction of Ni²⁺ cations in, effect of environment, **136**, 170
- ultra-stable, Ni–Mo/Al₂O₃ catalysts with, in cleavage of biphenyl moieties: hydrocracking pathway, **137**, 504
- ZSM-5
- amorphous silica–alumina composite catalysts prepared with high-alumina and low organic

- template content gels, synthesis and cracking behavior, **133**, 28
- nucleophilic substitution of chlorobenzene with methanol on, **134**, 373
- pores, dynamic behaviors of simple aromatic hydrocarbons inside, simulation, **136**, 141
- support of Pt catalysts, Pt dispersion in, characterization, **136**, 43
- two-component diffusion in, theoretical model, **136**, 263
- ZSM-11, Al-, Fe-, and Ga- silicate derivatives, in methylation of xylenes: selective formation of 1,2,4 isomer among trimethylbenzenes, **138**, 518
- Zinc**
- chromium-Cu catalysts, Co-modified, in methanol synthesis, **135**, 386
 - chromium-O catalyst, Cs-promoted, higher alcohol synthesis, chain growth process in kinetics, **135**, 99
 - and Sn-promoted Cu catalysts, direct synthesis of methylchlorosilanes, steady-state and transient reaction kinetics, **134**, 168
 - ZnCrO, K₂O-promoted catalysts, higher alcohol synthesis, mechanistic aspects, **135**, 400
- Zinc oxide**
- CuO-Al₂O₃ catalysts for decomposition of 2-propanol, catalytic behavior and surface chemistry, **136**, 86
 - CuO catalysts, Al₂O₃-supported, liquid-phase oxidation of phenol, kinetics, **135**, 345
- support of
- Co catalysts, Co reduction and state in, analysis: metal-support interaction, **135**, 263
 - Cu catalysts
 - methyl formate formation, mechanism, **136**, 609
 - synthesis catalysts, precursor preparation by coprecipitation methods, **138**, 754
 - Pd catalysts, hydrogenation of esters, **135**, 420
 - and ZnO-Al₂O₃, support of Cu catalysts, in methanol synthesis from H₂, CO, and CO₂, **136**, 59
- Zirconia, *see* Zirconium oxide
- Zirconium**
- incorporated SiO₂, TiO₂, and ZrO₂ catalysts, propane reactions on, **136**, 423
 - Mn mixed oxide catalysts, structure and properties in CO hydrogenation, **138**, 630
- Zirconium oxide**
- amorphous, support of Au catalysts for CO oxidation: activity, deactivation, and reaction mechanism, **137**, 306
 - Pt- and SO₄²⁻-promoted catalysts, surface acid properties, dynamic modification with hydrogen molecule, **135**, 609
 - SiO₂ deposition, generation of acid sites, **134**, 340
 - SO₄²⁻-catalysts support of Pt, *in situ* XPS study, **135**, 60
 - stabilized pellet, ethylene oxidation on Pt with, NEMCA effect, **137**, 278
 - support of
 - AlPO₄ catalysts, alkylation of toluene with methanol over, **137**, 51
 - Cu catalyst, reverse water-gas shift reaction, mechanism, **134**, 220
 - Fe catalysts, in Fischer-Tropsch synthesis, associated carbonaceous deposits, effect of support, **136**, 96
 - Mo-, Ni-, Pd- and Zr-incorporated catalysts, propane reactions, analysis, **136**, 423
 - MoO catalysts: surface structures under ambient conditions, **136**, 539
 - Nb₂O₅ catalysts, acidic properties, IR spectroscopic analysis, **135**, 186
 - Pd catalyst prepared from amorphous Pd-Zr alloy, CO oxidation: chemical nature of active surface, **137**, 139
 - WS₂ catalysts, dispersion and catalytic functionalities study, **133**, 146
 - Y₂O₃-doped solid electrolyte reactor
 - Ag films deposited on, chemisorptive properties: NEMCA effect, **138**, 570
 - ethylene epoxidation on Ag deposited on: NEMCA effect, **138**, 588