ELSEVIER

Journal of Molecular Catalysis A: Chemical 114 (1996) 365–371

JOURNAL OF MOLECULAR CATALYSIS A: CHEMICAL

Subject Index

Acetal
Kinetic studies of liquid-phase acetal formation catalyzed by Keggin-type heteropolyacids (Sato, S. (114) 209)

Acidic protons
^{1}H NMR studies on the dynamic property of protons in Pd^0–$H_3PW_{12}O_{40}$ systems in the presence of dihydrogen (Baba, T. (114) 247)

Acylperoxy radicals
Co-oxidative epoxidation of cyclohexene with molecular oxygen, isobutyraldehyde reductant, and the polyoxoanion-supported catalyst precursor $[(n\text{-}C_4H_9)_4N]_5Na_3[(1,5\text{-COD})Ir \cdot P_2W_{15}Nb_3O_{62}]$. The importance of key control experiments including omitting the catalyst and adding radical-chain initiators. (Mizuno, N. (114) 15)

Adamantane
Aerobic photocatalytic oxidation of adamantane with heteropolyoxometalates $[X^{n+}W_{12}O_{40}]^{8-n}$ where X = Si, Co^{2+}, Co^{3+} (Ermolenko, L. (114) 87)

Added radical-chain initiator control reactions
Co-oxidative epoxidation of cyclohexene with molecular oxygen, isobutyraldehyde reductant, and the polyoxoanion-supported catalyst precursor $[(n\text{-}C_4H_9)_4N]_5Na_3[(1,5\text{-COD})Ir \cdot P_2W_{15}Nb_3O_{62}]$. The importance of key control experiments including omitting the catalyst and adding radical-chain initiators. (Mizuno, N. (114) 15)

Aerobic
The first combinatorially prepared and evaluated inorganic catalysts. Polyoxometalates for the aerobic oxidation of the mustard analog tetrahydrothiophene (THT) (Hill, C.L. (114) 103)

Alcohol oxidation
Photochemical behavior of Keggin ions and related compounds (Fournier, M. (114) 53)
Investigation of the manganese-substituted α-Keggin-heteropolyanion $K_6SiW_{11}O_{39}Mn(H_2O)$ by cyclic voltammetry and its application as oxidation catalyst (Sadakane, M. (114) 221)

Aldehyde autoxidation
Co-oxidative epoxidation of cyclohexene with molecular oxygen, isobutyraldehyde reductant, and the polyoxoanion-supported catalyst precursor $[(n\text{-}C_4H_9)_4N]_5Na_3[(1,5\text{-COD})Ir \cdot P_2W_{15}Nb_3O_{62}]$. The importance of key control experiments including omitting the catalyst and adding radical-chain initiators. (Mizuno, N. (114) 15)

Alkane oxidation
Alkane oxidation with mixed addenda heteropoly catalysts containing Ru(III) and Rh(III) (Matsumoto, Y. (114) 161)

Alkene epoxidation
Polyfunctional action of transition metal substituted heteropolytungstates in alkene epoxidation by molecular oxygen in the presence of aldehyde (Kholdeeva, O.A. (114) 123)
Alkene epoxidation by hydrogen peroxide in the presence of titanium-substituted Keggin-type polyoxotungstates $[PTi_xW_{12-x}O_{40}]^{(3+2x)-}$ and $[PTi_xW_{12-x}O_{40-x}(O_2)_x]^{(3+2x)-}$ (x = 1 and 2) (Yamase, T. (114) 237)

Allylic alcohols
Epoxidation of allylic alcohols by hydrogen peroxide in the presence of complexed peroxotungstic species (Gelbard, G. (114) 77)

Amine oxide
Epoxidation of allylic alcohols by hydrogen peroxide in the presence of complexed peroxotungstic species (Gelbard, G. (114) 77)

Anionic oxidants
Oxidation of *N,N*-benzylalkylamines to nitrones by Mo(VI) and W(VI) polyperoxo complexes (Ballistreri, F.P. (114) 229)

Aromatic hydrocarbons
Contribution to water purification using polyoxometalates. Aromatic derivatives, chloroacetic acids (Mylonas, A. (114) 191)

Autooxidation
Aerobic photocatalytic oxidation of adamantane with heteropolyoxometalates $[X^{n+}W_{12}O_{40}]^{8-n}$ where X = Si, Co^{2+}, Co^{3+} (Ermolenko, L. (114) 87)

Benzene
Hydroxylation of benzene catalyzed by selectively site-substituted vanadium(V) heteropolytungstates in the presence of hydrogen peroxide (Nomiya, K. (114) 181)

Benzene oxidation
Complexes of palladium(II) and platinum(II) with the $PW_{11}O_{39}^{7-}$ heteropolyanion as catalytically active species in benzene oxidation (Kuznetsova, N.I. (114) 131)

Biomimetic oxidation
Redox properties of photoexcited $(nBu_4N)_3PW_{12}O_{40}/Fe^{III}$ porphyrins composite systems (Maldotti, A. (114) 141)

1,2-Butandiol
Kinetic studies of liquid-phase acetal formation catalyzed by Keggin-type heteropolyacids (Sato, S. (114) 209)

Carbon supported heteropolyacids
Esterification of propanoic acid by butanol and 2-ethylhexanol catalyzed by heteropolyacids pure or supported on carbon (Dupont, P. (114) 299)

Catalysis
Co-oxidative epoxidation of cyclohexene with molecular oxygen, isobutyraldehyde reductant, and the polyoxoanion-supported catalyst precursor $[(n\text{-}C_4H_9)_4N]_5Na_3[(1,5\text{-COD})Ir \cdot P_2W_{15}Nb_3O_{62}]$. The importance of key control experiments including omitting the catalyst and adding radical-chain initiators. (Mizuno, N. (114) 15)
The first combinatorially prepared and evaluated inorganic catalysts. Polyoxometalates for the aerobic oxidation of the mustard analog tetrahydrothiophene (THT) (Hill, C.L. (114) 103)
Preparation, spectroscopic and catalytic studies of poly(1,4-phenylene-methylidynenitrilo-1,4-phenylenenitrilomethylidyne) protonated with selected heteropolyacids (Stochmal-Pomarzańska, E. (114) 267)
Catalyst
Catalysis of the oxidation of isobutyric acid by vanadyl, copper and mixed vanadyl–copper salts of $H_3[PMo_{12}O_{40}]$ and $H_4[PMo_{11}VO_{40}]$ (Bayer, R. (114) 277)
Catalyst precursor
Hydroxylation of benzene catalyzed by selectively site-substituted vanadium(V) heteropolytungstates in the presence of hydrogen peroxide (Nomiya, K. (114) 181)
Catalytic activity
A perspective on nanocluster catalysis: polyoxoanion and $(n\text{-}C_4H_9)_4N^+$ stabilized $Ir(0)_{\sim 300}$ nanocluster 'soluble heterogeneous catalysts' (Aiken III, J.D. (114) 29)
Catalytic effect of carbonyl compounds
Photochemical behavior of Keggin ions and related compounds (Fournier, M. (114) 53)
Catalytic lifetime
A perspective on nanocluster catalysis: polyoxoanion and $(n\text{-}C_4H_9)_4N^+$ stabilized $Ir(0)_{\sim 300}$ nanocluster 'soluble heterogeneous catalysts' (Aiken III, J.D. (114) 29)
Chain radical mechanism
Polyfunctional action of transition metal substituted heteropolytungstates in alkene epoxidation by molecular oxygen in the presence of aldehyde (Kholdeeva, O.A. (114) 123)
Chloroacetic acids
Contribution to water purification using polyoxometalates. Aromatic derivatives, chloroacetic acids (Mylonas, A. (114) 191)
cis/trans isomerization
High-valent manganese in polyoxotungstates. 4. Catalytic and stoichiometric alkene oxidation (Zhang, X.-y. (114) 201)
Combinatorial
The first combinatorially prepared and evaluated inorganic catalysts. Polyoxometalates for the aerobic oxidation of the mustard analog tetrahydrothiophene (THT) (Hill, C.L. (114) 103)
Conjugated polymers
Preparation, spectroscopic and catalytic studies of poly(1,4-phenylene-methylidynenitrilo-1,4-phenylenenitrilomethylidyne) protonated with selected heteropolyacids (Stochmal-Pomarzańska, E. (114) 267)
Copper
Catalysis of the oxidation of isobutyric acid by vanadyl, copper and mixed vanadyl–copper salts of $H_3[PMo_{12}O_{40}]$ and $H_4[PMo_{11}VO_{40}]$ (Bayer, R. (114) 277)
Cyclic voltammetry
Investigation of the manganese-substituted α-Keggin-heteropolyanion $K_6SiW_{11}O_{39}Mn(H_2O)$ by cyclic voltammetry and its application as oxidation catalyst (Sadakane, M. (114) 221)
Cycloalkenes
Molybdovanadophosphate (NPMoV)/hydroquinone/O_2 system as an efficient reoxidation system in palladium-catalyzed oxidation of alkenes (Yokota, T. (114) 113)
Cyclohexanone
Kinetic studies of liquid-phase acetal formation catalyzed by Keggin-type heteropolyacids (Sato, S. (114) 209)
Cyclohexene
High-valent manganese in polyoxotungstates. 4. Catalytic and stoichiometric alkene oxidation (Zhang, X.-y. (114) 201)

Dawson-type
Hydroxylation of benzene catalyzed by selectively site-substituted vanadium(V) heteropolytungstates in the presence of hydrogen peroxide (Nomiya, K. (114) 181)
Dihydrogen
^1H NMR studies on the dynamic property of protons in Pd^0–$H_3PW_{12}O_{40}$ systems in the presence of dihydrogen (Baba, T. (114) 247)
vic-Diol
Oxidative C–C bond cleavage of *vic*-diols with H_2O_2 catalyzed by heteropolyacids (Shimizu, M. (114) 217)
Dioxygen
Aerobic photocatalytic oxidation of adamantane with heteropolyoxometalates $[X^{n+}W_{12}O_{40}]^{8-n}$ where X = Si, Co^{2+}, Co^{3+} (Ermolenko, L. (114) 87)

Electrocatalysis
Electrocatalytic reduction of nitrite using Dawson-type tungstodiphosphate anions in aqueous solutions, adsorbed on a glassy carbon electrode and doped in polypyrrole film (Xi, X. (114) 257)
Epoxidation
Epoxidation of allylic alcohols by hydrogen peroxide in the presence of complexed peroxotungstic species (Gelbard, G. (114) 77)
A new dinuclear rhodium(III) 'sandwich' polyoxometalate, $[(WZnRh_2^{III})(ZnW_9O_{34})_2]^{10-}$. Synthesis, characterization and catalytic activity (Neumann, R. (114) 169)
High-valent manganese in polyoxotungstates. 4. Catalytic and stoichiometric alkene oxidation (Zhang, X.-y. (114) 201)
Esterification
Esterification of propanoic acid by butanol and 2-ethylhexanol catalyzed by heteropolyacids pure or supported on carbon (Dupont, P. (114) 299)

Formation of furan
Comparison of catalytic properties for partial oxidation between heteropolyacids and phosphates of vanadium and iron (Ai, M. (114) 3)

Heterogeneous catalysis
A perspective on nanocluster catalysis: polyoxoanion and $(n\text{-}C_4H_9)_4N^+$ stabilized $Ir(0)_{\sim 300}$ nanocluster 'soluble heterogeneous catalysts' (Aiken III, J.D. (114) 29)

Heteropolyacid
Kinetic studies of liquid-phase acetal formation catalyzed by Keggin-type heteropolyacids (Sato, S. (114) 209)
Oxidative C–C bond cleavage of *vic*-diols with H_2O_2 catalyzed by heteropolyacids (Shimizu, M. (114) 217)
Heteropoly acid
^1H NMR studies on the dynamic property of protons in Pd^0–$H_3PW_{12}O_{40}$ systems in the presence of dihydrogen (Baba, T. (114) 247)
Heteropoly acid $H_3PW_{12}O_{40}$
Study of catalysts comprising heteropoly acid $H_3PW_{12}O_{40}$ supported on MCM-41 molecular sieve and amorphous silica (Kozhevnikov, I.V. (114) 287)
Heteropolyacids
Esterification of propanoic acid by butanol and 2-ethylhexanol catalyzed by heteropolyacids pure or supported on carbon (Dupont, P. (114) 299)
Heteropolyanions
Preparation, spectroscopic and catalytic studies of poly(1,4-phenylene-methylidynenitrilo-1,4-phenylenenitrilomethylidyne) protonated with selected heteropolyacids (Stochmal-Pomarzańska, E. (114) 267)
Heteropoly catalysts
Alkane oxidation with mixed addenda heteropoly catalysts containing Ru(III) and Rh(III) (Matsumoto, Y. (114) 161)
Heteropoly compounds
Catalytic performance of $Cs_{2.5}Fe_{0.08}H_{1.26}PVMo_{11}O_{40}$ for direct oxidation of lower alkanes (Mizuno, N. (114) 309)
Heteropoly oxometalates
The interaction of nitrogen oxides with metal–oxygen cluster compounds (heteropoly oxometalates) (Bélanger, R. (114) 319)
Heteropolytungstate
Complexes of palladium(II) and platinum(II) with the $PW_{11}O_{39}^{7-}$ heteropolyanion as catalytically active species in benzene oxidation (Kuznetsova, N.I. (114) 131)
Hydroxylation of benzene catalyzed by selectively site-substituted vanadium(V) heteropolytungstates in the presence of hydrogen peroxide (Nomiya, K. (114) 181)
Heteropolytungstates
Photochemical behavior of Keggin ions and related compounds (Fournier, M. (114) 53)
Aerobic photocatalytic oxidation of adamantane with heteropolyoxometalates $[X^{n+}W_{12}O_{40}]^{8-n}$ where X = Si, Co^{2+}, Co^{3+} (Ermolenko, L. (114) 87)
High-valent manganese in polyoxotungstates. 4. Catalytic and stoichiometric alkene oxidation (Zhang, X.-y. (114) 201)
^1H NMR
^1H NMR studies on the dynamic property of protons in Pd^0–$H_3PW_{12}O_{40}$ systems in the presence of dihydrogen (Baba, T. (114) 247)
Homogeneous catalysis
A perspective on nanocluster catalysis: polyoxoanion and $(n\text{-}C_4H_9)_4N^+$ stabilized $Ir(0)_{\sim 300}$ nanocluster 'soluble heterogeneous catalysts' (Aiken III, J.D. (114) 29)
Preparation and photocatalytic studies on a novel Ti-substituted polyoxometalate (Crano, N.J. (114) 65)
Hydrogen
Complexes of palladium(II) and platinum(II) with the $PW_{11}O_{39}^{7-}$ heteropolyanion as catalytically active species in benzene oxidation (Kuznetsova, N.I. (114) 131)
Hydrogenations
A perspective on nanocluster catalysis: polyoxoanion and $(n\text{-}C_4H_9)_4N^+$ stabilized $Ir(0)_{\sim 300}$ nanocluster 'soluble heterogeneous catalysts' (Aiken III, J.D. (114) 29)
Hydrogen peroxide
Epoxidation of allylic alcohols by hydrogen peroxide in the presence of complexed peroxotungstic species (Gelbard, G. (114) 77)
Oxidative C–C bond cleavage of *vic*-diols with H_2O_2 catalyzed by heteropolyacids (Shimizu, M. (114) 217)
Hydrogen peroxide activation
A new dinuclear rhodium(III) 'sandwich' polyoxometalate, $[(WZnRh_2^{III})(ZnW_9O_{34})_2]^{10-}$. Synthesis, characterization and catalytic activity (Neumann, R. (114) 169)
Hydrogen spillover
A perspective on nanocluster catalysis: polyoxoanion and $(n\text{-}C_4H_9)_4N^+$ stabilized $Ir(0)_{\sim 300}$ nanocluster 'soluble heterogeneous catalysts' (Aiken III, J.D. (114) 29)
Hydroperoxide
Aerobic photocatalytic oxidation of adamantane with heteropolyoxometalates $[X^{n+}W_{12}O_{40}]^{8-n}$ where X = Si, Co^{2+}, Co^{3+} (Ermolenko, L. (114) 87)
Hydroxylation
Hydroxylation of benzene catalyzed by selectively site-substituted vanadium(V) heteropolytungstates in the presence of hydrogen peroxide (Nomiya, K. (114) 181)

Inorganic
The first combinatorially prepared and evaluated inorganic catalysts. Polyoxometalates for the aerobic oxidation of the mustard analog tetrahydrothiophene (THT) (Hill, C.L. (114) 103)
Involvement of $^{\cdot}OH$
Alkene epoxidation by hydrogen peroxide in the presence of titanium-substituted Keggin-type polyoxotungstates $[PTi_xW_{12-x}O_{40}]^{(3+2x)-}$ and $[PTi_xW_{12-x}O_{40-x}(O_2)_x]^{(3+2x)-}$ (x = 1 and 2) (Yamase, T. (114) 237)
Iodosylbenzene
High-valent manganese in polyoxotungstates. 4. Catalytic and stoichiometric alkene oxidation (Zhang, X.-y. (114) 201)
Iron
Catalytic performance of $Cs_{2.5}Fe_{0.08}H_{1.26}PVMo_{11}O_{40}$ for direct oxidation of lower alkanes (Mizuno, N. (114) 309)
Iron phosphate
Comparison of catalytic properties for partial oxidation between heteropolyacids and phosphates of vanadium and iron (Ai, M. (114) 3)
Iron porphyrins
Redox properties of photoexcited $(nBu_4N)_3PW_{12}O_{40}/Fe^{III}$ porphyrins composite systems (Maldotti, A. (114) 141)
Isobutane oxidation
Reactivity of Keggin-type heteropolycompounds in the oxidation of isobutane to methacrolein and methacrylic acid: Reaction mechanism (Busca, G. (114) 343)
Isobutyraldehyde
Polyfunctional action of transition metal substituted heteropolytungstates in alkene epoxidation by molecular oxygen in the presence of aldehyde (Kholdeeva, O.A. (114) 123)

Keggin heteropolycompounds
Reactivity of Keggin-type heteropolycompounds in the oxidation of isobutane to methacrolein and methacrylic acid: Reaction mechanism (Busca, G. (114) 343)
Keggin ions
Investigation of the manganese-substituted α-Keggin-heteropolyanion $K_6SiW_{11}O_{39}Mn(H_2O)$ by cyclic voltammetry and its application as oxidation catalyst (Sadakane, M. (114) 221)
Keggin-type
Hydroxylation of benzene catalyzed by selectively site-substituted vanadium(V) heteropolytungstates in the presence of hydrogen peroxide (Nomiya, K. (114) 181)
α-Ketol
Oxidative C–C bond cleavage of *vic*-diols with H_2O_2 catalyzed by heteropolyacids (Shimizu, M. (114) 217)
Kinetic measurements
Photochemical behavior of Keggin ions and related compounds (Fournier, M. (114) 53)
Kinetics
Kinetic studies of liquid-phase acetal formation catalyzed by Keggin-type heteropolyacids (Sato, S. (114) 209)
K-vitamins
Heteropoly acids as oxidation catalysts in synthesis of K-vitamins (Matveev, K.I. (114) 151)

Laser flash photolysis
Redox properties of photoexcited $(nBu_4N)_3PW_{12}O_{40}/Fe^{III}$ porphyrins composite systems (Maldotti, A. (114) 141)
Ligand exchange
Investigation of the manganese-substituted α-Keggin-heteropolyanion $K_6SiW_{11}O_{39}Mn(H_2O)$ by cyclic voltammetry and its application as oxidation catalyst (Sadakane, M. (114) 221)
Lower alkanes
Catalytic performance of $Cs_{2.5}Fe_{0.08}H_{1.26}PVMo_{11}O_{40}$ for direct oxidation of lower alkanes (Mizuno, N. (114) 309)

Manganese
Investigation of the manganese-substituted α-Keggin-heteropolyanion $K_6SiW_{11}O_{39}Mn(H_2O)$ by cyclic voltammetry and its application as oxidation catalyst (Sadakane, M. (114) 221)
MCM-41 molecular sieve
Study of catalysts comprising heteropoly acid $H_3PW_{12}O_{40}$ supported on MCM-41 molecular sieve and amorphous silica (Kozhevnikov, I.V. (114) 287)
Mechanism
Heteropoly acids as oxidation catalysts in synthesis of K-vitamins (Matveev, K.I. (114) 151)
Mechanism of isobutane selective oxidation
Reactivity of Keggin-type heteropolycompounds in the oxidation of isobutane to methacrolein and methacrylic acid: Reaction mechanism (Busca, G. (114) 343)
Mechanistic studies
Co-oxidative epoxidation of cyclohexene with molecular oxygen, isobutyraldehyde reductant, and the polyoxoanion-supported catalyst precursor $[(n\text{-}C_4H_9)_4N]_5Na_3[(1,5\text{-COD})Ir \cdot P_2W_{15}Nb_3O_{62}]$. The importance of key control experiments including omitting the catalyst and adding radical-chain initiators. (Mizuno, N. (114) 15)
Metal–oxygen cluster compounds
The interaction of nitrogen oxides with metal–oxygen cluster compounds (heteropoly oxometalates) (Bélanger, R. (114) 319)
Methacrolein
Reactivity of Keggin-type heteropolycompounds in the oxidation of isobutane to methacrolein and methacrylic acid: Reaction mechanism (Busca, G. (114) 343)
Methacrylic acid
Reactivity of Keggin-type heteropolycompounds in the oxidation of isobutane to methacrolein and methacrylic acid: Reaction mechanism (Busca, G. (114) 343)
Methanol oxidation
Silica-supported 12-molybdophosphoric acid catalysts: Influence of the thermal treatments and of the Mo contents on their behavior, from IR, Raman, X-ray diffraction studies, and catalytic reactivity in the methanol oxidation (Rocchiccioli-Deltcheff, C. (114) 331)
Molecular oxygen
Molybdovanadophosphate (NPMoV)/hydroquinone/O_2 system as an efficient reoxidation system in palladium-catalyzed oxidation of alkenes (Yokota, T. (114) 113)
Polyfunctional action of transition metal substituted heteropolytungstates in alkene epoxidation by molecular oxygen in the presence of aldehyde (Kholdeeva, O.A. (114) 123)
Molybdophosphate
Catalysis of the oxidation of isobutyric acid by vanadyl, copper and mixed vanadyl–copper salts of $H_3[PMo_{12}O_{40}]$ and $H_4[PMo_{11}VO_{40}]$ (Bayer, R. (114) 277)
12-Molybdophosphates
Reactivity of Keggin-type heteropolycompounds in the oxidation of isobutane to methacrolein and methacrylic acid: Reaction mechanism (Busca, G. (114) 343)
Molybdophosphoric acid
Comparison of catalytic properties for partial oxidation between heteropolyacids and phosphates of vanadium and iron (Ai, M. (114) 3)
Molybdovanadophosphate
Molybdovanadophosphate (NPMoV)/hydroquinone/O_2 system as an efficient reoxidation system in palladium-catalyzed oxidation of alkenes (Yokota, T. (114) 113)
Mo–V–phosphoric heteropoly acids
Heteropoly acids as oxidation catalysts in synthesis of K-vitamins (Matveev, K.I. (114) 151)
Mustard
The first combinatorially prepared and evaluated inorganic catalysts. Polyoxometalates for the aerobic oxidation of the mustard analog tetrahydrothiophene (THT) (Hill, C.L. (114) 103)

Nanocolloids
A perspective on nanocluster catalysis: polyoxoanion and $(n\text{-}C_4H_9)_4N^+$ stabilized $Ir(0)_{\sim 300}$ nanocluster 'soluble heterogeneous catalysts' (Aiken III, J.D. (114) 29)
Nitrite
Electrocatalytic reduction of nitrite using Dawson-type tungstodiphosphate anions in aqueous solutions, adsorbed on a glassy carbon electrode and doped in polypyrrole film (Xi, X. (114) 257)

Nitrogen oxides
The interaction of nitrogen oxides with metal–oxygen cluster compounds (heteropoly oxometalates) (Bélanger, R. (114) 319)
Nitrones
Oxidation of *N,N*-benzylalkylamines to nitrones by Mo(VI) and W(VI) polyperoxo complexes (Ballistreri, F.P. (114) 229)
N,N-benzylalkylamines
Oxidation of *N,N*-benzylalkylamines to nitrones by Mo(VI) and W(VI) polyperoxo complexes (Ballistreri, F.P. (114) 229)
No-catalyst control reactions
Co-oxidative epoxidation of cyclohexene with molecular oxygen, isobutyraldehyde reductant, and the polyoxoanion-supported catalyst precursor $[(n\text{-}C_4H_9)_4N]_5Na_3[(1,5\text{-COD})Ir \cdot P_2W_{15}Nb_3O_{62}]$. The importance of key control experiments including omitting the catalyst and adding radical-chain initiators. (Mizuno, N. (114) 15)

Olefin co-oxidations
Co-oxidative epoxidation of cyclohexene with molecular oxygen, isobutyraldehyde reductant, and the polyoxoanion-supported catalyst precursor $[(n\text{-}C_4H_9)_4N]_5Na_3[(1,5\text{-COD})Ir \cdot P_2W_{15}Nb_3O_{62}]$. The importance of key control experiments including omitting the catalyst and adding radical-chain initiators. (Mizuno, N. (114) 15)
Olefin epoxidation
Co-oxidative epoxidation of cyclohexene with molecular oxygen, isobutyraldehyde reductant, and the polyoxoanion-supported catalyst precursor $[(n\text{-}C_4H_9)_4N]_5Na_3[(1,5\text{-COD})Ir \cdot P_2W_{15}Nb_3O_{62}]$. The importance of key control experiments including omitting the catalyst and adding radical-chain initiators. (Mizuno, N. (114) 15)
Oxidation
Keggin phosphomolybdovanadates for catalytic oxidations (Grate, J.H. (114) 93)
The first combinatorially prepared and evaluated inorganic catalysts. Polyoxometalates for the aerobic oxidation of the mustard analog tetrahydrothiophene (THT) (Hill, C.L. (114) 103)
Molybdovanadophosphate (NPMoV)/hydroquinone/O_2 system as an efficient reoxidation system in palladium-catalyzed oxidation of alkenes (Yokota, T. (114) 113)
Oxidative C–C bond cleavage of *vic*-diols with H_2O_2 catalyzed by heteropolyacids (Shimizu, M. (114) 217)
Oxidation of *N,N*-benzylalkylamines to nitrones by Mo(VI) and W(VI) polyperoxo complexes (Ballistreri, F.P. (114) 229)
Catalytic performance of $Cs_{2.5}Fe_{0.08}H_{1.26}PVMo_{11}O_{40}$ for direct oxidation of lower alkanes (Mizuno, N. (114) 309)
Oxidation catalysis
Heteropoly acids as oxidation catalysts in synthesis of K-vitamins (Matveev, K.I. (114) 151)
Oxidation of acrolein
Comparison of catalytic properties for partial oxidation between heteropolyacids and phosphates of vanadium and iron (Ai, M. (114) 3)
Oxidation of alkanes
Comparison of catalytic properties for partial oxidation between heteropolyacids and phosphates of vanadium and iron (Ai, M. (114) 3)
Oxidation of alkenes
Comparison of catalytic properties for partial oxidation between heteropolyacids and phosphates of vanadium and iron (Ai, M. (114) 3)
Oxidation of crotonaldehyde
Comparison of catalytic properties for partial oxidation between heteropolyacids and phosphates of vanadium and iron (Ai, M. (114) 3)
Oxidation of isobutyric acid
Comparison of catalytic properties for partial oxidation between heteropolyacids and phosphates of vanadium and iron (Ai, M. (114) 3)
Oxidation of methacrolein
Comparison of catalytic properties for partial oxidation between heteropolyacids and phosphates of vanadium and iron (Ai, M. (114) 3)
Oxidation of methanol
Comparison of catalytic properties for partial oxidation between heteropolyacids and phosphates of vanadium and iron (Ai, M. (114) 3)
Oxidation of propionic acid
Comparison of catalytic properties for partial oxidation between heteropolyacids and phosphates of vanadium and iron (Ai, M. (114) 3)
Oxygen
Complexes of palladium(II) and platinum(II) with the $PW_{11}O_{39}^{7-}$ heteropolyanion as catalytically active species in benzene oxidation (Kuznetsova, N.I. (114) 131)
Oxygen activation
Redox properties of photoexcited $(nBu_4N)_3PW_{12}O_{40}/Fe^{III}$ porphyrins composite systems (Maldotti, A. (114) 141)

Palladium
Molybdovanadophosphate (NPMoV)/hydroquinone/O_2 system as an efficient reoxidation system in palladium-catalyzed oxidation of alkenes (Yokota, T. (114) 113)
Palladium complexes
Complexes of palladium(II) and platinum(II) with the $PW_{11}O_{39}^{7-}$ heteropolyanion as catalytically active species in benzene oxidation (Kuznetsova, N.I. (114) 131)
Palladium metal
^1H NMR studies on the dynamic property of protons in Pd^0–$H_3PW_{12}O_{40}$ systems in the presence of dihydrogen (Baba, T. (114) 247)
Peroxo Keggin-type polyoxotungstates
Alkene epoxidation by hydrogen peroxide in the presence of titanium-substituted Keggin-type polyoxotungstates $[PTi_xW_{12-x}O_{40}]^{(3+2x)-}$ and $[PTi_xW_{12-x}O_{40-x}(O_2)_x]^{(3+2x)-}$ ($x = 1$ and 2) (Yamase, T. (114) 237)
Peroxotungstic
Epoxidation of allylic alcohols by hydrogen peroxide in the presence of complexed peroxotungstic species (Gelbard, G. (114) 77)
Phosphine oxide
Epoxidation of allylic alcohols by hydrogen peroxide in the presence of complexed peroxotungstic species (Gelbard, G. (114) 77)
Phosphomolybdovanadate
Keggin phosphomolybdovanadates for catalytic oxidations (Grate, J.H. (114) 93)
Phosphonic acid
Epoxidation of allylic alcohols by hydrogen peroxide in the

presence of complexed peroxotungstic species (Gelbard, G. (114) 77)
Photocatalysis
Redox properties of photoexcited $(nBu_4N)_3PW_{12}O_{40}/Fe^{III}$ porphyrins composite systems (Maldotti, A. (114) 141)
Contribution to water purification using polyoxometalates. Aromatic derivatives, chloroacetic acids (Mylonas, A. (114) 191)
Photochemistry
Photochemical behavior of Keggin ions and related compounds (Fournier, M. (114) 53)
Photodegradation
Contribution to water purification using polyoxometalates. Aromatic derivatives, chloroacetic acids (Mylonas, A. (114) 191)
Photolysis
Aerobic photocatalytic oxidation of adamantane with heteropolyoxometalates $[X^{n+}W_{12}O_{40}]^{8-n}$ where X = Si, Co^{2+}, Co^{3+} (Ermolenko, L. (114) 87)
Photooxidation
Preparation and photocatalytic studies on a novel Ti-substituted polyoxometalate (Crano, N.J. (114) 65)
Platinum complexes
Complexes of palladium(II) and platinum(II) with the $PW_{11}O_{39}^{7-}$ heteropolyanion as catalytically active species in benzene oxidation (Kuznetsova, N.I. (114) 131)
^{31}P NMR
Study of catalysts comprising heteropoly acid $H_3PW_{12}O_{40}$ supported on MCM-41 molecular sieve and amorphous silica (Kozhevnikov, I.V. (114) 287)
Polyimines
Preparation, spectroscopic and catalytic studies of poly(1,4-phenylene-methylidynenitrilo-1,4-phenylenenitrilomethylidyne) protonated with selected heteropolyacids (Stochmal-Pomarzańska, E. (114) 267)
Polyoxoanions
A perspective on nanocluster catalysis: polyoxoanion and $(n\text{-}C_4H_9)_4N^+$ stabilized $Ir(0)_{\sim 300}$ nanocluster 'soluble heterogeneous catalysts' (Aiken III, J.D. (114) 29)
Polyoxoanion-stabilized clusters
A perspective on nanocluster catalysis: polyoxoanion and $(n\text{-}C_4H_9)_4N^+$ stabilized $Ir(0)_{\sim 300}$ nanocluster 'soluble heterogeneous catalysts' (Aiken III, J.D. (114) 29)
Polyoxoanion-supported catalysis
Co-oxidative epoxidation of cyclohexene with molecular oxygen, isobutyraldehyde reductant, and the polyoxoanion-supported catalyst precursor $[(n\text{-}C_4H_9)_4N]_5Na_3[(1,5\text{-COD})Ir \cdot P_2W_{15}Nb_3O_{62}]$. The importance of key control experiments including omitting the catalyst and adding radical-chain initiators. (Mizuno, N. (114) 15)
Polyoxometalate
The first combinatorially prepared and evaluated inorganic catalysts. Polyoxometalates for the aerobic oxidation of the mustard analog tetrahydrothiophene (THT) (Hill, C.L. (114) 103)
Polyoxometalates
Catalysis of the oxidation of isobutyric acid by vanadyl, copper and mixed vanadyl–copper salts of $H_3[PMo_{12}O_{40}]$ and $H_4[PMo_{11}VO_{40}]$ (Bayer, R. (114) 277)
Polyoxomolybdates
Silica-supported 12-molybdophosphoric acid catalysts: Influence of the thermal treatments and of the Mo contents on their behavior, from IR, Raman, X-ray diffraction studies, and catalytic reactivity in the methanol oxidation (Rocchiccioli-Deltcheff, C. (114) 331)
Polyoxotungstate
Preparation and photocatalytic studies on a novel Ti-substituted polyoxometalate (Crano, N.J. (114) 65)
Polyoxotungstates
Redox properties of photoexcited $(nBu_4N)_3PW_{12}O_{40}/Fe^{III}$ porphyrins composite systems (Maldotti, A. (114) 141)
Contribution to water purification using polyoxometalates. Aromatic derivatives, chloroacetic acids (Mylonas, A. (114) 191)
Polyperoxo complexes
Oxidation of *N,N*-benzylalkylamines to nitrones by Mo(VI) and W(VI) polyperoxo complexes (Ballistreri, F.P. (114) 229)
Polypyrrole film electrode
Electrocatalytic reduction of nitrite using Dawson-type tungstodiphosphate anions in aqueous solutions, adsorbed on a glassy carbon electrode and doped in polypyrrole film (Xi, X. (114) 257)

Quantum yield
Aerobic photocatalytic oxidation of adamantane with heteropolyoxometalates $[X^{n+}W_{12}O_{40}]^{8-n}$ where X = Si, Co^{2+}, Co^{3+} (Ermolenko, L. (114) 87)
Quinone
Molybdovanadophosphate (NPMoV)/hydroquinone/O_2 system as an efficient reoxidation system in palladium-catalyzed oxidation of alkenes (Yokota, T. (114) 113)

Radical-chain reactions
Co-oxidative epoxidation of cyclohexene with molecular oxygen, isobutyraldehyde reductant, and the polyoxoanion-supported catalyst precursor $[(n\text{-}C_4H_9)_4N]_5Na_3[(1,5\text{-COD})Ir \cdot P_2W_{15}Nb_3O_{62}]$. The importance of key control experiments including omitting the catalyst and adding radical-chain initiators. (Mizuno, N. (114) 15)
Raman spectrometry
Silica-supported 12-molybdophosphoric acid catalysts: Influence of the thermal treatments and of the Mo contents on their behavior, from IR, Raman, X-ray diffraction studies, and catalytic reactivity in the methanol oxidation (Rocchiccioli-Deltcheff, C. (114) 331)
Rate of electron exchange
Photochemical behavior of Keggin ions and related compounds (Fournier, M. (114) 53)
Reaction kinetics
Alkene epoxidation by hydrogen peroxide in the presence of titanium-substituted Keggin-type polyoxotungstates $[PTi_xW_{12-x}O_{40}]^{(3+2x)-}$ and $[PTi_xW_{12-x}O_{40-x}(O_2)_x]^{(3+2x)-}$ (x = 1 and 2) (Yamase, T. (114) 237)
Reaction mechanism
Oxidation of *N,N*-benzylalkylamines to nitrones by Mo(VI) and W(VI) polyperoxo complexes (Ballistreri, F.P. (114) 229)
Review
A perspective on nanocluster catalysis: polyoxoanion and (n-

$C_4H_9)_4N^+$ stabilized $Ir(0)_{\sim 300}$ nanocluster 'soluble heterogeneous catalysts' (Aiken III, J.D. (114) 29)

Rhodium
Alkane oxidation with mixed addenda heteropoly catalysts containing Ru(III) and Rh(III) (Matsumoto, Y. (114) 161)

Rhodium polyoxometalate
A new dinuclear rhodium(III) 'sandwich' polyoxometalate, $[(WZnRh_2^{III})(ZnW_9O_{34})_2]^{10-}$. Synthesis, characterization and catalytic activity (Neumann, R. (114) 169)

Ruthenium
Alkane oxidation with mixed addenda heteropoly catalysts containing Ru(III) and Rh(III) (Matsumoto, Y. (114) 161)

Selectivity
Heteropoly acids as oxidation catalysts in synthesis of K-vitamins (Matveev, K.I. (114) 151)

Silica
Study of catalysts comprising heteropoly acid $H_3PW_{12}O_{40}$ supported on MCM-41 molecular sieve and amorphous silica (Kozhevnikov, I.V. (114) 287)

Silica-supported heteropolyacids
Silica-supported 12-molybdophosphoric acid catalysts: Influence of the thermal treatments and of the Mo contents on their behavior, from IR, Raman, X-ray diffraction studies, and catalytic reactivity in the methanol oxidation (Rocchiccioli-Deltcheff, C. (114) 331)

Soluble metal-particle catalysis
A perspective on nanocluster catalysis: polyoxoanion and $(n$-$C_4H_9)_4N^+$ stabilized $Ir(0)_{\sim 300}$ nanocluster 'soluble heterogeneous catalysts' (Aiken III, J.D. (114) 29)

Stereochemical studies
Co-oxidative epoxidation of cyclohexene with molecular oxygen, isobutyraldehyde reductant, and the polyoxoanion-supported catalyst precursor $[(n\text{-}C_4H_9)_4N]_5Na_3[(1,5\text{-COD})Ir \cdot P_2W_{15}Nb_3O_{62}]$. The importance of key control experiments including omitting the catalyst and adding radical-chain initiators. (Mizuno, N. (114) 15)

Stilbene
High-valent manganese in polyoxotungstates. 4. Catalytic and stoichiometric alkene oxidation (Zhang, X.-y. (114) 201)

Synthesis
Heteropoly acids as oxidation catalysts in synthesis of K-vitamins (Matveev, K.I. (114) 151)

TEM
Study of catalysts comprising heteropoly acid $H_3PW_{12}O_{40}$ supported on MCM-41 molecular sieve and amorphous silica (Kozhevnikov, I.V. (114) 287)

Tetrahydrothiophene
The first combinatorially prepared and evaluated inorganic catalysts. Polyoxometalates for the aerobic oxidation of the mustard analog tetrahydrothiophene (THT) (Hill, C.L. (114) 103)

Thermal stability
A perspective on nanocluster catalysis: polyoxoanion and $(n$-$C_4H_9)_4N^+$ stabilized $Ir(0)_{\sim 300}$ nanocluster 'soluble heterogeneous catalysts' (Aiken III, J.D. (114) 29)

Thin layer electrochemical cell
Photochemical behavior of Keggin ions and related compounds (Fournier, M. (114) 53)

TiO_2
Preparation and photocatalytic studies on a novel Ti-substituted polyoxometalate (Crano, N.J. (114) 65)

Ti-substituted Keggin-type polyoxotungstates
Alkene epoxidation by hydrogen peroxide in the presence of titanium-substituted Keggin-type polyoxotungstates $[PTi_xW_{12-x}O_{40}]^{(3+2x)-}$ and $[PTi_xW_{12-x}O_{40-x}(O_2)_x]^{(3+2x)-}$ ($x = 1$ and 2) (Yamase, T. (114) 237)

Titania
Preparation and photocatalytic studies on a novel Ti-substituted polyoxometalate (Crano, N.J. (114) 65)

Trans-de-*t*-butylation of 2,6-di-*t*-butyl-4-methylphenol
Study of catalysts comprising heteropoly acid $H_3PW_{12}O_{40}$ supported on MCM-41 molecular sieve and amorphous silica (Kozhevnikov, I.V. (114) 287)

Transition metal nanoclusters
A perspective on nanocluster catalysis: polyoxoanion and $(n$-$C_4H_9)_4N^+$ stabilized $Ir(0)_{\sim 300}$ nanocluster 'soluble heterogeneous catalysts' (Aiken III, J.D. (114) 29)

Transition-metal-substituted heteropolytungstates
Polyfunctional action of transition metal substituted heteropolytungstates in alkene epoxidation by molecular oxygen in the presence of aldehyde (Kholdeeva, O.A. (114) 123)

Tungsten
Epoxidation of allylic alcohols by hydrogen peroxide in the presence of complexed peroxotungstic species (Gelbard, G. (114) 77)

Tungstodiphosphate
Electrocatalytic reduction of nitrite using Dawson-type tungstodiphosphate anions in aqueous solutions, adsorbed on a glassy carbon electrode and doped in polypyrrole film (Xi, X. (114) 257)

Vanadium(V)-substituted polyoxoanions
Hydroxylation of benzene catalyzed by selectively site-substituted vanadium(V) heteropolytungstates in the presence of hydrogen peroxide (Nomiya, K. (114) 181)

Vanadomolybdophosphate
Catalysis of the oxidation of isobutyric acid by vanadyl, copper and mixed vanadyl–copper salts of $H_3[PMo_{12}O_{40}]$ and $H_4[PMo_{11}VO_{40}]$ (Bayer, R. (114) 277)

Vanadyl pyrophosphate
Comparison of catalytic properties for partial oxidation between heteropolyacids and phosphates of vanadium and iron (Ai, M. (114) 3)

XRD
Study of catalysts comprising heteropoly acid $H_3PW_{12}O_{40}$ supported on MCM-41 molecular sieve and amorphous silica (Kozhevnikov, I.V. (114) 287)