Comprehensive Organometallic Chemistry II

A Review of the Literature 1982–1994

Editors-in-Chief Edward W. Abel University of Exeter, UK

F. Gordon A. Stone Baylor University, Waco, TX, USA

Geoffrey Wilkinson
Imperial College of Science, Technology and Medicine, London, UK

Volume 1 LITHIUM, BERYLLIUM, AND BORON GROUPS

Volume Editor

Catherine E. Housecroft

Institut für Anorganische Chemie der Universität Basel, Switzerland



Contents of All Volumes

Volume 1 Lithium, Beryllium, and Boron Groups

- 1 Alkali Metals
- 2 Beryllium
- 3 Magnesium, Calcium, Strontium and Barium
- 4 Compounds with Three- or Four-coordinate Boron, Emphasizing Cyclic Systems
- 5 Boron Rings Ligated to Metals
- 6 Polyhedral Carbaboranes
- 7 Main-group Heteroboranes
- 8 Metallaboranes
- 9 Transition Metal Metallacarbaboranes
- 10 Aluminum
- 11 Gallium, Indium and Thallium, Excluding Transition Metal Derivatives
- 12 Transition Metal Complexes of Aluminum, Gallium, Indium and Thallium

Author Index

Subject Index

Volume 2 Silicon Group, Arsenic, Antimony, and Bismuth

- 1 Organosilanes
- 2 Carbacyclic Silanes
- 3 Organopolysilanes
- 4 Silicones
- 5 Germanium
- 6 Tin
- 7 Lead
- 8 Arsenic, Antimony and Bismuth

Author Index

Subject Index

Volume 3 Copper and Zinc Groups

- 1 Gold
- 2 Copper and Silver
- 3 Mercury
- 4 Cadmium and Zinc

Author Index

Subject Index

Volume 4 Scandium, Yttrium, Lanthanides and Actinides, and Titanium Group

- 1 Zero Oxidation State Complexes of Scandium, Yttrium and the Lanthanide Elements
- Scandium, Yttrium, and the Lanthanide and Actinide Elements, Excluding their Zero Oxidation State Complexes
- 3 Titanium Complexes in Oxidation States Zero and Below
- 4 Titanium Complexes in Oxidation States +2 and +3
- 5 Titanium Complexes in Oxidation State +4
- 6 Zirconium and Hafnium Complexes in Oxidation States Zero and Below
- 7 Metallocene(II) Complexes of Zirconium and Hafnium
- 8 Zirconium and Hafnium Compounds in Oxidation State +3
- 9 Bis(cyclopentadienyl)zirconium and -hafnium Halide Complexes in Oxidation State +4
- Bis(cyclopentadienyl) Metal(IV) Compounds with Si, Ge, Sn, N, P, As, Sb, O, S, Se, Te or Transition Metal-centred Ligands
- 11 Zirconium and Hafnium Complexes in Oxidation State +4

- Cationic Organozirconium and Organohafnium Complexes 12
- 13 Cyclooctatetraene Complexes of Zirconium and Hafnium

Author Index Subject Index

Volume 5 Vanadium and Chromium Groups

- Vanadium 1
- 2 Niobium and Tantalum
- 3 Hexacarbonyls and Carbonyl Complexes of Carbon σ-Bonded Ligands of Chromium, Molybdenum and Tungsten
- Carbonyl Complexes of Noncarbon σ-Bonded Ligands of Chromium, Molybdenum and 4 Tungsten
- 5 Organometallic Complexes of Chromium, Molybdenum and Tungsten without Carbonyl Ligands
- π-Complexes of Chromium, Molybdenum and Tungsten, Excluding those of Cyclopentadienyls 6 and Arenes
- 7 Cyclopentadienyl Complexes of Chromium, Molybdenum and Tungsten
- Arene and Heteroarene Complexes of Chromium, Molybdenum and Tungsten

Author Index

Subject Index

Volume 6 Manganese Group

- Manganese Carbonyls and Manganese Carbonyl Halides 1
- Manganese Alkyls and Hydrides
- 2 Manganese Complexes Containing Nonmetallic Elements
- 4 Manganese Hydrocarbon Complexes Excluding Cyclopentadienyl
- 5 Cyclopentadienyl Manganese Complexes
- 6 Manganese Nitrosyl and Isonitrile Complexes
- 7 High-valent Organomanganese Compounds
- 8 Technetium
- 9 Low-valent Organorhenium Compounds
- High-valent Organorhenium Compounds 10

Author Index

Subject Index

Volume 7 Iron, Ruthenium, and Osmium

- Iron Compounds without Hydrocarbon Ligands 1
- 2 Mononuclear Iron Compounds with η¹-η6 Hydrocarbon Ligands
- 3 Dinuclear Iron Compounds with Hydrocarbon Ligands
- 4 Polynuclear Iron Compounds with Hydrocarbon Ligands
- 5 Introduction to Organoruthenium and Organoosmium Chemistry
- 6 Mononuclear Complexes of Ruthenium and Osmium Containing η¹ Carbon Ligands
- 7 Complexes of Ruthenium and Osmium Containing η²-η6 Hydrocarbon Ligands: (i) Complexes not Containing Cyclobutadiene, Cyclopentadienyl or η-Arene Coligands
- Complexes of Ruthenium and Osmium Containing η²-η6 Hydrocarbon Ligands: (ii) Complexes 8 Containing Four- and Five-membered Rings (Including MCp(arene) Complexes)
- 9 Complexes of Ruthenium and Osmium Containing η²-η6 Hydrocarbon Ligands: (iii) Complexes Containing Six-, Seven- and Eight-membered Rings
- Ruthenocenes and Osmocenes 10
- Binuclear Complexes of Ruthenium and Osmium Containing Metal-Metal Bonds 11
- 12 Trinuclear Clusters of Ruthenium and Osmium: (i) Introduction and Simple Neutral, Anionic and Hydrido Clusters
- Trinuclear Clusters of Ruthenium and Osmium: (ii) Hydrocarbon Ligands on Metal Clusters 13
- Trinuclear Clusters of Ruthenium and Osmium: (iii) Clusters with Metal-Carbon Bonds to 14 Heteroatom Ligands
- Tetranuclear Clusters of Ruthenium and Osmium 15
- Medium- and High-nuclearity Clusters of Ruthenium and Osmium

Author Index

Subject Index

Volume 8 Cobalt, Rhodium, and Iridium

- 1 Cobalt
- 2 Rhodium
- 3 Iridium
- 4 Cluster Complexes of Cobalt, Rhodium, and Iridium

Author Index

Subject Index

Volume 9 Nickel, Palladium, and Platinum

- 1 Nickel Complexes with Carbonyl, Isocyanide, and Carbene Ligands
- 2 Nickel-Carbon σ-Bonded Complexes
- 3 Nickel-Carbon π-Bonded Complexes
- 4 Palladium Complexes with Carbonyl, Isocyanide and Carbene Ligands
- 5 Palladium-Carbon σ-Bonded Complexes
- 6 Palladium-Carbon π-Bonded Complexes
- 7 Platinum Complexes with Carbonyl, Isocyanide and Carbene Ligands
- 8 Platinum-Carbon σ-Bonded Complexes
- 9 Platinum-Carbon π-Bonded Complexes

Author Index

Subject Index

Volume 10 Heteronuclear Metal-Metal Bonds

- 1 Synthesis of Compounds Containing Heteronuclear Metal-Metal Bonds
- 2 Heterodinuclear Compounds
- 3 Heteronuclear Clusters Containing C₁, C₂, C₃, ..., C_n Acyclic Hydrocarbyl Ligands
- 4 Binary Carbonyls, Carbonyls plus Hydrides, Carbonyls plus Phosphines, Cyclic Hydrocarbyls and Main-group Ligands without Acyclic Hydrocarbyls
- 5 Cluster Complexes with Bonds Between Transition Elements and Copper, Silver and Gold
- 6 Cluster Complexes with Bonds Between Transition Elements and Zinc, Cadmium, and Mercury
- 7 Catalysis and Related Reactions with Compounds Containing Heteronuclear Metal-Metal Bonds

Author Index

Subject Index

Volume 11 Main-group Metal Organometallics in Organic Synthesis

- 1 Lithium
- 2 Sodium and Potassium
- 3 Magnesium
- 4 Zinc and Cadmium
- 5 Boron
- 6 Aluminum
- 7 Silicon
- 8 Tin
- 9 Mercury
- 10 Thallium
- 11 Lead
- 12 Antimony and Bismuth
- 13 Selenium
- 14 Tellurium

Author Index

Subject Index

Volume 12 Transition Metal Organometallics in Organic Synthesis

- 1 Introduction and Fundamentals
- 2 Transition Metal Hydrides: Hydrocarboxylation, Hydroformylation, and Asymmetric Hydrogenation
- 3.1 Transition Metal Alkyl Complexes from Hydrometallation
- 3.2 Transition Metal Alkyl Complexes from RLi and CuX
- 3.3 Transition Metal Alkyl Complexes: Main-group Transmetallation and Insertion Chemistry
- 3.4 Transition Metal Alkyl Complexes: Oxidative Addition and Transmetallation

١

- 3.5 Transition Metal Alkyl Complexes: Oxidative Addition and Insertion
- 3.6 Transition Metal Alkyl Complexes: Multiple Insertion Cascades
- 3.7 Transition Metal Alkyl Complexes: Reductive Dimerization of Alkenes and Alkynes
- 4 Transition Metal Carbonyl Complexes
- 5.1 Transition Metal Carbene Complexes: Cyclopropanation
- 5.2 Transition Metal Carbene Complexes: Diazodecomposition, Ylide, and Insertion
- 5.3 Transition Metal Carbene Complexes: Alkyne and Vinyl Ketene Chemistry
- 5.4 Transition Metal Carbene Complexes: Photochemical Reactions of Carbene Complexes
- 5.5 Transition Metal Carbene Complexes: Tebbe's Reagent and Related Nucleophilic Alkylidenes
- 6.1 Transition Metal Alkene, Diene, and Dienyl Complexes: Nucleophilic Attack on Alkene Complexes
- 6.2 Transition Metal Alkene, Diene, and Dienyl Complexes: Complexation of Dienes for Protection
- 6.3 Transition Metal Alkene, Diene, and Dienyl Complexes: Nucleophilic Attack on Diene and Dienyl Complexes
- 7.1 Transition Metal Alkyne Complexes: Transition Metal-stabilized Propargyl Systems
- 7.2 Transition Metal Alkyne Complexes: Pauson-Khand Reaction
- 7.3 Transition Metal Alkyne Complexes: Transition Metal-catalyzed Cyclotrimerization
- 7.4 Transition Metal Alkyne Complexes: Zirconium-Benzyne Complexes
- 8.1 Transition Metal Allyl Complexes: Telomerization of Dienes
- 8.2 Transition Metal Allyl Complexes: Pd, W, Mo-assisted Nucleophilic Attack
- 8.3 Transition Metal Allyl Complexes: Intramolecular Alkene and Alkyne Insertions
- 8.4 Transition Metal Allyl Complexes: Trimethylene Methane Complexes
- 8.5 Transition Metal Allyl Complexes: π-Allylnickel Halides and Other π-Allyl Complexes Excluding Palladium
- 9.1 Transition Metal Arene Complexes: Nucleophilic Addition
- 9.2 Transition Metal Arene Complexes: Ring Lithiation
- 9.3 Transition Metal Arene Complexes: Side-chain Activation and Control of Stereochemistry
- 10 Synthetically Useful Coupling Reactions Promoted by Ti, V, Nb, W, Mo Reagents
- 11.1 Transition Metal-catalyzed Oxidations: Asymmetric Epoxidation
- 11.2 Transition Metal-catalyzed Oxidations: Asymmetric Hydroxylation
- 11.3 Transition Metal-catalyzed Oxidations: Other Oxidations
- 12.1 Transition Metals in Polymer Synthesis: Ziegler-Natta Reaction
- 12.2 Transition Metals in Polymer Synthesis: Ring-opening Metathesis Polymerization and Other Transition Metal Polymerization Techniques

Author Index

Subject Index

Volume 13 Structure Index

Structures of Organometallic Compounds Determined by Diffraction Methods

Volume 14 Cumulative Indexes

Cumulative Formula Index

Cumulative Subject Index