

## Bernard D. Santarsiero

Center for Pharmaceutical Biotechnology (CPB) and the  
Department of Medicinal Chemistry and Pharmacognosy (MCP)  
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### Current Positions

2003-      Research Professor, CPB  
2003-      Facility Director, Macromolecular Structure Facility, RRC  
2004-      Facility Director, Small Molecule X-Ray Diffraction Facility, RRC  
2008-      Research Professor, MCP  
2008-      Associate Member, Graduate College  
2009-      Co-Director, Translational Technology Resources, CCTS  
2011-      Co-Director, X-ray Diffraction Resources, Center for Structural Biology, CFSB/RRC  
2013-      Associate Director, UI Hospital and Health Sciences Systems Biorepository

### Background

1971-1975      B.S., Chemistry, Harvey Mudd College, Claremont, CA  
1975-1980      M.S., Ph.D., Physical Chemistry, University of Washington, Seattle, WA  
1980-1986      Research Fellow, Chemistry and Chemical Engineering, Caltech, Pasadena, CA  
1986              Visiting Scientist, Chemistry and Biological Structure, University of Washington  
1986-1988      Research Associate, Biochemistry, University of Alberta  
1988-1991      Director, Structure Determination Laboratory, Chemistry, University of Alberta  
1991-1995      Manager, Macromolecular Crystallography, Molecular Structure Corporation  
1995-2000      Visiting Scholar, Chemistry, University of California, Berkeley, CA  
1997-2008      Co-founder and Consultant, Syrrx (sold to Takeda, 2008)  
1996-2000      Project Manager, HT Robotics for Protein Microcrystallization, Berkeley National Lab  
1997-2000      Project Manager, HT Robotics for Synchrotron Data Collection, Berkeley National Lab  
1998-2000      Director, Structural Genomics, Genomics Institute of the Novartis Research Foundation  
1998-2000      Visiting Investigator, Molecular Biology, The Scripps Research Institute, La Jolla, CA  
2001-2002      Visiting X-ray Specialist, CPB  
2002-2003      Research Assistant Professor, CPB  
2012-2013      Assistant to the Director, UI Hospital and Health Sciences Systems Biorepository  
2012-2013      Interim Associate Director, UICentre for Drug Discovery

### Committees

2008              Search Committee, Special Assistant to the Provost for Diversity, UIC  
2008, 2014-      Diversity Advisory Committee, UIC  
2012-              Abraham Lincoln Fellowship Committee, Graduate College, UIC  
2013-              Diversity Committee, College of Pharmacy, UIC  
2014-2016      Chancellor's Committee on the Status of LGBTQPA, UIC (Co-Chair)  
2014-              Health Sciences Diversity Leadership Council, UIC (Co-Chair)  
2015-              IT Faculty Committee, COP

### Interests

Structure-Based Drug Discovery: Antibiotics, Cancer Chemopreventatives, Neurodegenerative Diseases  
Structural Chemistry: Material Science, Nanoparticles, and Nanotechnology  
Structural Biology: Structure, Mechanism, and Function, Energy Storage and Catalysis

## Honors

- 1975-1979 Standard Oil Company of California Research Fellow, University of Washington  
1981-1986 Myron A. Bantrell Research Fellow in Chemical Catalysis, Caltech  
2002 R&D 100 Award for 2002

## Service

- 1998-2003 Structural Biology Review Panel, NASA  
1993 Session Co-chair, Organic and Biochemical Compounds, ACA Meeting  
1994 Session Co-chair, Protein Crystallization, ACA Meeting  
1996 Co-organizer, CCD Detectors, ACA Meeting  
1997-1999 Apparatus and Standards Committee, ACA (Chair, 1999)  
2002-2004 Instructor, ACA Summer Course in Crystallography  
2002-2008 Automation Standing Committee, SER-CAT, Advanced Photon Source  
2004 Local Chair, ACA Meeting, Chicago  
2006-2011 U. S. National Committee for Crystallography  
2007-2009 NSF Workshop, CyberEnabled Instrumentation in Chemistry  
2007-2011 Treasurer, American Crystallographic Association  
2007-2012 Editorial Advisory Board, *Journal of Natural Products*  
2008- Liaison Committee on Underrepresented Minorities, American Institute of Physics  
2008 Session Co-chair, Education Outreach, IUCr Meeting  
2009 Session Co-chair, Green Biochemistry, ACA Meeting  
2010 Local Chair, ACA Meeting, Chicago  
2011- Co-Editor, *Acta Crystallographica, Crystal Structure Communications*  
2011- Chair, Chicago Drug Discovery Consortium  
2011-2012 Local Chair, Midwest Enzyme Chemistry Conference, UIC  
2012 Co-organizer, Galaxy International Bioinformatics Conference 2012, UIC  
2014 Session Co-Chair, Protein Structure Validation Methods, IUCr conference (Montreal)

## Teaching (at UIC)

- BCHE513 (2003- ) *Structure of Biopolymers: "Structural and Functional Genomics"*
- MDCH562 (2005-2010) *Spectroscopy in Medicinal Chemistry: "X-ray Crystallography"*
- MDCH571 (2009-2010) *Advanced Medicinal Organic Chemistry: "Vitamins, Heme, and Co-factors in Reaction Mechanisms"*
- PHAR331 (2009-2010) *Fundamentals of Drug Action I: "Signal Transduction, Oncogenes, and Cancer"*
- PHAR404 (2009-2010) *Principles of Drug Action and Therapeutics IV: "Diabetes: Medicinal Chemistry and Pharmacology"*
- GCLS504 (2011- ) *GEMS Research Methods I: "Spectroscopic and Structural Biology Methods"*
- GCLS505 (2013- ) *Essential Technologies and Approaches in Translational Research: "Biobanking" and "Drug Discovery" lectures*
- CHEM514 (2013- ) *Advanced Inorganic Chemistry: "Symmetry in 3D and Crystallography"*
- PSOP387 (2014- ) *Critical Dialogues in Healthcare: "Health Disparities in LGBT Issues"*

## Patents

1. "Methods and apparatus for performing array microcrystallizations," 6296673, Oct 2, 2001.
2. "Method for screening microcrystallizations for crystal formation," 6630006, Oct 7, 2003.
3. "Method for diffracting crystals formed by submicroliter crystallization experiments," 6911056, Jun 28, 2005.
4. "Integrated crystal mounting and alignment system for high-throughput biological crystallography," 6918698, Jul 19, 2005.
5. "Method for performing submicroliter crystallization experiments," 6932845, Aug 23, 2005.
6. "Method for performing high density submicroliter crystallization experiments," 6951575, Oct 4, 2005.
7. "Method for performing submicroliter crystallization experiments with high experiment to experiment precision," 7001438, Feb 21, 2006.
8. "Automated method for setting up multiple crystallization experiments in submicroliter volumes," 7015041, Mar 21, 2006.
9. "Integrated crystal mounting and alignment system for high-throughput biological crystallography," 7274769, Sep 25, 2007.

## Current tasklist

### ***Associate Director, UI Hospital and Health Sciences Systems Biorepository (50%)***

- Promote UI Biorepository to the research community through seminars, workshops, and news articles
- Recruit and coordinate new projects with campus researchers
- Develop SOPs, manage facility, and oversee safety, records, budget, personnel, and certification
- Develop and expand resources and services within Biorepository
- Lecture on "Drug Discovery and Biobanking" in GCLS505 "Essential Technologies" course
- Implement "opt-in" protocol to expand biospecimen acquisition of leftover material from patients
- Manage website

### ***Co-Director, X-ray Diffraction Resources, Center for Structural Biology (45%)***

- Facility Director of structural biology and structural chemistry facilities, including Macromolecular Structure Facility and Small Molecule X-ray Diffraction Facility (data collection and analysis, training, equipment maintenance)
- Oversee, coordinate, and schedule user access to Advanced Photon Source, Argonne National Laboratory
- Lecture and manage GCLS504 "Spectroscopic and Structural Biology Methods" course
- Lecture on "Structural and Functional Genomics" in BCHE513 "Structure of Biopolymers" course
- Collaborate with researchers on structural chemistry and structural biology projects, training, and outreach
- Co-organize Structural Biology Journal Club
- Co-I, UIC Natural Products Technology Center, Research Project

### ***Associate Director, Translational Technology Resources, Center for Clinical and Translational Science (5%)***

- Coordinate expansion of shared resources and services for clinical and translational research
- Promote, expand, and coordinate high-performance computing resources for drug discovery, bioinformatics, proteomics and genomics analysis, chemical informatics, bioassays, assay development (UICExtreme)
- Represent the RRC and TTR in CCTS functions and meetings

## Bernard D. Santarsiero

### Publications (Full list, in chronological order)

1. G. R. Van Hecke, B. D. Santarsiero, and L. J. Theodore, "Physical Studies of Homologous *trans*-ethoxy-4'-*n*-alkanoyloxyazobenzenes: Birefringence," *Mol. Cryst. Liq. Cryst.*, **45**, 1-20 (1978).
2. H. W. Smith, B. D. Santarsiero, and E. C. Lingafelter, "Bis(Acetonitrile)(2,3,9,10-tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene) Iron(II) Hexafluorophosphate,  $[\text{Fe}(\text{C}_{14}\text{H}_{24}\text{N}_4)(\text{CH}_3\text{CN})_2](\text{PF}_6)_2$ ," *Cryst. Struct. Comm.*, **8**, 49-52 (1979).
3. E. J. Valente, B. D. Santarsiero, and V. Schomaker, "Conformation of Dihydropyran Rings. Structures of Two 3,4-Dihydro-2*H*,5*H*-pyrano[3,2-*c*][1] benzopyran-5-ones," *J. Org. Chem.*, **44**, 798-802 (1979).
4. L. E. McCandlish, B. D. Santarsiero, N. J. Rose, and E. C. Lingafelter, "Acetonitrile(carbonyl)(2,3,9,10-tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene) Iron(II) Hexafluorophosphate," *Acta Crystallogr.*, **B35**, 3053-3056 (1979).
5. A. E. Elia, B. D. Santarsiero, E. C. Lingafelter, and V. Schomaker, "(*N*-Methylimidazole)(2,3,9,10-tetramethyl-1,4,8,11-tetraazacyclotetradeca-1,3,8,10-tetraene) Copper(II) Hexafluorophosphate," *Acta Crystallogr.*, **B38**, 3020-3023 (1982).
6. J. D. Audett, T. J. Collins, B. D. Santarsiero, and G. H. Spies, "The Substrate Organometallic Chemistry of Osmium Tetraoxide: Formation of a Novel Type of Carbon Dioxide Coordination," *J. Amer. Chem. Soc.*, **104**, 7352-7353 (1982).
7. J. M. Mayer, P. T. Wolczanski, B. D. Santarsiero, W. A. Olson, and J. E. Bercaw, "X-ray Crystal Structure Determination of  $(\eta^5\text{-C}_5\text{Me}_5)\text{Ta}(\text{PMe}_3)_2\text{H}_4$  and High-Field NMR Studies of Phosphine Derivatives of Penta-methylcyclopentadienyltantalum(V) Hydrides," *Inorg. Chem.*, **22**, 1149-1155 (1983).
8. M. A. El-Hinnawi, A. A. Aruffo, B. D. Santarsiero, D. R. McAlister, and V. Schomaker, "Organometallic Sulfur Complexes, 1. Syntheses, Structures and Characterization of Organoiron Sulfane Complexes,  $(\mu\text{-S}_x)[\eta^5\text{-C}_5\text{H}_5]\text{Fe}(\text{CO})_2$ , ( $x=1,2,3,4$ )," *Inorg. Chem.*, **22**, 1585-1590 (1983).
9. B. D. Santarsiero and R. E. Marsh, "Crystal Structure of the Hydrochloride Salt of *N,N*-dimethylglycine," *J. Cryst. Spectro. Res.*, **13**, 245-251 (1983).
10. E. J. Moore, D. A. Straus, J. Armantrout, B. D. Santarsiero, R. H. Grubbs, and J. E. Bercaw, "Synthesis and Structure of Ketene Complexes of Permethylzirconocene and Their Hydrogenation to Zirconium Enolate Hydrides," *J. Amer. Chem. Soc.*, **105**, 2068-2070 (1983).
11. T. J. Collins, B. D. Santarsiero, and G. H. Spies, "Complexation of Secondary Amides to Chromium(III): The X-ray Structure of a Molecule with Two Modes of Monodentate Organic Amide Coordination," *J. Chem. Soc., Chem. Commun.*, 681-682 (1983).
12. J. S. Najdzionek and B. D. Santarsiero, "Structure of a Binuclear Rh (I) Complex: Tris[ $\mu$ -(2,5-dimethyl-2,5-hexanediyldiisocyanide)-*C,C'*]- $\mu$ -3,3,6,6-tetramethylaza-1-cyclohexene-2-ido(*N,C*<sup>2</sup>)dirhodium(I)(Rh-Rh) Trifluoromethanesulfonate," *Acta Crystallogr.*, **C39**, 577-579 (1983).
13. B. D. Santarsiero and V. Schomaker, "Redetermination of the Crystal Structure of  $\text{Ni}(\text{tren})(\text{NCS})_2$ ," *Acta Crystallogr.*, **C39**, 1216-1217 (1983).
14. P. T. Wolczanski, R. S. Threlkel, and B. D. Santarsiero, "A Zirconoxy Carbene from Biscyclopentadienyl Tungsten Monocarbonyl and Permethylzirconocene Dihydride:  $(\eta^5\text{-C}_5\text{H}_5)_2\text{W}=\text{C}(\text{H})\text{OZr}(\text{H})(\eta^5\text{-C}_5\text{Me}_5)_2$ ," *Acta Crystallogr.*, **C39**, 1330-1333 (1983).

15. V. M. Miskowski, B. D. Santarsiero, W. P. Schaefer, G. E. Ansok, and H. B. Gray, "Crystal Structure and Polarized Electronic Spectra of a  $\mu$ -Superoxodicobalt(III) Complex:  $\{[(\text{NH}_3)_5\text{Co}]_2\text{O}_2\}(\text{NO}_3)_2\text{Cl}_3 \cdot 2\text{H}_2\text{O}$ ," *Inorg. Chem.*, **23**, 172-176 (1984).
16. V. Miskowski, W. P. Schaefer, B. Sedeghi, B. D. Santarsiero, and H. B. Gray, "Polarized Electronic Spectra of Dirhodium(II)Tetraacetate," *Inorg. Chem.*, **23**, 1154-1162 (1984).
17. R. M. Waymouth, B. D. Santarsiero, and R. H. Grubbs, "A Trigonal-Bipyramidal Methyl Group Bridging Two Zirconocene-Ketene Centers," *J. Amer. Chem. Soc.*, **106**, 4050-4051 (1984).
18. F. C. Anson, J. A. Christie, T. J. Collins, R. J. Coots, T. T. Furutani, S. L. Gibson, J. T. Keech, T. E. Krafft, B. D. Santarsiero, and G. H. Spies, "The Design of Multianionic Chelating Ligands for the Production of Inorganic Oxidizing Agents. Osmium Coordination Chemistry that Provides Stable Potent Oxidizing Agents and Stable Potent Reducing Agents," *J. Amer. Chem. Soc.*, **106**, 4460-4472 (1984).
19. P. T. Barger, B. D. Santarsiero, J. L. Armantrout, and J. E. Bercaw, "Carbene Complexes of Zirconium. Synthesis, Structure and Reactivity with Carbon Monoxide to Afford Coordinated Ketenes," *J. Amer. Chem. Soc.*, **106**, 5178-5186 (1984).
20. T. S. Coolbaugh, B. D. Santarsiero, and R. G. Grubbs, "Synthesis, Characterization and Equilibrium Studies of Group VI-B Intramolecular Metalloesters: Crystal Structure of *trans*-( $\eta^5$ -C<sub>5</sub>H<sub>5</sub>)CH<sub>2</sub>CH<sub>2</sub>O<sub>2</sub>CW(CO)<sub>2</sub>PPh<sub>3</sub>," *J. Amer. Chem. Soc.*, **106**, 6310-6318 (1984).
21. A. A. Aruffo, B. D. Santarsiero, V. Schomaker, and E. C. Lingafelter, "Bis(phenylmethanethiolato)(2,3,9,10-tetramethyl-1,4,8,11-tetraaza-1,3,8,10-cyclotetradeca-tetraene)Iron(III)Hexafluorophosphate," *Acta Crystallogr.*, **C40**, 1693-1695 (1984).
22. J. A. Christie, T. J. Collins, T. E. Krafft, B. D. Santarsiero, and G. H. Spies, "Complexation of a Tetradentate Tetraanionic Ligand to Osmium (IV): A Step Towards Development of Multianionic Chelating Ligands for Use in Stabilizing Oxidizing Inorganic Complexes," *J. Chem. Soc., Chem. Commun.*, 198-199 (1984).
23. T. S. Coolbaugh, R. J. Coots, B. D. Santarsiero, and R. H. Grubbs, "Transition Metal Carbonyl Compounds Containing Intramolecular Nucleophiles: Crystal Structure of  $[\eta^5\text{-C}_5\text{H}_4(\text{CH}_2)_3\text{OH}]\text{Mo}(\text{CO})_3_2$ ," *Inorg. Chem. Acta*, **98**, 99-105 (1985).
24. D. M. Roddick, B. D. Santarsiero, and J. E. Bercaw, "Synthesis and Reactivity of Cyclopentadienyl Hafnium Phosphido Complexes. Hydrogenolysis and Carbon Monoxide Insertion for Hf-PF<sub>2</sub>Bonds," *J. Amer. Chem. Soc.*, **107**, 4670-4678 (1985).
25. R. M. Waymouth, B. D. Santarsiero, R. J. Coots, M. J. Bronikowski, and R. H. Grubbs, "Trinuclear Zr<sub>2</sub>Al- $\mu$ -Ketene Complexes Containing Bridging Ligands. Implications for Transmetalation Reactions and CO Reduction Chemistry," *J. Amer. Chem. Soc.*, **108**, 1427-1441 (1986).
26. T. J. Collins, T. G. Richmond, B. D. Santarsiero, and B. G. R. T. Treco, "The Design of PAC Ligands for the Production of Inorganic Oxidizing Agents, IV. NMR Detection of Paramagnetic Complexes of Cobalt(III)," *J. Amer. Chem. Soc.*, **108**, 2088-2090 (1986).
27. J. D. Meinhart, B. D. Santarsiero, and R. H. Grubbs, "Carbonylation of Titanocenecyclobutenes. Synthesis and Characterization of a Titanocene Vinyl Ketene Complex," *J. Amer. Chem. Soc.*, **108**, 3318-3323 (1986).
28. T. J. Collins, R. J. Coots, T. T. Furutani, J. T. Keech, G. T. Peake, and B. D. Santarsiero, "Non-planar Amide Groups as Ligands," *J. Amer. Chem. Soc.*, **108**, 5333-5339 (1986).

29. A. van Asselt, B. D. Santarsiero, and J. E. Bercaw, "Tert-Butylperoxide Complexes of Permethylhafnocene,  $(\eta^5\text{-C}_5\text{Me}_5)_2\text{Hf(R)}(\text{OOCMe}_3)$ . Stoichiometric Transformation of Alkyl-tert-butylperoxide Derivatives to Alkoxy-tert-butoxides,  $(\eta^5\text{-C}_5\text{Me}_5)_2\text{Hf(OR)}(\text{OOCMe}_3)$ ," *J. Amer. Chem. Soc.*, **108**, 8291-8293 (1986).
30. C. J. Barner, T. J. Collins, and B. E. Mapes, B. D. Santarsiero, "Reactions of Osmium(IV) Complexes of PAC Ligands with Azide Species," *Inorg. Chem.*, **25**, 4322-4323 (1986).
31. M. Kubota, W. G. Sly, B. D. Santarsiero, M. S. Clifton, and L. Kuo, "Photoisomerism of Dimethylacetylenedicarboxylatebis(triphenylphosphine) platinum. Structure of Ethoxycarbonylmethoxycarbonylacetylidobis(triphenylphosphine)platinum(II)," *Organometallics*, **6**, 1257-1259 (1987).
32. F. C. Anson, T. J. Collins, R. J. Coats, S. L. Gipson, T. E. Krafft, B. D. Santarsiero, and G. H. Spies, "Oxidative and Hydrolytic Decomposition of a PAC Ligand," *Inorg. Chem.*, **26**, 1161-1168 (1987).
33. M. E. Thompson, S. M. Baxter, A. R. Bulls, B. J. Burger, M. C. Nolan, B. D. Santarsiero, W. P. Schaefer, and J. E. Bercaw, " $\sigma$ -Bond Metathesis" for C-H Bonds of Hydrocarbons and Sc-R (R = H, alkyl, aryl) Bonds of Permethyl scandocene Derivatives. Evidence for Non-Involvement of the  $\pi$  System in Electrophilic Activation of Aromatic and Vinylic C-H Bonds," *J. Amer. Chem. Soc.*, **109**, 203-219(1987).
34. C. J. Simmons, B. J. Hathaway, K. Amornjarusiri, B. D. Santarsiero, and A. Clearfield, "The First Determination of the Energy Difference Between Solid-State Conformers Using X-Ray Diffraction: 1. The Crystal Structure of the Pseudo Jahn-Teller Complex (nitro)bis(2,2'-bipyridyl)Copper(II)Nitrate at 20, 100, 165, and 296K, and of its Isostructural Zinc(II) Analogue at 295K. 2. The Possibility of Using X-Ray Diffraction to Characterize Adiabatic Potential Energy Surfaces and Relative Ligand Strengths," *J. Amer. Chem. Soc.*, **109**, 1947-1958 (1987).
35. F. C. Anson, T. J. Collins, T. G. Richmond, B. D. Santarsiero, J. E. Toth, and B. G. R. T. Treco, "Highly Stabilized Copper(III) Complexes," *J. Amer. Chem. Soc.*, **109**, 2974-2979 (1987).
36. A. H. Liu, R. C. Murray, J. C. Dewan, B. D. Santarsiero, and R. R. Schrock, "High Oxidation State Monopentamethyl cyclopentadienyl Tungsten Methyl Complexes Including the First  $d^0$  complex Containing a Highly Distorted Methylene Ligand,  $W(\eta^5\text{-C}_5\text{Me}_5)\text{Me}_3(\text{CH}_2)$ ," *J. Amer. Chem. Soc.*, **109**, 4282-4291 (1987).
37. B. B. Masek, B. D. Santarsiero, and D. A. Dougherty, "Determining the Conformations of Organic Macrocycles Through a Combination of Dale's Rules, Molecular Mechanics, Solid State  $^{13}\text{C}$  NMR and X-Ray Diffraction," *J. Amer. Chem. Soc.*, **109**, 4373-4379 (1987).
38. E. Valencia, B. D. Santarsiero, S. J. Geib, A. L. Rheingold, and J. M. Mayer, "Synthesis and Characterization of Symmetrical and Unsymmetrical Low-Valent Rhenium-Oxo Dimers,  $\text{Re}_2\text{O}_2(\text{RC}\equiv\text{CR})_4$ ," *J. Amer. Chem. Soc.*, **109**, 6896-6898 (1987).
39. C. McDade, V. C. Gibson, B. D. Santarsiero, and J. E. Bercaw, "Interaction of Trialkylaluminum Reagents with Metal-Bound Ethylene and Carbon Monoxide. The Molecular Structure of  $(\eta^5\text{-C}_5\text{Me}_5)_2\text{Ta(H)}(\text{C}_2\text{H}_4)\text{AlEt}_3$ ," *Organometallics*, **7**, 1-7 (1988).
40. G. L. Hillhouse, A. R. Bulls, B. D. Santarsiero, and J. E. Bercaw, "Synthesis and Molecular Structure of  $(\eta^5\text{-C}_5\text{Me}_5)_2\text{Hf(H)}(\text{NHMe})$ . Structural Evidence for Nitrogen-to-Hafnium  $\pi$ -Donation," *Organometallics*, **7**, 1309-1312 (1988).
41. E. V. Anslyn, B. D. Santarsiero, and R. H. Grubbs, "Synthesis and Structures of Bimetallic Titanium and Chromium Carbene Complexes of the Type  $\text{Cp}_2\text{Ti(Cl)O}(\text{CH}_3)\text{CCr(CO)}_5$ ," *Organometallics*, **7**, 2137-2145 (1988).
42. E. J. Moore and B. D. Santarsiero, "An  $N,N'$ -hydrazonide Metal Complex: The Crystal Structure of Bis(pentamethylcyclopentadienyl)[ $\eta^2$ -bis(*p*-tolyl)ketonemethylhydrozonido]hydroxozirconium," *Acta Crystallogr.*, **C44**, 433-435 (1988).

43. E. J. Moore and B. D. Santarsiero, "Crystal Structure of a Permethylzirconoceneylide Complex:  $(\eta^5\text{-C}_5\text{Me}_5)_2\text{Zr}(\text{H})\text{CH}_2\text{P}(\text{CH}_3)_2\text{CH}_2$ ," *Acta Crystallogr.*, **C44**, 1911-1913 (1988).
44. J. C. Brewer, T. J. Collins, M. R. Smith, and B. D. Santarsiero, "Neutral Square Planar Cobalt(III) Complexes," *J. Amer. Chem. Soc.*, **110**, 423-428 (1988).
45. B. J. Burger, B. D. Santarsiero, M. S. Trimmer, and J. E. Bercaw, "Kinetics and Mechanism of the Insertion of Olefins into Niobocene- and Tantalocene-Hydride Bonds: A Study of the Competition Between Steric and Electronic Effects," *J. Amer. Chem. Soc.*, **110**, 3134-3146 (1988).
46. J. F. Dellaria and B. D. Santarsiero, "Stereoselective Alkylation of Chiral Glycine Enolate Synthons. The Enantioselective Synthesis of  $\alpha$ -Amino Acid Derivatives," *Tetrahedron Letters*, **29(47)**, 6079-6082 (1988).
47. M. A. St. Clair, B. D. Santarsiero, and J. E. Bercaw, "Addition of Sc-H, Sc-C, and Sc-N Bonds to Coordinated Carbon Monoxide. Structure of a Methyl Scandoxy Carbene Derivative of Cobalt," *Organometallics*, **8**, 17-22 (1989).
48. E. J. Moore and B. D. Santarsiero, "Structures of 2 Permethylzirconium-Ketene Isomers: (O-*l*)- and (O-*c*)- $(\eta^5\text{-C}_5\text{Me}_5)_2\text{Zr}(\text{COCHPMe}_3)\text{H}$ ," *Acta Crystallogr.*, **C45**, 579-581 (1989).
49. S. A. Moore, B. D. Santarsiero, T. Lin, M. N. G. James, M. Tandon, L. I. Wiebe, and E. E. Knaus, "Structure of 5-[(7*S*)-9,9-dibromocyclopropyl]-1-(1-deoxy- $\beta$ -*D*-ribofuranoyl)uracil," *Acta Crystallogr.*, **C45**, 647-650 (1989).
50. M. A. St. Clair and B. D. Santarsiero, "The Structure of a Scandium Carboxylate Complex:  $(\eta^5\text{-C}_5\text{Me}_5)_2\text{Sc}(\text{O}_2\text{C})\text{C}_6\text{H}_4\text{CH}_3$ ," *Acta Crystallogr.*, **C45**, 850-852 (1989).
51. J. F. Dellaria and B. D. Santarsiero, "Enantioselective Synthesis of  $\alpha$ -Amino Acids via the Stereoselective Alkylation of an Homochiral Glycine Enolate Synthone," *J. Org. Chem.*, **54**, 3916-3926 (1989).
52. J. E. Bercaw, B. J. Burger, M. L. H. Green, B. D. Santarsiero, A. Sella, M. S. Trimmer, and L. L. Wong, "A New Mechanism for Exchange Processes Observed in the Compounds  $[\text{Cp}_2\text{M}(\text{exo-}\mu\text{-RCH=CH}_2)\text{H}]$ , M = Nb and Ta," *J. Chem. Soc., Chem. Commun.*, 734-735 (1989).
53. B. D. Santarsiero, "The Crystal Structure of 1,1-Cyclobutanedicarboxylic Acid at 20K," *J. Chem. Phys.*, **92**, 3794-3797 (1990).
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