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Education:

B. Sc.(Honors)*:*
1st Class Honors in Chemistry with Distinction,
Berhampur University, Berhampur, India, 1977.

M. Sc. (Chemistry):
1st Class, Berhampur University, Berhampur, India, 1979.

Ph. D. (Chemistry):
Oklahoma State University, Stillwater, OK, USA, 1985.

Professional Experience:

Research Professor, Department of Chemistry and Biochemistry, University of Missouri, St. Louis, MO, 2004 to present.

Research Associate Professor, Department of Chemistry, University of Missouri, St. Louis, MO, 1997 to 2004.

Research Assistant Professor, Department of Chemistry, University of Missouri, St. Louis, MO, 1989 to 1996.

Assistant Faculty Fellow, Department of Chemistry, University of Notre Dame, Notre Dame, IN 1987 to 1989.

Post Doctoral Research Associate, Department of Chemistry, University of Notre Dame, Notre Dame, IN 1986-87.

Graduate Assistant, Department of Chemistry, Oklahoma State University, Stillwater, OK 1982 to 1985.

Junior Research Fellow *(CSIR)*, Department of Chemistry, Indian Institute of Technology, Kharagpur, India, 1981-82.

Junior Research Fellow, Department of Chemistry, Indian Institute of Technology, Kanpur, India, 1979 to 1981.

Professional Positions:

Visiting Scientist, Monsanto Corporate Research, Chesterfield, MO, 1992 to 1994.

Scientific Consultant, Regional Research Laboratory, Trivandrum, India, 1992 to present.

Assistant Professor, Evening College, University of Missouri, St. Louis, 1992 to 2000.

Research Mentor, Engelmann Mathematics and Science Institute, University of Missouri, St. Louis, 1990 to 1998.

Research Mentor, NSF STARS Program, University of Missouri, St. Louis, 1999 to present.

Honors and Awards:

National Merit Scholarship, India, 1977-79.
Junior Research Fellowship, Council of Scientific and Industrial Research, India, 1981-82.
American Chemical Society Travel Award for Students, 1985.
Service Award, George Engelmann Mathematics and Science Institute, University of Missouri - St. Louis, MO, 1994.
Distinguished Service Award, Students and Teachers as Research Scientists, University of Missouri- St. Louis, MO, 2008.

Organizations:

Member, American Crystallography Association

Teaching experience:

At the University of Missouri - St. Louis

General Chemistry (CHEM 1)
General Chemistry Laboratory (CHEM 3)
Chemistry and Society (CHEM 10)
Chemistry in the environment and everyday living (CHEM 10, CHEM 1011)
Chemistry for the health profession (CHEM 1052 and CHEM 1062)
Special Topics in Introductory Chemistry (CHEM 13)
Inorganic Chemistry Laboratory (CHEM 343, Chem 4433-Taught Crystallography part)
Organic Chemistry Laboratory (CHEM 363, CHEM3643-Taught Crystallography part)
Special Topics in Inorganic Chemistry - Chemical Crystallography (CHEM 449, CHEM5449-graduate)

Prior to joining UM, St. Louis

Instructor, Inorganic Chemistry, Indian Institute of Technology, Kharagpur, India, 1981-82.
Graduate Teaching Assistant, General, Organic and Inorganic Chemistry, Oklahoma State Univ., Stillwater, OK, 1982-85.
Substitute Lecturer, Inorganic Chemistry, University of Notre Dame, Notre Dame, IN, 1986-88.

Research Interests:

Single crystal X-ray diffraction study of novel organic and and organometallic compounds.
Weak interactions, polymorphism and other inter-molecular interactions

Application of computers and structural data bases in chemistry.
Solution and refinement of “difficult” crystal structures.

Publications:

1. Tetranuclear Metal Complexes of Ni(II) with m-Bis(1,3,5- trioxohexyl)benzene and m-Bis(1,3,5-trioxo-5-phenyl pentyl)benzene and Corresponding Macrocyclic Schiff Base Compounds Formed on Reaction with o-pheylenediamine. A. K. Jena, Nigam P. Rath, Bhagirathi Sahoo and B. Sahoo. *Ind. J. Chem.,* **1983**, *122A*, 371-5.

2. Structural Comparison of $(CuCH_3CN)_4$ dibenzo-18-crown-6 (I) and $(CuICH_3CN)_x$ (II) fluorescent Cu(I) materials. J. P. Jasinski, Nigam P. Rath and Elizabeth M. Holt. *Inorg. Chim. Acta,* **1985**, *97*, 91-7.

3. Copper(I) Iodide complexes of novel structure: $(Cu_4I_6)(Cu_8I_{13})$ K_7(12-crown-4)$_6$ (I), $(Cu_4I_6)K_2$(15-crown-5)$_2$ (II) and (Cu_3I_4) K(dibenzo-24-crown-8) (III). Nigam P. Rath and Elizabeth M. Holt. *J. Chem. Soc., Chem. Commun.,* **1985**, 665-7.

4. Fluorescent Copper(I) complexes : Structure and spectroscopic characterization of Cu_4I_4(p-toluidine)$_2$ acetonitrile)$_2$ and $[Cu_2I_2$ (*p*-chloroaniline) (acetonitrile)$]_2$; tetrameric complexes of mixed ligand character. Nigam P. Rath, Elizabeth M. Holt and K. Tanimura. *Inorg. Chem.,* **1985,** *24*, 3934-8.

5. Fluorescent Copper(I) Iodide systems; correlation of structural parameters with emission characteristics of quinoline complexes of stoichiometry 1:1:2 and 1:1:1. Nigam P. Rath and Elizabeth M. Holt. *J. Chem. Soc., Dalton Trans.,* **1986**, *11*, 2303-10.

6. Synthesis and structural characterization of CuI_2^-. Nigam P. Rath and Elizabeth M. Holt. *J. Chem. Soc., Chem. Commun.,* **1986**, *11*, 311-2.

7. Fluorescent Copper(I) complexes: Complexes of CuI and pyridine derivatives of rhombic; Cu_2I_2(3-picoline)$_4$ (I) and polymeric structure;$[CuI(2\text{-picoline})]_x$ (II) and $[CuI(2,4\text{-lutidine})]_x$ (III). Nigam P. Rath, Jana L. Maxwell and Elizabeth M. Holt. *J. Chem. Soc., Dalton Trans.,* **1986**, *11*, 2449-53.

8. Multiple deprotonation of a ferraborane: Evidence for the formation of a discrete Transition metal boride. Nigam P. Rath and Thomas P. Fehlner. *J. Am. Chem. Soc.*, **1987**, *109*, 5273-4.

9. Interaction of iron with boron in metal-rich metallaboranes resulting in large deshielding and rapid relaxation process of boron-11 nucleus. Nigam P. Rath and Thomas P. Fehlner. *J. Am. Chem. Soc.*, **1988**, *110*, 5345-9.

10. Synthesis and characterization of $HFe_4(CO)_{12}CBH_2$. A cluster substituted tricoordinate monoborane. Xiangsheng Meng, Nigam P. Rath and Thomas P. Fehlner. *J. Am. Chem. Soc.*, **1989**, *111*, 3422-3.

11. Metalloporphyrine π-cation radicals. Intermolecular spin coupling in zinc tetraphenyl porphyrine derivatives. Hungsun Song, Nigam P. Rath, Christopher A. Reed and W. Robert Scheidt. *Inorg. Chem.,* **1989**, *28*, 1839-47.

12. Ferromagnetic Coupling via Imidazolate in an Iron(III)- Porphyrine-Dicopper(II) System. Carol A. Koch, Christopher A. Reed, Greg A. Brewer, Nigam P. Rath, W. Robert Scheidt, Govind Gupta and George Lang. *J. Am. Chem. Soc.*, **1989**, *111*, 7645-8.

13. Reaction of 1,1-Dimethylallene with $NiMo(CO)_4$(h-C_5H_5) (h- C_5H_4Me). Isomerization of the products to NiMo(μ-CO)(CO){μ- η^1, η^3-C_5H_5)(η-C_5H_4Me): A 1,2-methyl

migration or a 1,4- proton shift? Michael J. Checuti, Steven R. McDonald and Nigam P. Rath. *Organometallics,* **1989**, *8*, 2077-9.

14. Photo-rearrangement of bridgehead aryl-substituted dibenzo- barrelenes. Study state and laser flash photolysis studies. S. Pratapan, K. Ashok, K. R. Gopidas, N. P. Rath, P. K. Das and M. V. George. *J. Org. Chem.,* **1990**, *55*, 1304-8.

15. A New Synthetic Metal Precursor: Dimethyltetrathiotetracene and related compounds. Toshio Maruo, Megh Singh, M. Thomas Jones, Nigam P. Rath and Dong Min. Electrical, Optical and Magnetic Properties of Organic Solid State Materials, (Ed. L Y. Chang), *Material Research Society Proceedings,* **1990**, *173,* 149-54.

16. The Synthesis and Reactivity of the Metal Substituted Borane $(CO)_4CoBH_2$. THF. Preparation of the Ambiphilic Clusters $(CO)_9Co_3C(CH_2)_nOH$; n = 4,5. John D. Basil, Allen A. Aradi, Nripendra K. Bhattacharya, Nigam P. Rath, Charles Eigenbrot and Thomas P. Fehlner. *Inorg. Chem.,* **1990**, *29*, 1260-70.

17. Reductive Elimination Reactions from Platinum Dimers Bridged by (Diphenylphosphino)cyclopentadienyl Ligands. Gordon K. Anderson, M. Lin and Nigam P. Rath. *Organometallics*, **1990**, *9*, 2880-81.

18. Synthesis, Spectroscopic and Structural Studies of Spirocyclic Pseudosilatranes. Joyce Y. Corey, Nigam P. Rath, Christy S. John and Eugene R. Corey. *J. Organomet. Chem.*, **1990**, *399*, 221-33.

19. Synthesis of 9,10-Dihydrosilaanthracenes with Substituents Orhto to the Silicon and Methylene Bridges. Thomas C. Bedard, Joyce Y. Corey, Lura D. Lange and Nigam P. Rath. *J. Organomet. Chem.*, **1991**, *401*, 261-72.

20. Hemiketal Formation and Subsequent Intramolecular Acylation of an N-Hydroxy beta Lactam. M. A. Wiiliams, Marvin J. Miller and Nigam P. Rath. *J. Org. Chem.*, **1991**, *56*, 1293-6.

21. Reaction of Compounds Containing Ni-Ni, Ni-Mo and Ni-W bonds with Allene and 1,1 Dimethylallene. X-Ray Diffraction Studies of the π-allylic complexes $NiMo(CO)_2\{m\text{-}h^3, \eta^3\ C_9H_{12}\}(\eta^5\text{-}C_5H_5)(\ \eta^5\text{-}C_5H_4Me)$ and NiMo(m -CO)(CO){μ-η^1, η^3-C(Me)-$C(Me)CH_2$}(η^5-C_5H_5)(η^5-C_5H_4Me)(Ni-Mo). Michael J. Checuti, Phillip E. Fanwick, Steven R. McDonald and Nigam P. Rath. *Organometallics,* **1991**, *10*, 1551-60

22. Electron Transfer Reactions. Reaction of Tetracyclone, Tetraphenylfuran and related substrates with potassium. B. Pandey, M. P. Mahajan, R. K. Tikare, M. Muneer, Nigam P. Rath, Prashant V. Kamat and Manapurathu. V. George. *Res. Chem. Intermediates,* **1991**, *15*, 271-91.

23. Synthesis and Physical Studies of a New Organic Donor: 2,3- Dimethyl-5,6:11,12-bis(dithio)tetracene. Toshio Maruo, M. Thomas Jones, Megh Singh and Nigam P. Rath. *Chemistry of Materials*, **1991**, *3*, 630-4.

24. A Carbido Cluster as a Bulky pi Donor Ligand. Preparation and Characterization of $[HFe_4(CO)_{12}C]BXY$ (X=Y=H, Cl, Br; X=H, Y=Cl, Br, OH). Xiangsheng Meng, Nigam P. Rath, Thomas P. Fehlner and Arnold L. Rheingold. *Organometallics,* **1991**, *10*, 1986-93.

25. Novel Phototransformations of bridgehead-dimethyl-substituted Dibenzobarrelene. Structure of the Photoproducts. V. Asokan, S. A. Kumar, S. Das, N. P. Rath, M. V. George. *J. Org. Chem.*, **1991**, *56*, 5890-92.

26. Solution and Solid State Conformations of 5-5'-Bistrimethylsilyl -10,11-dihydro-5-H-dibenzo [b,f]Silepins. Lura D. Lange, Joyce Y. Corey, Nigam P. Rath. *Organometallics*, **1991**, *10*, 3189-96.

27. Nucleophilic Attack on or Displacement of Coordinated 1,5-cyclooctadien. Structure of $[Pt\{s:h^2\text{-}C_8H_{12}(PPh_3)\}(dppe)]$ $[ClO_4]$ and $[Pt(H_2O)_2(dppe)][SO_3CF_3]_2$. Stephen Fallis, Gordon K. Anderson and Nigam P. Rath. *Organometallics*, **1991**, *10*, 3180-84.

28. Synthesis and Structure of the Tetrametallic Complex $[TlAu(C_5H_4PPh_2)_2]_2$. Gordon K. Anderson and Nigam P. Rath. *J. Organomet. Chem.*, **1991**, *414*, 129-35.

29. X-Ray Structural and NMR Characterization of the Cu(I) Dimer $[Cu(dmpe)_2]_2$ $(BF_4)_2$, where dmpe is 1,2-Bis(dimethylphospino) ethane. Bernhard Mohr, Elwood E. Brooks, Nigam P. Rath, and Edward Deutsch. *Inorg. Chem.*, 1991, *30*, 4541-45.

30. Synthesis of Two Isomers of Diphenylphosphinoindene and their Platinum(II) Complexes. Kathleen A. Fallis, Gordon K. Anderson and Nigam P. Rath. *Organometallics*, **1992**, *11*,885-8.

31. Three Isomers of (Triphenylstannyl)-nido-pentaborane(9): Isolation and Structural Characterization of 2,3-μ-$(SnPh_3)B_5H_8$, 1-$(SnPh_3)B_5H_8$ and 1-$(SnClPh_2)B_5H_8$. D. K. Srivastava, Nigam P. Rath, and Lawrence Barton. *Organomet*., **1992**, *11*, 2263-73.

32. Stoichiometric Removal of ligand from Phosphine-ligated Copper(I) Reagents with BH_3.THF: A Novel Synthesis of Di-μ-bromo-tetrakis(methyldiphenylphosphine)-Dicopper(I) and the Structures of $CuBr[PMePh_2]_3$ and $\{CuBr[PMePh_2]_3\}_2$. D. K. Srivastava, Nigam P. Rath, and Lawrence Barton. *Polyhedron*, **1992**, *11*, 1251-9.

33. Platinum Dimers Bridged by Diphenylphosphinocyclopentadienyl Ligands. Molecular Structure and NMR Studies of Two Isomeric Forms of the Complexes $[Pt_2R_2(\mu\text{-}C_5H_4PPh_2)_2]$. Minren Lin, Kathleen A. Fallis, Gordon K. Anderson and Nigam P. Rath and Michael Y. Chiang. *J. Am. Chem. Soc.*, **1992**, *114*, 4687-93.

34. The Synthesis and Physical Studies of a New Synthetic Metal: The Charge Transfer Salt of Dimethyltetrathiotetracene Tetracyanoethylene. Kim J. Kilgore, Nigam P. Rath and M. Thomas Jones. *Material Research Society Proceedings*, **1992**, *247*, 529-35.

35. Synthesis of An Allene containing Germacranoid. Rudolph E. K. Winter, William R. Shiang, Steve A. Kolodzeij and Nigam P. Rath. *Tetrahedron Let.*, **1992**, *33*, 2941-4.

36. Interesting Phototransformations of Aziridylmaleates and Fumarates. Steady state and Laser Flash Photolysis studies. D. Ramaiah, K. Ashok, R. Barik, D. Venugopal, N. P. Rath, K. Bhattacharyya, P. K. Das and M. V. George. *J. Org. Chem.*, **1992**, *57*, 6032-7.

37. Novel Photorearrangement of Bridgehead-disubstituted dibenzobarrelenes. Steady state and Laser Flash Photolysis Studies of a 9-hydroxymethyl-10-methyl-dibenzobarrelene. S. A. Kumar, C. V. Asokan, S. Das, J. A. Wilbur, N. P. Rath and M. V. George. *J. Photochem and Photobiol*, **1993**, A*71*, 27-31.

38. Structure of Chiral Monocyclic Phosphonamide. Kevin J. Koeller, Nigam P. Rath and Christopher D. Spilling. *Acta Cryst (Sectn C)*, **1993**, 1199-201.

39. Structure and Spectra of 4,5-μ-(Tetracarbonyl)ironhexaborane(10), $[Fe(CO)_4B_6H_9]^-$. Dileep K. Srivastava, Nigam P. Rath, Lawrence Barton, James D. Ragaini, Orin Hollander, Robert Godfroid and Sheldon G. Shore. *Organometallics*, **1993**, *12*, 2017-24.

40. Structure of a Chiral Bicyclic 1-hydroxy Phosphonamide. Kevin J. Koeller, Nigam P. Rath and Christopher D. Spilling. *Acta Cryst (Sectn C)*, **1993**, 1547-9.

41. Synthesis and Reactions of Cationic Palladium and Platinum Cyclopentadienyl Complexes. Molecular Structure of (5-Cyclopentadienyl)-[1,2-bis(diphenylphosphino) ethane]platinum (II) Triflate. Stephen Fallis, Lori Rodriguez, Gordon K. Anderson and Nigam P. Rath. *Organometallics*, **1993**, *12*, 3851-5.

42. The Dicobalt Hexacarbonyl(alkyne) Moiety as a Stereocontrol Element in Intramolecular Friedel-Crafts Alkylations. David D. Grove, James R. Corte, Roxanne P. Spencer, Malinda E. Pauly and Nigam P. Rath. *J. Chem. Soc. Chem Commun*,. **1994**, 49-50.

43. Synthesis and reactions of Mesitylplatinum Complexes. Molecular structure of Bromo(mesityl)(1,5- cyclooctadiene)Platinum(II). K. A. Fallis, G. K. Anderson and N. P. Rath. *Organometallics*, **1993**, *12*, 2435-9.

44. Aqua-dichloro-triphenylphospine-platinum (II). Nigam P. Rath, Kathleen A. Fallis and Gordon K. Anderson. *Acta Cryst (Sectn C)*, **1993**, *49*, 2079-81.

45. The Enantioselective Addition of Dialkylphosphites to Aldehydes: Catalysis by a Lanthanum Binapthoxide Complex. Nigam P. Rath and Christopher D. Spilling. *Tet. Letters*, **1994**, *35*, 227-30.

46. *Meso*- and *rac*-2,7-Diphenyl-3,5-octadiyne-2,7-diol, $C_{20}H_{18}O_2$. M. D. Lord, R. E. K. Winter and N. P. Rath. *Acta Cryst (Sectn C)*, **1994**, 116-20.

47. Triphenylstannyl-derivatives of Pentaborane(9) and Hexaborane(10). D. Srivastava, H. Fang, N. P. Rath and L. Barton. *Current Topics in Chemistry of Boron*, Royal Society of Chemistry, **1994**, 310-13.

48. Carbonylation of Organoplatinum Dimers Bridged by Diphenyl Phosphino-cyclopentadienyl Ligands. Structural Characterization of complexes containing 1,1- or 1,2- substituted η^1-cyclopentadienyl groups and reductive elimination of ketones. K. A. Fallis, G. K. Anderson, M. Lin and N. P. Rath. *Organometallics*, **1994**, *13*, 478-88.

49. Photorearrangement of Bridgehead Disubstituted Dibenzobarrelene Esters and Lactones. S. Ajaya Kumar, C. S. Rajesh, Suresh Das, Nigam. P. Rath and M. V. George. *J.Photochem. Photobio.*, **1995**, A*86*, 177-83.

50. A Chiral Bicyclic 1-Acetoxy Phosphonamide. Vincent J. Blazis, Kevin J. Koeller, Nigam P. Rath and Christopher D. Spilling. *Acta Cryst (Sectn C)*, **1995**, 86-8.

51. {1,2{η^5-(C_5Me_5)Ir]2B_5H_5}: Isolation and Structural Characterization of a *closo*-polyhedral Metallaborane Cluster with capping BH Group. Jonathan Bould, Nigam P. Rath and L. Barton. *Organometallics*, **1995**,*14*, 2119-22.

52. Isomers of $SnPh_2(B_5H_8)_2$: Synthesis and Characterization of μ,μ'-$SnPh_2(B_55H_8)_2$, μ, 2'-$SnPh_2(B_55H_8)_2$,and μ,1'- $SnPh_2(B_55H_8)_2$. Hong Fang, Dong Zhao, Nigam P. Rath, Lee Brammer and Lawrence Barton. *Organometallics*, **1995,***14*, 1700-11.

53. (Tetraphenylporphyrinato)zirconium(IV) Diacetate. Jean L. Huhmann, Joyce Y. Corey and Nigam P. Rath. *Acta Cryst. (Sectn C)*, **1995**, 195-6.

54. Zirconocene Dichloride. Joyce Y. Corey, Xio-Hong Zhu, Lee Brammer and Nigam P. Rath. *Acta Cryst (Sectn C)*, **1995,** C51, 565-7.

55. Determination of the Enatiomeric Purity and Absolute Configuration of α-Hydroxy Phosphonates. James J. Kozlowski, Nigam P. Rath and Christopher D. Spilling. *Tetrahedron*, **1995**, 51(23), 6385-6396.

56. Reaction of Chiral Phosphorous Acid Diamides: Lewis Acid Catalyzed Addition to Imines and Oxidation with SnCl4. Kevin J. Koeller, Nigam P. Rath and Christopher D. Spilling. *Phosphrous, Sulfur and Sillicon*, **1995**, 103, 171-181.

57. Structure of *trans*-Chloro(methyl)bis(triphenylarsine) palladium (II). Nigam P. Rath, Folami T. Ladipo and Gordon K. Anderson. *Acta Cryst (Sectn. C)*, **1995,** C51, 1289-90.

58. 1,1,1-$(CO)_3$-2,2,2-$(CO)_2(PPh_3)$-5-(PPh_3)-closo-1,2-$FeIrB_5H_4$: The first structurally characterized Closo-heterobimetalla- heptaborane system. J. Bould, Nigam P. Rath and Lawrence Barton. *Angew. Chemie*, **1995**, 34(15), 1641-3.

59. Isolation and Structural Characterization of *cis*- and *trans*- Forms of $[(\eta^5\text{-}C_5Me_5)TiCl_2]_2[\mu\text{-}\eta^5\text{:}\eta^5\text{-}(C_5H_3)_2(SiMe_2)_2]$. Joyce Y. Corey, Jean L. Huhmann and Nigam P. Rath. *Inorg. Chem.*, **1995**, 34, 3203-09.

60. Synthesis and Characterization of 1,9-Difluoro-5-methyl-5- phenyl-10, 11-dihydro-5H-dibenzo [b,f] silepin. Joyce Y. Corey, Alex A. Pitts, Rudolph E. K. Winter and Nigam P. Rath. *J. Organomet. Chem.*, **1995**, 499, 113-21.

61. *Nido*-$[\{(C_5Me_5)Ir\}B_3H_7\{(PPh_3)_2(CO)Os\}]$, *Closo*- $[\{(C_5Me_5)Ir\}B_4H_6\{(PPh_3)_2(CO)Os\}]$ and *Pileo*- $[\{(PPh_3)COHIrB_5H_5(PPh_3)_2(CO)Os]$: A Unique Homologous Series of Iridaosmaborane Cluster Types. J. Bould, N. P. Rath and L. Barton. *J. Chem Soc., Chem. Commun.*, **1995**, 1285-86.

62. Synthesis of Heterobimetallaboranes and Related Species from $[(PPh_3)_2(CO)OsB_5H_9]$: *Pileo*-$[(PPh_3)_2(CO)OsB_5H_5IrH(PPh_3)(CO)]$, *Closo*-$[(PPh_3)_2(CO)(\mu\text{-}H)OsB_5H_5\{\eta^5\text{-}(C_5Me_5)M\}]$ (M = Rh, Ir), *Nido*-$[(PPh_3)_2(CO)Os(\mu\text{-}H)\{\eta^5\text{-}(C_5Me_5)Ir\}B_3H_6]$, and *Nido*- $[(PPh_3)_2(CO)OsB_4H_7(n\text{-}Bu)]$. J. Bould, M. Pasieka, J. Braddock-Wilking, N. P. Rath, L. Barton and C. Gloeckner. *Organometallics*, **1995**, *14*, 5138-49.

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65. Structure of Ethyl(3-bromo-4-hydroxyphenyl)-2E-Oximino-Propanoate. Todd R. Boehlow, Nigam P. Rath, Christopher D. Spilling. *Acta Cryst (Setn C)*, **1995**, 2654-56.

66. Macropolyhedral Boron Containing Cluster Chemistry: Nineteen-vertex [$S_2B_{17}(SMe_2)_2$)]: An Unusual Apical Boron Atom of Cluster Connectivity Six and a New Polyhedral Boron Building Block. P. Kaur, J. Holub, N. P. Rath, J. Bould, L. Barton, B. Stibr and J. D. Kennedy. *J. Chem. Soc., Chem. Commun*., **1996**, 273-75.

67. Synthesis and Characterization of *nido*-[1,1,2,2-$(CO)_4$-1,2-$(PPh_3)_2$-1,2- $FeIrB_2H_5$]: A Heterobimetallaborane Analogue of *Nido*-[B_4H_7]. Jonathan Bould, Nigam P. Rath and Lawrence Barton. *Inorg. Chemistry*, **1996**, *35*, 35-39.

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71. Chiral α-Hydroxy Acids: Racemic 2-Hydroxy-2,3,3-Trimethylbutanoic Acid and 2-Hydroxy-2- Trimethylsilylpropanoic Acid. Robert W. Murray, Megh Singh and Nigam P. Rath. *Acta Cryst (Sectn. C)*, **1996**, *C52*, 1282-85.

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48. Silicon Bridged Binuclear Titanocene Catalysts in the Dehydropolymerization of $PhSiH_3$. Joyce Y. Corey, J. L. Huhmann, and N. P. Rath. XVIII Silicon Meeting, Gainesville, Fl, March 1995.

49. Synthesis and Reactivity of Sterically Hindered Diarylsilanes: $(R_F)_2SiHX$ (R_F = $(CF_3)_3C_6H_2$; X = H, F). J. Braddock-Wilking, M.W. Schiesher, L. Brammer, J.L. Huhmann, R. Shaltout, Peter P. Gaspar, and Nigam P. Rath.Gordon Research Conference, Organometallics Division, July 1995, Newport RI.

50. Synthesis and Characterization of Sterically Hindered Diarylsilanes Containing 2,4,6-trimethylphenyl and 2,4,6-tris-(trifluoromethylphenyl) Substituents.J. Braddock-Wilking, M.W. Schiesher, L. Brammer, J.L. Huhmann, R. Shaltout, Peter P. Gaspar, and Nigam P. Rath. 12th Missouri Inorganic Chemistry Day, University of Missouri-St. Louis, St. Louis, MO, May 1995.

51. Synthesis and Characterization of Sterically Hindered Diarylsilanes Containing 2,4,6-trimethylphenyl and 2,4,6-tris-(trifluoromethylphenyl) Substituents. X-ray Crystal Structure of bis[2,4,6-tris-(trifluoromethyl-phenyl)]fluorosilane. J. Braddock-Wilking, M.W. Schiesher, L. Brammer, J.L. Huhmann, R. Shaltout and N. P. Rath.Twenty-Eighth Organosilicon Symposium, March 1995, Gainesville, FL, Abstract P-22.

52. Formation of Hetero Bimetallaheptaboranes from nido-metalla-hexaboranes $(PPh_3)_2(CO)OsB_5H_9$ and $(PPh_3)_2(CO)IrB_5H_8$. Jonathan Bould, Nigam P. Rath and Lawrence Barton. Abstract, INTRABORON, Leeds University, Sept. 11-13, 1995.

53. Some Iridanoborane Chemistry. Jonathan Bould, Nigam P. Rath and Lawrence Barton. Abstract, INTRABORON, Leeds University, Sept. 11-13, 1995.

54. Heteroatom Incorporation into Metallaboranes. Lawrence Barton, Jonathan Bould, Nigam P. Rath; 13th Annual MO Inorganic Day, Univ. Of Missouri - Rolla, April 1996.

55. Synthesis and Characterization of the Sterically Hindered Platinum Silyl Hydride Complex, cis-$[Ar_2HSi]PtH(PPh_3)_2$. Janet Braddock-Wilking, Nigam Rath and Peter D. Gaspar. 13th Annual MO Inorganic Day, Univ. Of Missouri - Rolla, April 1996.

56. Synthesis of Palladium Complexes of the type [PdClR(cod)]. β-Elimination from [PdClEt(cod)] and related reactions. Robert A. Stockland, Jr., Gordon K. Anderson, Nigam Rath and Janet Braddock-Wilking.13th Annual MO Inorganic Day, Univ. Of Missouri - Rolla, April 1996.

57. Metalla-B-Frame Chemistry. Jonathan Bould, Nigam P. Rath and Lawrence Barton. BUSA-V-MEX meeting, Mexico City, Mexico, May 1996.

58. Heterobimetallaboranes based on Small Borane Cages. Jonathan Bould, Nigam P. Rath and Lawrence Barton. Fifth Boron-USA Workshop, (BUSA-V-MEX), Mexico City, Mexico, May, 1996.

59. Nido exo-arachno Metallahexaborane Equilibrium: Formation of $[(PPh_3)_2(CO)OsB_5H_9](PR_3)$ providing possible insights into the mechanism of formation of the key compound 1-$[Fe(CO)_3]B_4H_8$. Lawrence Barton, Jonathan Bould, Hong Fang, Kevin Hupp and Nigam P. Rath. Ninth International Meeting on Boron Chemistry, Heidelberg, July 14-18, 1996.

60. Incorporation of Heteroatoms into Metallaboranes: Formation of Metallacarboranes, Metallathiaboranes and An Iridaazaborane from an Iridanonaborane. L. Barton, J. Bould, N. P. Rath, and J. D. Kennedy. Ninth International Meeting on Boron Chemistry, Heidelberg, July 14-18, 1996.

61. Mass Spectrometry of Metallaboranes and Related Species. Charles Gloeckner, Lawrence Barton, Jonathan Bould and Nigam P. Rath. Abstracts, Annual Meeting, American Society for Mass Spectrometry, Portland, OR, May 11-16, 1996.

62. Metallaborane Heteroatom Incorporation Reac tions: Metallacarboranes, Metalla-thiaboranes and An Iridaazaborane from Iridanonaborane Precursors. Jonathan Bould, Nigam P. Rath and Lawrence Barton. Abstracts, 211th. National Meeting, American Chemical Society, Orlando, FL, Aug 1996.

63. Synthesis and Characterization of The Sterically Hindered Platinum Silyl Hydride Complex, Cis $[(RF)_2HSi]PtH(PPh_3)_2$ [RF = 2,4,6-tris(trifluoromethyl)phenyl)]". J. Braddock-Wilking, N. Rath, and P. P. Gaspar. Twenty-Ninth Organosilicon Symposium, March, 1996, Evanston, IL, Abstract P47.

64. Structure Determination Using CCD Area Detector. How small a crystal is too small?. Nigam P. Rath. Invited talk, IUCR meeting, Seattle, August, 96.

65. Synthesis, Characterization, and Reactivity of Some Sterically Hindered Mono- and Diarylsilanes. J. Braddock-Wilking Y. Levchinsky, N. Rath, and P. P. Gaspar. Eleventh International Symposium on Organosilicon Chemistry, September 1996, Montpellier, France, Abstract PA97.

66. Optimizing Single Crystal Data Collections and Data Reduction Parameters for a CCD Based Area Detector System. Christina M. Collins and Nigam P. Rath. Undergraduate Research Symposium, Argonne National Laboratory, Chicago, October 1996.

67. Chemistry of the Hexaborane(10) Analogue $(PPh_3)_2(CO)OsB_5H_9$: Formation and Characterization of Lewis Base adducts and a New Degradation Reaction for Metallaborane Clusters. Lawrence Barton, Jonathan Bould, Hong Fang, Kevin Hupp and Nigam P. Rath. Abstracts, 212th. National Meeting, American Chemical Society, San

Francisco, CA, Apr 1997.

68. Incorporation of Unsaturated Molecules into Polyhedral Borane Cages: Synthesis and Characterization of a New Dicage Orthocarborane. R. Marcias, N. P. Rath and L. Barton. 213th National Meeting of the American Chemical Society, Las Vegas, Sept. 1997.

69. Synthesis and Characterization of Early Transition Metal Metallaboranes: Structure of a Novel Air-stable Cationic Zirconaborane. Rhodri Ll. Thomas, Nigam P. Rath and Lawrence Barton. 213th National Meeting of the American Chemical Society, Las Vegas, Sept. 1997.

70. Divergent Pathways in the Reaction of Hexamethylbenzene with Dimethyldioxirane. Robert W. Murray, Megh Singh and Nigam P. Rath. 32nd ACS Midwest Regional Meeting, Lake of the Ozarks, 1997.

71. Synthesis and Characterization of Late Transition-Metal Silyl Complexes. Yanina Levchinsky, Janet Braddock-Wilking, Jessica Ricca and Nigam P. Rath. 32nd ACS Midwest Regional Meeting, Lake of the Ozarks, 1997.

72. Heterobimetallaboranes Based on the Species, *nido*-$(PPh_3)_2(CO)OsB_5H_9$: An Air-stable Analogue of Hexaborane(10). P. McQuade, R. Ll. Thomas, R. Marcias, H. Fang, N. P. Rath and L. Barton. 32nd ACS Midwest Regional Meeting, Lake of the Ozarks, 1997.

73. Synthesis and Characterization of Diamine-platinum and palladium Complexes of L-ascorbic Acid. Malcom J. Arendse, Gordon K, Anderson and Nigam P. Rath. 32nd ACS Midwest Regional Meeting, Lake of the Ozarks, 1997.

74. Precursors for Low Temperature Growth of III-V Nitrides. Sean D. Dingman, William E. Buhro and Nigam P. Rath. 32nd ACS Midwest Regional Meeting, Lake of the Ozarks, 1997.

75. Fluxional Processes Involving Cyclooctenylpalladium Complexes. Robert A. Stockland, Jr., Gordon K. Anderson, Janet Braddock-Wilking and Nigam P. Rath. 32nd ACS Midwest Regional Meeting, Lake of the Ozarks, 1997.

76. Synthesis and Characterization of Early Transition Metal Metallaboranes: Structure of $[(Cp)_2Zr_2B_5H_8][B_{11}H_{14}]$, A Novel Air-stable Dizirconaborane. Rhodri Ll. Thomas, Nigam P. Rath and Lawrence Barton. 32nd ACS Midwest Regional Meeting, Lake of the Ozarks, 1997.

77. Characterization of a New Dicage Orthocarborane and the Observation of Supra-molecular Assembly Involving Borane Cages. R. Marcias, N. P. Rath and L. Barton. 32nd ACS Midwest Regional Meeting, Lake of the Ozarks, 1997.

78. Improved Synthesis and X-Ray Crystallographic Structure Determination of the stereoisomeric K-region Arene Dioxides of Pyrene and Dibenz[a,h]anthracene. Robert W. Murray, Megh Singh and Nigam P. Rath. 16th Annual Symposium of Polycyclic Aromatic Compounds, North Carolina, 1997.

79. Synthesis of C2-Symmetric Group 4 Metallocene Dichlorides as Precatalysts for the Dehydropolymerization of Phenylsilane to Polyphenylsilanes. Joyce Y. Corey, Brian Grimmond, Nigam P. Rath, Juan Carlos Mareque-Rivas and Qingzheng Wang. Fargo Main Group Conference. 1998.

80. Reactions of the Hexaborane(10) analogue *nido*-$(PPh_3)_2(CO)OsB_5H_9$ with phosphines. P.McQuade, R. Ll. Thomas, H. Fang, N. P. Rath and L. Barton. Missouri Inorganic Day, Columbia, MO, May 2, 1998.

81. New Metallaborane Chemistry Arising from pentaborane(9): Synthesis and Characterization of the First Nine-vertex *n-arachno*-Biplatinaborane. Ramón Macías, Nigam P. Rath and Lawrence Barton. Missouri Inorganic Day, Columbia, MO, May 2, 1998.

82. Reactions of the Hexaborane(10) Analogue *nido*-$(PPh_3)_2(CO)OsB_5H_9$ with Phosphines. P.McQuade, R. Ll. Thomas, H. Fang, N. P. Rath and L. Barton. Abstracts, BUSA-VI, Athens GA, May 14 – 18, 1998.

83. New metallaborane chemistry arising from pentaborane(9): synthesis and characterization of the first nine-vertex *n-arachno*-Biplatinaborane. Ramón Macías, Nigam P. Rath and Lawrence Barton. Abstracts, BUSA-VI, Athens GA, May 14 – 18, 1998.

84. Construction of Metallaheteroboranes and Macropolyhedral Boranes From Iridanonaborane Precursors. J. Bould, N. P. Rath, J. D. Kennedy and L. Barton, Abstracts, BUSA-VI, Athens GA, May 14 – 18, 1998.

85. [8,8-η^2-{η^2-$(BH_3)Ph_2PCH_2PPh_2$}-8,7-$RhSB_9H_{10}$]: A *nido*-rhodathiaborane with a novel intramolecular phosphine-borane adduct coordinating to a metal center. Ramón Macías, Nigam P. Rath and Lawrence Barton. Abstracts, 215th. National Meeting, American Chemical Society, Boston, Aug. 1998.

86. Novel Chemistry on a Rhodathiaborane Cluster: Formation of a Complex Containing a Unique Bidentate Phosphine-borane Ligand, [{η^2-(BH_3)}$Ph_2PCH_2PPh_2$]. Ramón Macías, N. P. Rath and L. Barton. Abstracts, 33rd. Midwest Regional Meeting, American Chemical Society, Wichita, KS, Nov 1998.

87. P.McQuade, N. P. Rath and L. Barton. Reactions of small metallaboranes with Lewis bases. Abstracts, 33rd. Midwest Regional Meeting, American Chemical Society, Wichita, KS, Nov 1998.

88. Structural Studies of Oxides of Polycyclic Aromatic Hydrocarbons. Nigam P. Rath, Megh Singh and Robert W. Murray. Annual Meeting of the American Crystallography Association, Buffalo, NY, May 1999.

89. Macropolyhedral Boron-containing Cluster Chemistry. Characterization of Larger Metallaborane Assemblies with up to Thirty Metal and Boron Atoms and some Possible General Structural Implications. Jonathan Bould, Daniel L. Ormsby, Hai-Jun Yao, Chun-Hua Hu, Jie Sun, Ruo-Shui Jin, Suzanne L. Shea, William Clegg, Nigam P. Rath, Mark Thronton-Pett, Robert Greatrex, Pei-Ju Zheng, Lawrence Barton and John D. Kennedy. International Meeting on Boron Chemistry, Durham, UK, 1999.

90. Spirocyclic cyclohexadienyl ruthenium complexes via intramolecular nucleophilic aromatic addition to arene-Ru(II) cations. F. C. Pigge, S. Fang, N. P. Rath. Meeting of the American Chemical Society, March 2000.

91. Synthesis and reactivity of palladium dimers. G. K. Anderson, M. Janka and N. P. Rath. Meeting of the American Chemical Society, March 2000, INOR-141.

92. Synthesis of neutral molecular squares. G. K. Anderson, D. A. Carrigan and N. P. Rath. Meeting of the American Chemical Society, March 2000 INOR-149.

93. Platinum and palladium complexes containing ph-LTTP ligands. G. K. Anderson, P. Nair and N. P. Rath. Meeting of the American Chemical Society, March 2000, INOR-151.

94. Preparation of bidentate phosphine derivatives and their reactions with metallohexaboranes. L. Barton, N. P. Rath and P. McQuade. Meeting of the American Chemical Society, March 2000, INOR-302.

95. Spirocyclic cyclohexadienyl ruthenium complexes via intramolecular nucleophilic aromatic addition to arene-Ru(II) cations. F. Christopher Pigge, Shiyue Fang, Nigam P. Rath. Abstracts, 219th ACS National Meeting, San Francisco, March 26-30, 2000, ORGN-602.

96. Formation and characterization of Group IV transition metal derivatives of pentaborane (9). Rhodri LI. Thomas, Mitsuhiro Hata, Nigam P. Rath, and Lawrence Barton. Abstracts, 222nd National Meeting, American Chemical Society, Chicago, IL, August, 2001.

97. Formation and characterization of a series of bifunctional bidentate phosphines. Mitsuhiro Hata, Paul McQuade, Nigam P. Rath, Lawrence Barton. National ACS Meeting, Chicago, 2001.

98. Reactions of 11-vertex rhodathiaboranes and rhodadicarbaboranes with bidentate phosphines and their subsequent rearrangements. Oleg Volkov, Ramon Macias, Nigam

P. Rath and Lawrence Barton. Abstracts, 222nd National Meeting, American Chemical Society, Chicago, IL, August 2001.

99. Reactions of 11-vertex rhodathiaboranes and rhodadicarbaboranes with bidentate phosphines and their subsequent rearrangements. Lawrence Barton, Oleg Volkov, Ramon Macias, and Nigam P. Rath, Abstracts, Euroboron2, Dinard, France, Sept 2 – 6, 2001.

100. Metallaboranes in St. Louis: New Wrinkles on Phosphine Borane Chemistry. Lawrence Barton, Mitsuhiro Hata, Paul McQuade Nigam P. Rath and Oleg Volkov. Abstracts, INTRABORON20, Killin, Scotland, Sept. 10 – 12, 2001.

101. Bimetallic complexes of phenyl-linear tetratertiary phosphine. Gordon K Anderson, Padma Nair, and Nigam P. Rath. National ACS Meeting, Chicago, 2001.

102. Construction of neutral molecular squares. Gordon K. Anderson, Mesfin Janka, and Nigam P. Rath. National ACS Meeting, Chicago, 2001.

103. A versatile Benzannulation Approach to Novel Architectures: Potential Applications of 1,3,5-Triaroylbenzene Derivatives in Supramolecular Chemistry. F. Christopher Pigge, Fatemeh Ghasedi, and Nigam P. Rath. Presented at the Gordon Conference on Physical Organic Chemistry, Plymouth, July 2001.

104. The Structural Chemistry of the *Arachno*-Nonaboranes. L. Barton, J. Bould, R. Greatrex, J. D. Kennedy, D. L. Ormsby, M. G. S. Londesborough, K. L. F. Callaghan, M. Thornton-Pett, S. J. Teat, W. Clegg, H. Fang, N. P. Rath, and T. R. Spalding. Abstracts, *Boron Americas-VIII*, Death Valley, Jan 2002.

105. Reactions of 11-vertex rhodathiaboranes and rhodadicarbaboranes with bidentate phosphines and their subsequent rearrangements. O. Volkov, R. Macias, N. P. Rath and L. Barton. Abstracts, *Boron Americas-VIII*, Death Valley, CA. Jan, 2002.

106. Formation of Group IV transition metal derivatives of pentaborane(9) and a novel oxidative coupling reaction to form the new structural motif $B_9H_{11}(PPh_3)_2$. M. Hata, R. LI. Thomas, N. P. Rath, L. Barton. Abstracts, *Boron Americas-VIII*, Death Valley, Jan, 2002.

107. Data security issues in the X-ray diffraction Laboratory. Nigam P. Rath and Eric A. Bruton. Invited talk presented at the Annual Am. Crystallography Meeting, San Antonio, TX, May 2002.

108. Organometallic chemistry on a rhodathiaborane cluster: Reactions with bidentate phosphines and organotransition metal reagents. Lawrence Barton, Oleg Volkov, Nigam P. Rath. 224th ACS National Meeting, Boston, MA, August 18-22, 2002, INOR-568.

109. Treatment of L2Pd(C(O)Me)(P(O)(OPh)2 with substituted olefins and acetylenes. Adam M. Levine, Robert A. Stockland, Jr., Nigam P. Rath. 224th ACS National Meeting, Boston, MA, August 18-22, 2002, INOR-529.

110. An investigation of the lability of P(C6H4Cl2)2(C6H5) by the addition of Lewis bases to Pd(P(C6H4Cl2)2(C6H5))2Cl2. Joshua J. Stone, Robert A. Stockland, Jr.; Nigam P.Rath. 224th ACS National Meeting, Boston, MA, August 18-22, 2002, INOR-521.

111. Structures and properties on liquid-crystal complexes and models for liquid-crystal complexes. Stephen Clark, John R. Chipperfield, Simon Teat, Ekkehard Sinn, Nigam Rath. 224th ACS National Meeting, Boston, MA, August 18-22, 2002, INOR-177.

112. Polymorphism, supramolecular isomerism and guest inclusion in 1,3,5-tris(4-cyanobenzoyl)benzene. V. S. Senthil Kumar, F. Christopher Pigge and Nigam P. Rath. Presented at the 38th Midwest Regional ACS Meeting, Nov 2003, Columbia.

113. Reaction of Pt(0) Phosphine Complexes with Silicon Hetrocycles. Lisa French, Janet Braddock-Wilking, Joyce Y. Corey and Nigam P. Rath. Presented at the 38th Midwest Regional ACS Meeting, Nov 2003, Columbia.

114. Molecular receptors formed from 1,3,5-triaroylbenzene derivatives. Angela V. Schmitt, F. C. Pigge, Nigam P. Rath. Presented at the 38th Midwest Regional Meeting of the American Chemical Society, Columbia, MO, November, 2003.

115. Si-H bond activation reaction involving silcon heterocycles and Pt(0) complexes. Janet Braddock-Wilking, Joyce Y. Corey, Kevin Trankler, Lisa French and Nigam P. Rath. Presented at the 227th ACS National Meeting, March 2004, Anaheim, CA March 2004.

116. Polymorphism and pseudopolymorphism in 1,3,5-triaroylbenzenes. F. Christopher Pigge, V. S. Senthil Kumar, Nigam P. Rath. Presented at the 227th ACS National Meeting, Anaheim, CA, March 2004.

117. Functionalized cyclophanes via enaminone-directed benzannulation/macrocyclization. F. Christopher Pigge, Angela V. Schmitt, Nigam P. Rath. Presented at the 227th ACS National Meeting, Anaheim, March 2004.

118. Synthesis, structure, spectroscopy, and reactivity of a neutral iridathiabenzene. John R. Bleeke, Monica Shokeen, Paul V. Hinkle, and Nigam P. Rath. Presented at the 228th ACS National Meeting, Philadelphia, PA, August 22-26, 2004 in Philadelphia.

119. Triaroylbenzene: Super Molecules In Supramolecular Chemistry. Mayuri K. Dighe, F. Christopher Pigge, Nigam P. Rath. Presented at the 39th Midwest Regional Meeting of the American Chemical Society, Manhattan, KS, October 2004.

120. Polymorphism in Some Organic and Organometallic Compounds. Invited lecture, Department of Chemistry, University of Missouri- Rolla, February, 2005.

121. Activation of heavier group 14-hydrogen bonds with Pt-phosphine complexes. Janet Braddock-Wilking, Joyce Y. Corey, Lisa French, Colin White, Ngamjit Praingam, Nigam P. Rath. Presented at the 229th ACS National Meeting, San Diego, CA, March 2005.

122. Synthesis, characterization, and electrochemical analysis of nitrosyl rhenacarborane complexes. Paul A Jelliss, Justin H Orlando, Nigam P. Rath, Michael Shaw. Presented at the 29th ACS National Meeting, San Diego, CA, March 2005.

123. Polypyridyl complexes of ruthenacarboranes: Electrochemistry and photophysics. Paul A. Jelliss, Nigam P. Rath, Albert Vinson, John Harbison. Presented at the 29th ACS National Meeting, San Diego, CA, March 2005.

124. Synthesis, structure, spectroscopy and reactivity of (thiapentadienyl)rhodium(phosphine) complexes. Monica Shokeen, Eric S. Wise, Nigam P. Rath, John R. Bleeke. 230th ACS National Meeting, Washington, DC, August 2005.

125. The structure of the nido-undecaborate anion. L. Barton, O. Volkov, R. Li, Thomas K. Radacki, N. P. Rath. 230th ACS National Meeting, Washington, DC, August 2005.

126. Non-steroidal compounds that reduce prostate-cancer cell proliferation with little or no feminizing effect. Cal Y. Meyers, Songwen Xie, Yuxing Hou, , Aaron W. McLean Laura Murphy, Stuart Adler, Todd Winters, Nancy Henry, Stefanie Ellis, Paul Robinson, Nigam P. Rath. 40th Midwest Regional Meeting of the American Chemical Society, Joplin, MO, United States, October 2005.

127. Bidentate phosphine-borane complexes as chelating or bridging ligands. Lawrence Barton, Nigam P. Rath, Paul McQuade, Oleg Volkov, Mitsuhiro Hata. 40th Midwest Regional Meeting of the American Chemical Society, Joplin, MO, United States, October, 2005.

128. Further Developments in Ruthenacarborane Chemistry: Using EPR and Spectroelectrochemistry to Probe Electronic Structure. Paul A. Jelliss, Justin H. Orlando, Nigam P. Rath, Michael J. Shaw. 57th Southeast/61st Southwest Joint Regional Meeting of the American Chemical Society, Memphis, TN, United States, November 2005.

129. The Effect of Phosphine on SiH Bond Activation Reactions with Pt Complexes. Ngamjit Praingam, Janet Braddock-Wilking, Joyce Y. Corey, Nigam P Rath. 57th Southeast/61st Southwest Joint Regional Meeting of the American Chemical Society, Memphis, TN, United States, November 2005.

130. Luminescent carborane complexes for optoelectronic devices. Matthew J. Fischer, Paul A. Jelliss, Nigam P. Rath, Shelley D. Minteer, Rensheng Luo. 231st ACS National

Meeting, Atlanta, GA, United States, March 26-30, 2006.

131. Synthesis, reactivity, and spectroelectrochemical analysis of rhenacarborane nitrosyl complexes. Paul A. Jelliss, Justin H. Orlando, Nigam P. Rath, Michael J. Shaw. 231st ACS National Meeting, Atlanta, GA, United States, March 26-30, 2006.

132. Preparation and Reactivity of Silicon-Functionalized Siloles. Janet Braddock-Wilking, Yan Zhang, Joyce Y. Corey, Nigam P. Rath, R. Brett Cothran, Kevin A. Trankler. 38th Central Regional Meeting of the American Chemical Society, Frankenmuth, MI, May 16-20, 2006.

133. Solid State Structure of 1,2,3-selenadiazole Derivatives. Nigam P. Rath, A. Marx, V. Manivanan and S. Muthusubramanian. Poster presentation, Annual meeting of the American Crystallographic Association, July 2006, Honolulu, HI.

134. Synthesis and reactivity of substituted dihydrosilacyclopentadienes with Pt(0) phosphine complexes. Janet Braddock-Wilking, Yan Zhang, Joyce Y. Corey, Nigam P. Rath, R. Brett Cothran, Kevin A. Trankler. 232nd ACS National Meeting, San Francisco, CA, Sept. 10-14, 2006.

135. Carbazole: Electronically and Geometrically Similar to the 9-Fluorenyl Anion. Aaron W. McLean, Yuqing Hou, Cal Y. Meyers, Nigam P. Rath. 41st Midwest Regional Meeting of the American Chemical Society, Quincy, IL, October 25-27, 2006.

136. Nitrosyl bipyridyl rhenacarborane complexes: Synthesis, characterization, and prospective uses. Paul A. Jelliss, Xiaoming Shi, Justin H. Orlando, Nigam P. Rath, Michael J. Shaw. 233rd ACS National Meeting, Chicago, IL, March 25-29, 2007.

137. Chemistry of iridium complexes and silane compounds. Todsapon Thananatthanachon, John R. Bleeke, Nigam P. Rath. 233rd ACS National Meeting, Chicago, IL, March 25-29, 2007.

138. Reactions of $CH_3Mn(CO)_5$ with alkynes revisited: New reactivity from an old system. Michael J. Shaw, Adam J. Warhausen, Lemas Mitchell, Nigam P. Rath. 233rd ACS National Meeting, Chicago, IL, March 25-29, 2007.

139. Effect of chelating phosphine ligands on SiH bond activation reactions at platinum. Janet Braddock-Wilking, Ngamjit Praingam, Nigam P. Rath. 233rd ACS National Meeting, Chicago, IL, United States, March 25-29, 2007.

140. Chemistry of iridium complexes and silane compounds. Todsapon Thananatthanachon, John R. Bleeke, Nigam P. Rath. 233rd ACS National Meeting, Chicago, IL, United States, March 25-29, 2007.

141. Metallacarboranes – a new class of lumophores. Paul A. Jelliss, Steven Buckner, Matthew J. Fischer, Shelley D. Minteer, Rensheng Luo and Nigam P. Rath. Central

regional Meeting, May 23-27, 2007.

142. SilverI Cyanoximates: Synthesis, Characterization and Applications. Nikolay Gerasimchuk, K. Domasevitch, Garrett Glover, David Lewis, N. Kent Dalley and Nigam P. Rath. Midwest Regional Meeting, November 7-10, 2007.

143. Progress toward the total synthesis of enantiomeric deoxycholic acid. Bryson W. Katona, Nigam P. Rath and Douglas F. Covey. 234th ACS National Meeting, Boston, MA, August 19-23, 2007.

144. Synthesis, characterization and applications of Silver(I) cyanoximates. Nikolay N. Gerasimchuk, Konstantin V. Domasevitch, N. Kent Dalley, Nigam P. Rath, Garrett Glover. 234th ACS National Meeting, Boston, MA, August 19-23, 2007.

145. Metallacarboranes - a new class of lumophores. Paul A. Jelliss, Steven Buckner, Matthew J. Fischer, Shelley D. Minteer, Rensheng Luo, Nigam P. Rath. 39th Central Regional Meeting of the American Chemical Society, Covington, KY, United States, May 20-23 2007.

146. Synthesis, structure, and spectroscopy of thiapentadienyl-cobalt complexes. Bryn Lutes, John R. Bleeke, Nigam P. Rath. Abstracts of Papers, 235th ACS National Meeting, New Orleans, LA, April 6-10, 2008.

147. Synthesis, structure, and spectroscopy of silapentadienyl-iridium-phosphine complexes. Todsapon Thananatthanachon, John R. Bleeke, Nigam P. Rath. Abstracts of Papers, 235th ACS National Meeting, New Orleans, LA, April 6-10, 2008.

148. Carbon-carbon bond migration in the Ru-mediated reactions of internal alkynes to form vinylidene ligands. Michael J. Shaw, Nathan E. Motl, Nigam P. Rath, James E. Eilers. Abstracts of Papers, 235th ACS National Meeting, New Orleans, LA, April 6-10, 2008.

149. Hydrogen-bonded spherical nanocapsules formed from self-assembly of pyrogallol [4]arenes. Oleg V. Kulikov, Nigam Rath, George W. Gokel. Abstracts of Papers, 237th ACS National Meeting, Salt Lake City, UT, March 22-26, 2009.

150. Synthesis, structure and spectroscopy of heteropentadienyl-cobalt complexes. Bryn L. Lutes, Donastas Sakellariou-Thompson, Michael Lipschutz, John R. Bleeke, Nigam P. Rath. Abstracts of Papers, 237th ACS National Meeting, Salt Lake City, UT, March 22-26, 2009.

151. Crystallography experiments for Undergraduate Organic Chemistry Laboratory. Nigam P. Rath. Invited presentation, Annual Bruker User Group Meeting, Madison, WI, June 2009.

152. Crystallography Experiments for Organic Laboratory and Use of X2S in Undergraduate Teaching. Nigam P. Rath, Invited presentation, Plug-N-Analyze workshop, MD Anderson Caner Research Center, Houston, TX, Feb 2010.

153. Pathway from a molecular precursor to silver nanoparticles: The prominent role of aggregative growth. Vernal N. Richards, Nigam P.Rath, William E. Buhro. Abstract, 240th ACS National Meeting, Boston, MA, August 22-26, 2010.

154. Synthesis of Four Pairs of Perhydrochrysene Enantiomers and Their Effects on GABAA Receptor Function. Eva Stastna, Brad D. Manion, Amanda Taylor, Nigam P. Rath, Alex S. Evers, Charles F. Zorumski Steve Mennerick, Douglas F. Covey. Poster, 241 ACS National Meeting, Anaheim, CA, United States, March 27-31, 2011.

155. Importance of anisotropy axes allignment in octanuclear cyanometalate single-molecule magnets. Stephen M. Holmes, Yuanzhu Zhang, Uma P. Mallik, Nigam Rath, Gordon T. Yee, Rodolphe Clerac. Abstract, 241st ACS National Meeting, Anaheim, CA, March 27-31, 2011.

156. Irriversible solvent-driven conversion in cyanometalate single-molecule magnets: $\{Fe2Ni\}_n$ (n = 2, 3). Stephen M. Holmes, Yuanzhu Zhang, Uma P. Mallik, Nigam Rath, Gordon T. Yee, Rodolphe Clerac. Abstract, 241st ACS National Meeting, Anaheim, CA, March 27-31, 2011.

157. Crystallography Experiments for an Undergraduate Laboratory. Nigam P. Rath, Christopher D. Spilling and Stephen M. Holmes. Invited talk, 2011 ACA Annual Meeting, New Orleans, LA, May 28-June 02, 2011.

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Jason A. Wilbur, Engelmann II Scholar, Summer 1990.
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Christopher Burke, STARS Student, 2000
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David (Wei) Yan, STARS Student, 2002
Srikar Rao, STARS Student, 2002
Intelly Lee, STARS Student, 2003, 2004
Amir J, Ghodrati, STARS Student, 2004
Brett Carvallo, STARS Student, 2004
Jay Vora, STARS Student, 2005.
Terry D. Bollinger, 2008
Lucy Kastner, 2009
Travis Knight, STARS Student, 2009
Sereno Adamas, STARS Student, 2009
Yan Lai-Ping , Undergraduate research, 2010
Matthew A Stockel, Master student research, 2010
Saahil Sheth, STARS Student, 2010

Research Grants and Contracts:

Single crystal X-Ray structure determination study of organic compounds, Monsanto Corporate Research and Searle, funded in 1993 and renewed 1994-2000.

Purchase of an X-Ray Diffractometer (PI: L. Barton, Chair, Chemistry), NSF Chemical Instrumentation Program, Contributor to the departmental Proposal, funded in Nov 1993.

Upgrading the computational facilities for the x-ray diffraction laboratory of the chemistry department, UM- St. Louis Research Awards Grant, funded in October 1995, $7,300.

Upgrading the existing Silicon Graphics Computers in the x-ray diffraction laboratory of the chemistry department, UM- St. Louis Small Grants Fund, funded in April 1997, $3,600.

Professional Development- To attend a two-day hands-on course on the use and system administration of the SGI Computer systems. UM- St. Louis Small Grants Fund, Submitted, February 1998, $895.

Upgrading the CCD Diffractometer for the X-ray Diffraction Laboratory of the Department of Chemistry. UM- St. Louis Research Awards Grant, funded in March 1998, $12,000.00 (maximum allowed amount).

Upgrading a Optiplex GXI Computer- Faculty Desktop Enhancement Initiative Request. UMSL-Senate Computer Committee, funded in December 1999, $497.95.

Upgrade of a CCD-based X-ray Diffrcation Laboratory (Departmental proposal, PI: G. K. Anderson, Chair, Chemistry) NSF- Chemical Instrumentation Grant, $198,250, 2000, denied.

Enhancements to the x-ray diffraction laboratory of the department of chemistry. UMSL-Research Awards, $12,440; funded amount- $10,000, February 2000.

Non-equilibrium vapor pressure measurement on crystals (Co-PI), UM-Research Board, 2000, $34,200, Denied.

Development of a CCD-based Regional X-ray diffraction Facility. NSF-MRI proposal, $320,376; submitted, February 2001, Denied.

Professional Development grant, UMSL-small grants, $965; (funded for $895), April 2001.

Single crystal X-Ray structure determination study of organic and inorganic compounds Pharmacia Corporate Research, St. Louis. Collaborative research contract, 2002.

Small Grants Fund Request for attending National ACA Meeting, January 2002, $1000.

Development of a CCD-based Regional X-ray diffraction Facility. NSF-MRI proposal, $320,376; submitted, January 2002, Denied.

Improvements to the Bruker CCD X-Ray Diffraction System of the Department of Chemistry and Biochemistry, UMSL-Research Awards, $12,400, submitted, Feb 2002, Denied.

Development of a Regional X-ray diffraction Facility. NSF-MRI proposal, $317,400; submitted, January 2003, Denied..

Purchase of X-ray Collimation System for the Bruker CCD X-ray Diffractometer., Funded, $10,00. Research Awards, April 2003.

Purchase of a CCD Diffractometer for the X-Ray Diffraction Laboratory of the Department of Chemistry and Biochemistry at UM- St. Louis. MO Research Board, $50,520, Feb 2003, Denied.

Development of a Regional X-ray diffraction Facility. NSF-CRIF proposal, $243,000; submitted, July 2003, Denied.

Purchase of xray software Xseed: small grants fund, $1000. October, 2003.

Upgrade of a CCD based X-ray diffraction Laboratory, NSF-MRI proposal, $180,226; Funded, July 2004.

Upgrade of the X-ray diffraction facility in the department of chemistry and biochemistry at UM-St. Louis, Missouri Research Board, $59,572, funded, January, 2005.

Small Grants Fund, UMSL $1000 (funded $450), March 2006.

Service:

Chair, X-Ray Committee (Departmental), 2000 - present.
Member, X-Ray Committee (Departmental), 1990 - present.
Member, Instrumentation Committee (Departmental), 1992.
Member, Computer Committee (Departmental), 1991 to 1999.
Departmental Coordinator of VAX/VMS computing and networking
Member, Computer Committee for VAX/UNIX, University of Missouri- St. Louis.
Member, Senate Computer Committee works group, University of Missouri- St. Louis.
Co-organizer, American Crystallography Association Annual Meeting, St. Louis, 1997.
Organization Committee, American Chemical Society, 35th Regional Meeting, St. Louis, 2000.

Reviewer for Journals: Acta Crystallographica, Chemical Communications, Organometallics, Journal of Chemical Society, Dalton., Journal of American Chemical Society, Inorganica Chimica Acta, Journal of Chemical Education, Journal of Coordination Chemistry, Journal of Chemical Crystallography, Polyhedron.

Reviewer for funding proposals: National Science Foundation, Missouri Research Board, ACS-Petroleum Research Fund.