

Curriculum Vitae – Zhiping Zheng

A. CONTACT INFORMATION

Department of Chemistry
University of Arizona
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B. EDUCATION AND TRAINING

B.S. in Chemistry: 1987, Peking University, Beijing, China.

M.S. in Chemistry: 1990, Peking University, Beijing, China.
Advisors: Profs. Guangxian Xu and Tianzhu Jin

Ph.D. in Chemistry: 1995, UCLA, Los Angeles, CA.
Advisor: Prof. M. Frederick Hawthorne

Postdoctoral Associate: 1995-1997, Harvard University, Cambridge, MA
Advisor: Prof. Richard H. Holm

C. PROFESSIONAL APPOINTMENTS

2006-2011 Mingjiang Scholar Guest Professor, Xiamen University, China

2004-present Associate Professor, University of Arizona, Tucson, AZ

1997-2004 Assistant Professor, University of Arizona, Tucson, AZ

D. AWARDS AND DISTINCTIONS

- Invited Professorship, Rennes 1 University, Rennes, France (July 2008)
- Excellence in Teaching, The Honors College, The University of Arizona (2007)
- Mingjiang Scholar Guest Professor, Xiamen University, China (2006-2011)
- Visiting Professor, Peking University, China (July – December 2005)
- IUPAC Young Observer Award, The U.S. National Academies (2005)
- International Junior Award, European Rare Earth and Actinide Society (2003)
- Faculty Early Career Development (CAREER) Award, National Science Foundation (2003-2008)
- China Bridges International Fellowship, University of Connecticut (1999-2002)

- Research Innovation Award, Research Corporation (1998)
- Inorganic Dissertation Award (first recipient), University of California, Los Angeles (1995)
- Ralph Bauer Prize for Excellence in Research, University of California, Los Angeles (1994)
- Distinguished Teaching Assistant Award, University of California, Los Angeles (1992)
- Graduate Student Academic Award, University of California, Los Angeles (1992)
- Outstanding Graduate Award (highest honor), Peking University (1987)
- Outstanding Academic Records Scholarship, Peking University (1987)
- Student of the Year Scholarships, Peking University (1984-1987)

E. PROFESSIONAL SOCIETY MEMBERSHIPS

1993-present American Chemical Society

F. EDITORIAL AND OTHER PROFESSIONAL SERVICES

- Topic Editor, *Crystal Growth and Design* (2006-)
- Editorial Board, *Journal of Rare Earth* (2004-)
- Invited Review Panelist, *Dalton Transactions* (2004-)
- International Organizing Committee – *International Symposium of Metal Cluster Chemistry*, July 3-5, 2008, Rennes, France.
- Symposium Organizer and Chair – *Lanthanide-Containing Functional Materials*, 2008 International Rare Earth Research Conference (RERC08), Tuscaloosa, Alabama, June 22-28, 2008.
- Symposium Organizer and Chair – *Polymetallic Functional Lanthanide Complexes and Crystal Engineering*, 2005 International Rare Earth Research Conference, Keystone, Colorado, June 26-30, 2005.
- Organizing Committee, 20th International Symposium on the Organic Chemistry of Sulfur, Flagstaff, Arizona, July 2004.
- Session Chair, Symposium on *Finite and Infinite Polygons*, ACS Spring National Meeting, Orlando, Florida, April 2002.
- Session Chair, 2001 International Rare Earth Research Conference, Campos do Jordão, BRASIL.
- Co-Chair (with D. V. McGrath), 14th Biennial Carl S. Marvel Symposium, Tucson, Arizona, March 2001.
- Secretary, American Chemical Society, Southern Arizona Section, Tucson, Arizona (1999-2002).
- Session Chair, 1998 Rocky Mountain Regional ACS Meeting, Tucson, Arizona, March 1998.

G. SERVICE ON DEPARTMENTAL COMMITTEE

- Executive Committee (2005-2008)
- Graduate Admissions and Recruiting Committee (1997-2005); Committee Chair (2003-2005)
- Junior Faculty Advisory Committee (2004-)
- Student Seminars Committee (2002-2004)

- Library Committee (2000-2002); Committee Chair (2001-2002)
- Chemical Synthesis Committee (2001-2002)
- Coordinator of the Inorganic Chemistry Seminar Series (2000-2001)
- Co-chair, Marvel Symposium Committee (2000-2001)
- Peer Review Committee (1999-2000)
- Materials Characterization Program Committee (1998-1999)
- Dissertation Committees for more than 60 Ph.D. students (since 1998)

H. SERVICE AS REVIEWERS

Funding agencies:

- National Science Foundation
- National Institute of Health
- Research Corporation
- US Civilian Research and Development Foundation
- American Chemical Society–Petroleum Research Funds
- National Science Foundation of China
- Foundation for US-Israel Collaborative Research
- National Science Foundation of Singapore – A-Star* Program

Journals:

- *Accounts of Chemical Research*
- *Chemical Reviews*
- *Journal of American Chemical Society*
- *Inorganic Chemistry*
- *Chemistry of Materials*
- *Crystal Growth and Design*
- *Journal of Physical Chemistry, B*
- *Angewandte Chemie, International Edition*
- *Chemistry, A European Journal*
- *Coordination Chemistry Review*
- *Advanced Materials*
- *Journal of Rare Earths*
- *Physical Chemistry Chemical Physics*
- *Thin Solid Films*
- *Canadian Journal of Chemistry*
- *Australian Journal of Chemistry*
- *Tetrahedron Letter*

- *Nanoletter*
- *Small*
- *Chemical Communication*
- *Dalton Transactions*
- *European Journal of Inorganic Chemistry*
- *Journal of Solid State Chemistry*
- *Polyhedron*

Publishers:

- Benjamin Cummings Publishing

Dissertation review at Universities other than The University of Arizona:

- Chinese University of Hong Kong
- University of Jamaica

I. PEER-REVIEWED PUBLICATIONS:

- 1. Cluster compounds of the f-elements.** Zheng, Z. *Handbook of Physical and chemistry of the Rare Earth Elements (invited contribution)*, in preparation.
- 2. The coordination chemistry of rare earth alkoxides, phenoxides, and hydroxodes.** Zheng, Z.; Wang, R. Book chapter in *Coordination Chemistry of the f-elements*, Wiley-VCH. Huang, C. H. Ed.; **(invited contribution)**, in preparation.
- 3. The coordination chemistry of the rare earth elements with amino acids and polyaminopolycarboxylic acids.** Wang, R.; Zheng, Z. Book chapter in *Coordination Chemistry of the f-elements*, Wiley-VCH. Huang, C. H. Ed.; **(invited contribution)**, in preparation.
- 4. Novel complexes of the $[\text{Re}_6(\mu_3\text{-Se})_8]^{2+}$ core-containing clusters with water soluble PTA ligand.** Tu, X.; Nichol, G. S.; Wang, R.; Zheng, Z., to be submitted to *Dalton Transactions*.
- 5. Cluster carbonyls of the $[\text{Re}_6(\mu_3\text{-Se})_8]^{2+}$ core: Synthesis, structural characterization, and computational analysis.** Orto, P.; Nichol, G. S.; Okumura, N.; Evans, D. H.; Arratia-Pérez, R.; Ramirez-Tagle, R.; Wang, R.; Zheng, Z., to be submitted to *Dalton Transactions*.
- 6. New europium β -diketonates for red-emitting electroluminescent devices.** De Silva, C. R.; Li, F.; Huang, C.; Zheng, Z. submitted to *Thin Film Devices*.
- 7. Correlation of calculated excited-state energies and experimental quantum yields of luminescent Tb(III) β -diketonates.** De Silva, C.; Li, J.; Zheng, Z.; Corrales, L. R. *J. Phy. Chem. A*, **2008**, *112*, in press.

Featured on cover.

8. **Molecular and Supramolecular Arrays of the $[\text{Re}_6(\mu_3\text{-Se})_8]^{2+}$ core-containing cluster.** Zheng, Z. *Encyclopedia of Inorganic Chemistry – Nanomaterials*, **2008**, in press (**invited contribution**).
9. **A Four-shell, nesting doll-like 3d-4f cluster containing 108 metal ions.** Kong, X.; Ren, Y.; Chen, W.; Long, L.; Zheng, Z.; Huang, R.; Zheng, L. *Angew. Chem. Int. Ed.* **2008**, *47*, 2398-2401.
10. **Dual shell-like magnetic clusters containing Ni(II) and Ln(III) (Ln = La, Pr, and Nd) ions.** Kong, X.; Ren, Y.; Long, L.; Zheng, Z.; Nichol, G. S.; Huang, R.; Zheng, L. *Inorg. Chem.* **2008**, *47*, 2728-2739.
11. **Chiral symmetry breaking by chemically manipulating statistical fluctuation in crystallization.** Wu, S.; Wu, Y.; Kang, Q.; Zhang, H.; Long, L.; Zheng, Z.; Huang, R. B.; Zheng, L. *Angew. Chem. Int. Ed.* **2007**, *46*, 8475-8479.

Highlighted as "Very Important Paper" by the Journal.

Highlighted in "*Science and Technology*", "Breaking the chiral barrier: Chemically manipulating crystallization kinetics yields enantiopure products" *C&EN* 2007, issue of October 29; p30.

12. **Cluster carbonyls of the $[\text{Re}_6(\mu_3\text{-Se})_8]^{2+}$ core.** Orto, P.; Nichol, G. S.; Wang, R.; Zheng, Z. *Inorg. Chem.* **2007**, *46*, 8436-8438.
13. **Adducts of europium β -diketonates with nitrogen p,p'-disubstituted bipyridine and phenanthroline ligands: Synthesis, structural characterization, and luminescence studies.** De Silva, C. R.; Maeyer, J. R.; Wang, R.; Nichol, G. S.; Zheng, Z. *Inorg. Chim. Acta* **2007**, *360*, 3543-3552.
14. **Polythiophene-semiconductor nanoparticle composite thin films tethered to indium tin oxide substrates via electropolymerization.** Shallcross, R. C.; D'Ambruoso, G. D.; Hall, H. K.; Zheng, Z.; Pyun, J.; Armstrong, N. R. *J. Am. Chem. Soc.* **2007**, *129*, 11310-11311.
15. **Keplerate magnetic cluster featuring an icosidodecahedron of Ni(II) ions encapsulating a dodecahedron of La(III) ions.** Kong, X.; Ren, Y.; Long, L.; Zheng, Z.; Huang, R.; Zheng, L. *J. Am. Chem. Soc.* **2007**, *129*, 7016-7017.

Highlighted as "*News of the Week*", "Caged Beauty – Highly symmetric Keplerate boasts intriguing magnetic properties" *C&EN* **2007**, issue of May 21; p9.

Research Highlights: Magnetic clusters: Round and round" *Nature Nanotechnology* **2007**, *2*, 388-389.

Featured on *MRS Materials News* at http://www.mrs.org/s_mrs/sec.asp?CID+1920&DID+84063.

16. **Alcohol addition to acetonitrile activated by the $[\text{Re}_6(\mu_3\text{-Se})_8]^{2+}$ cluster core.** Orto, P.; Selby, H. D.; Ferris, D.; Maeyer, J. R.; Zheng, Z. *Inorg. Chem.* **2007**, *46*, 4377-4379.
17. **Adducts of lanthanide β -diketonates with 2,4,6-tri(2-pyridyl)-1,3,5-triazine: Synthesis, structural characterization, and photoluminescence studies.** De Silva, C. R.; Maeyer, J. R.; Dawson, A.; Zheng, Z. *Polyhedron* **2007**, *26*, 1229-1238.
18. **A hybrid sol-gel reverse-mesa waveguide using lanthanide phosphate nanoparticles for optical amplification.** Gan, H.; Li, L.; DeRose, C. T.; Norwood, R. A.; De Silva, C. R.; Zheng, Z.; Peyghambarian, N. *Proceedings of SPIE-The International Society for Optical Engineering*, **2007**, *6469*(Optical Components and Materials IV), 64690B/1-64690B/8.
19. **Redetermination of bis(acetonitrile)octa- μ_3 -selenido-tetrakis(triethylphosphine)hexarhenium(III) at 150 K.** Orto, P. J.; Nichol, G. S.; Zheng, Z. *Acta Crystal, Section E: Structure Reports Online* **2007**, *E63*, m678-m679.
20. **Highly luminescent Eu(III) complexes with 2,4,6-tri(2-pyridyl)-1,3,5-triazine ligand: Synthesis, structural characterization, and photoluminescence studies.** De Silva, C. R.; Wang, R.; Zheng, Z. *Polyhedron* **2006**, *25*, 3449-3455.
21. **Dendritic arrays of $[\text{Re}_6(\mu_3\text{-Se})_8]^{2+}$ core-containing clusters: Exploratory synthesis and electrochemical Studies.** Roland, B. K.; Flora, W. H.; Selby, H. D.; Armstrong, N. R.; Zheng, Z. *J. Am. Chem. Soc.* **2006**, *128*, 6620-6625.
22. **Tetrameric arrays of the $[\text{Re}_6(\mu_3\text{-Se})_8]^{2+}$ clusters supported by a porphyrin core: synthesis, characterization, and electrochemical studies.** Roland, B. K.; Flora, W. H.; Armstrong, N. R.; Zheng, Z. *Comptes Rendus Chim.* **2005**, *8*, 1798-1807 (invited contribution).

Selected as one of the two most representative contributions of the special issue for being accessed online on the site of the French Academy of Sciences.

23. **Lanthanide nanoparticle doped low-loss sol-gel amplifier materials.** Gan, H.; Norwood, R. A.; Li, L.; DeRose, C. T.; Wu, J.; Thomas, J.; Fardad, M. A.; Schuelzgen, A.; Peyghambarian, N.; De Silva, C. R.; Zheng, Z. *Proceedings of SPIE-The International Society for Optical Engineering* **2005**, *5935*(Linear and Nonlinear Optics of Organic Materials V), 59350D/1-59350D/10.

24. **New directions of cluster chemistry - the story of the $[\text{Re}_6(\mu_3\text{-Se})_8]^{2+}$ clusters.** Selby, H. D.; Zheng, Z. *Comments on Inorg. Chem.* **2005**, *26*, 75-102 (invited contribution).
25. **Supramolecular architectures featuring stereoisomeric cluster complexes of the $[\text{Re}_6(\mu_3\text{-Se})_8]^{2+}$ core.** Selby, H. D.; Roland, B. K.; Cole, J. R.; Zheng, Z. *Macromolecular Symposia* **2004**, *209*(Organometallic and Coordination Clusters and Polymers), 23-39 (invited contribution).
26. **Cluster and polynuclear compounds. A tetranuclear lanthanide-hydroxo complex featuring the cubane-like $[\text{Ln}_4(\mu_3\text{-OH})_4]^{8+}$ cluster core, $[\text{Nd}_4(\mu_3\text{-OH})_4(\text{H}_2\text{O})_{10}(\text{alanine})_6][\text{ClO}_4]_8$.** Wang, R.; Zheng, Z.; Liu, Q.; Wang, S. *Inorg. Synth.* **2004**, *34*, 184-187 (invited contribution).
27. **Cluster-supported supramolecular design and discovery.** Zheng, Z. *Polymer Preprints (ACS, Division of Polymer Chemistry)* **2004**, *45*, 458-459.
28. **Synthesis, structural characterization and luminescence studies of a novel europium(III) complex $[\text{Eu}(\text{DBM})_3(\text{TPTZ})]$ (DBM: dibenzoylmethanate; TPTZ: 2,4,6-tri(2-pyridyl)-1,3,5-triazine).** De Silva, C. R.; Wang, J.; Carducci, M. D.; Asha Rajapakshe, S.; Zheng, Z. *Inorg. Chim. Acta* **2004**, *357*, 630-634.
29. **An inorganic-organic hybrid composite featuring metal-chalcogenide clusters.** Roland, B. K.; Flora, W. H.; Carducci, M. D.; Armstrong, N. R.; Zheng, Z. *J. Cluster Sci.* **2004**, *14*, 449-458 (invited contribution).
30. **Hydrogen-bonded supramolecular arrays of the $[\text{Re}_6(\mu_3\text{-Se})_8]^{2+}$ core-containing clusters.** Roland, B. K.; Selby, H. D.; Cole, J. R.; Zheng, Z. *Dalton Trans.* **2003**, 4307-4312.
31. **Ligand-bridged oligomeric and supramolecular arrays of the hexanuclear rhenium selenide clusters-exploratory synthesis, structural characterization, and property investigation.** Selby, H. D.; Roland, B. K.; Zheng, Z. *Acc. Chem. Res.* **2003**, *36*, 933-944 (invited contribution).
32. **Supramolecular arrays of the $[\text{Re}_6(\mu_3\text{-Se})_8]^{2+}$ core-containing clusters mediated by transition metal ions.** Selby, H. D.; Orto, P.; Zheng, Z. *Polyhedron* **2003**, *22*, 2999-3008 (invited contribution).
33. **Assembling lanthanide hydroxide clusters.** Zheng, Z. *Chemtracts* **2003**, *16*, 1-12 (invited contribution).
34. **Hydrogen-bonded extended arrays of the $[\text{Re}_6(\mu_3\text{-Se})_8]^{2+}$ core-containing clusters.** Selby, H. D.; Roland, B. K.; Carducci, M. D.; Zheng, Z. *Inorg. Chem.* **2003**, *42*, 1656-1662.
35. **Novel concentration-driven structural interconversion in shape-specific solids supported by**

- the octahedral $[\text{Re}_6(\mu_3\text{-Se})_8]^{2+}$ cluster core.** Selby, H. D.; Orto, P.; Carducci, M. D.; Zheng, Z. *Inorg. Chem.* **2002**, *41*, 6175-6177.
- 36. Routes to metallodendrimers of the $[\text{Re}_6(\mu_3\text{-Se})_8]^{2+}$ core-containing clusters.** Roland, B. K.; Carter, C.; Zheng, Z. *J. Am. Chem. Soc.* **2002**, *124*, 6234-6235.
- 37. Built to order: Molecular Tinkertoys from the $[\text{Re}_6(\mu_3\text{-Se})_8]^{2+}$ clusters.** Roland, B. K.; Selby, H. D.; Carducci, M. D.; Zheng, Z. *J. Am. Chem. Soc.* **2002**, *124*, 3222-3223.
- 38. A triboluminescent europium(III) complex.** Zheng, Z.; Wang, J.; Liu, H.; Carducci, M. D.; Peyghambarian, N.; Jabbour, G. E. *Acta Cryst, Section C: Crystal Structure Communications* **2002**, *C58*, m50-m52.
- 39. Halide-templated assembly of polynuclear lanthanide-hydroxo complexes.** Wang, R.; Selby, H. D.; Liu, H.; Carducci, M. D.; Jin, T.; Zheng, Z.; Anthis, J. W.; Staples, R. J. *Inorg. Chem.* **2002**, *41*, 278-286.
- Featured on cover.
- 40. Ligand-controlled self-assembly of polynuclear lanthanide-oxo/hydroxo complexes: from synthetic serendipity to rational supramolecular design.** Zheng, Z. *Chem. Commun.* **2001**, 2521-2529 (invited contribution).
- Featured on cover.
- 41. The first 'hexaaqua-' complex of the $[\text{Re}_6\text{Se}_8]^{2+}$ cluster core, $[\text{Re}_6\text{Se}_8(\text{OH})_2(\text{H}_2\text{O})_4] \cdot 12\text{H}_2\text{O}$.** Zheng, Z.; Selby, H. D.; Roland, B. K. *Acta Cryst, Section E: Structure Reports Online* **2001**, *E57*, i77-i79.
- 42. First oxadiazole-functionalized terbium(III) β -diketonate for organic electroluminescence.** Wang, J.; Wang, R.; Yang, J.; Zheng, Z.; Carducci, M. D.; Cayou, T.; Peyghambarian, N.; Jabbour, G. E. *J. Am. Chem. Soc.* **2001**, *123*, 6179-6180.
- Highlighted in *Science & Technology Concentrates, C&EN* **2001**, issue of July 2; p23.
- 43. Lanthanide coordination with α -amino acids under near physiological pH conditions: Polymetallic complexes containing the cubane-like $[\text{Ln}_4(\mu_3\text{-OH})_4]^{3+}$ cluster core**
Wang, R.; Liu, H.; Carducci, M. D.; Jin, T.; Zheng, C.; Zheng, Z. *Inorg. Chem.* **2001**, *40*, 2743-2750.
- 44. Dendron-controlled nucleation and growth of gold nanoparticles.** Wang, R.; Yang, J.; Zheng, Z.; Carducci, M. D.; Jiao, J.; Seraphin, S. *Angew. Chem. Int. Ed.* **2001**, *40*, 549-552.

45. **Rare Earth Elements and Materials** in *Encyclopedia of Physical Science and Technology*, 3rd ed.; Meyers, R. A. Ed.; Zheng, Z.; Greedan, J. Vol. 14, **2001** (invited contribution).
 46. **Assembling lanthanide clusters under physiological or higher pH-conditions.** Zheng, Z.; Wang, R. *Comments on Inorg. Chem.* **2000**, *22*, 1-30 (invited contribution).
 47. **Direct hydrolytic route to molecular oxo-hydroxo lanthanide clusters.** Wang, R.; Carducci, M. D.; Zheng, Z. *Inorg. Chem.* **2000**, *39*, 1836-1837.
 48. **Synthesis and structures of solvated monoclusters and bridged di- and triclusters based on the cubic building block $[\text{Re}_6(\mu_3\text{-Se})_8]^{2+}$.** Zheng, Z.; Gray, T. G.; Holm, R. H. *Inorg. Chem.* **1999**, *38*, 4888-4895.
 49. **Coordination chemistry of lanthanides at "high" pH: synthesis and structure of the pentadecanuclear complex of europium(III) with tyrosine.** Wang, R.; Zheng, Z.; Jin, T.; Staples, R. J. *Angew. Chem. Int. Ed.* **1999**, *38*, 1813-1815.
 50. **Dendrimers supported by the $[\text{Re}_6(\mu_3\text{-Se})_8]^{2+}$ metal cluster core.** Wang, R.; Zheng, Z. *J. Am. Chem. Soc.* **1999**, *121*, 3549-3550.
 51. **Cluster condensation by thermolysis: Synthesis of a rhomb-linked $\text{Re}_{12}\text{Se}_{16}$ dicluster and factors relevant to the formation of the $\text{Re}_{24}\text{Se}_{32}$ tetracluster.** Zheng, Z.; Holm, R. H. *Inorg. Chem.* **1997**, *36*, 5173-5178.
 52. **Recognition of Electron-Donating Guests by Carborane-Supported Multidentate Macrocyclic Lewis Acid Hosts: Mercuracarborand Chemistry.** Hawthorne, M. F.; Zheng, Z. *Acc. Chem. Res.* **1997**, *30*, 267-276 (invited contribution).
- Featured on cover.
53. **A basis set of Re_6Se_8 cluster building blocks and demonstration of their linking capability: Directed synthesis of an $\text{Re}_{12}\text{Se}_{16}$ dicluster.** Zheng, Z.; Long, J. R.; Holm, R. H. *J. Am. Chem. Soc.* **1997**, *119*, 2163-2171.
 54. **Hydrocarbon-soluble mercuracarborands: Syntheses, halide complexes, and supramolecular chemistry.** Zheng, Z.; Knobler, C. B.; Mortimer, M. D.; Kong, G.; Hawthorne, M. F. *Inorg. Chem.* **1996**, *35*, 1235-1243.
 55. **A hexamethyl derivative of [9]mercuracarborand-3: Synthesis, characterization, and host-guest chemistry.** Zinn, A. A.; Zheng, Z.; Knobler, C. B.; Hawthorne, M. F. *J. Am. Chem. Soc.* **1996**,

118, 70-74.

56. **A mercuracarborand characterized by B-Hg-B bonds: Synthesis and structure of *cyclo*-[(*t*-BuMe₂Si)₂C₂B₁₀H₈Hg]₃.** Zheng, Z.; Diaz, M.; Knobler, C. B.; Hawthorne, M. F. *J. Am. Chem. Soc.* **1995**, *117*, 12338-12339.
57. **Stereoselective anion template effects: Syntheses and molecular structures of tetraphenyl [12]mercuracarborand-4 complexes of halide ions.** Zheng, Z.; Knobler, C. B.; Hawthorne, M. F. *J. Am. Chem. Soc.* **1995**, *117*, 5105-5113.
58. **Facile electrophilic iodination of icosahedral carboranes. Synthesis of carborane derivatives with boron-carbon bonds via the palladium-catalyzed reaction of diiodocarboranes with Grignard reagents.** Zheng, Z.; Jiang, W.; Zinn, A. A.; Knobler, C. B.; Hawthorne, M. F. *Inorg. Chem.* **1995**, *34*, 2095-2100.
59. **Structure and bonding of a novel mercuracycle complex containing B-Hg bonds at carborane vertices.** Zheng, Z.; Knobler, C. B.; Curtis, C. E.; Hawthorne, M. F. *Inorg. Chem.* **1995**, *34*, 432-435.
60. **Host-guest chemistry of a new class of macrocyclic multidentate Lewis acids comprised of carborane-supported electrophilic mercury centers.** Yang, X.; Knobler, C. B.; Zheng, Z.; Hawthorne, M. F. *J. Am. Chem. Soc.* **1994**, *116*, 7142-59.
61. **Host-guest chemistry of anion-complexation by macrocyclic multidentate Lewis acid.** Hawthorne, M. F.; Yang, X.; Zheng, Z. *Pure and Appl. Chem.* **1994**, *66*, 245-254 (invited contribution).
62. **An iodide ion complex of a hydrophobic tetraphenyl [12]mercuracarborand-4 having a sterically encumbered cavity.** Zheng, Z.; Yang, X.; Knobler, C. B.; Hawthorne, M. F. *J. Am. Chem. Soc.* **1993**, *115*, 5320-5321.
63. **"Anti-crown" chemistry: Synthesis of [9]mercuracarborand-3 and the crystal structure of its acetonitrile complexes.** Yang, X.; Zheng, Z.; Knobler, C. B.; Hawthorne, M. F. *J. Am. Chem. Soc.* **1993**, *115*, 193-195.
64. **Rare earth complexes of polyazapolycarboxylic macrocycle Part II. Synthesis and crystal structure of dysprosium complex of 1-oxa-4,7,10-triazacyclododecane-N,N',N''-triacetic acid** Jin, T.; ZHENG, Z.; Xu, G.; Lin, X.; Han, Y. *Proceedings of the 2nd International Conference on Rare Earth Development and Application*, **1991**, *1*, 73-76.
65. **Synthesis of mimetic peroxidase and its application for the determination of glucose in serum.** Sun, S.; Zheng, Z. *Fenxi Huaxue (Chinese Analytical Chemistry)* **1990**, *18*, 329-333.

J. PATENT APPLICATIONS AND LICENSED TECHNOLOGY

1. **Rhenium Heavy Metal Clusters U. S. Patent No. 5,804,161.** Long, J. R.; ZHENG, Z.; Holm, R. H.; Yu, S.; Droege, M.; Sanderson, W. A. Issued September 8, **1998**.
2. **Hexarhenium Clusters As New Paradigms for Radiographic Imaging**, Zheng, Z., in preparation with the UA Office of Technology Transfer.

K. INVITED LECTURES

1. California State University, Department of Chemistry, Los Angeles, California, April 14, 1998.
2. University of California, Los Angeles, Department of Chemistry, Los Angeles, California, April 15, 1998.
3. NSF Inorganic Chemistry Workshop, Belmont, Maryland, June 3-6, 1999.
4. Peking University, College of Chemical and Molecular Engineering, Beijing, CHINA, December 14, 1999.
5. Fujian Institute of Research on the Structure Matter, Fuzhou, CHINA, December 24, 1999.
6. Symposium on *Template Reactions in Inorganic Chemistry*, 32nd ACS Central Regional Meeting Covington, Kentucky, May 16-19, 2000.
7. University of New Mexico, Department of Chemistry, Albuquerque, New Mexico, September 15, 2000.
8. Arizona State University, Department of Chemistry, Phoenix, Arizona, November 9, 2000.
9. University of Illinois, Department of Chemistry, Urbana-Champaign, Illinois, October 9, 2001.
10. NSF Materials Chemistry Workshop, Madison, Wisconsin, October 18-21, 2001.
11. University of Michigan, Department of Chemistry, Ann Arbor, Michigan, October 23, 2001.
12. Michigan State University, Department of Chemistry, East Lansing, Michigan, October 24, 2001.
13. Texas A&M University, Department of Chemistry, College Station, Texas, October 31, 2001.

14. University of California, Berkeley, Department of Chemistry, Berkeley, California, November 16, 2001.
15. University of South Florida, Department of Chemistry, Tampa, Florida, November 29, 2001.
16. University of Florida, Department of Chemistry, Gainesville, Florida, November 30, 2001.
17. Materials Research Society, Spring Meeting, San Francisco, California, April 2, 2002.
18. Symposium on *Finite and Infinite Polygons*, Spring ACS meeting, Orlando, Florida, April 7, 2002.
19. 23rd Rare Earth Research Conference, Davis, California, July 14-18, 2002.
20. Fuzhou University, Institute of Photochemical Research, Fuzhou, CHINA, August 10, 2002.
21. University of California, Department of Chemistry, Santa Barbara, California, November 20, 2002.
22. University of California, Los Angeles, Department of Chemistry and Biochemistry, Los Angeles, California, January 8, 2003.
23. University of North Carolina, Department of Chemistry, Chapel Hill, North Carolina, February 27, 2003.
24. North Carolina State University, Department of Chemistry and Biochemistry, Raleigh, North Carolina, February 28, 2003.
25. Iowa State University, Department of Chemistry, Ames, Iowa, April 2, 2003.
26. University of Iowa, Department of Chemistry, Iowa City, Iowa, April 4, 2003.
27. Tulane University, Department of Chemistry, New Orleans, Louisiana, April 9, 2003.
28. University of New Orleans, Department of Chemistry, New Orleans, Louisiana, April 10, 2003.
29. Louisiana State University, Department of Chemistry, Baton Rouge, Louisiana, April 11, 2003.
30. University of Wisconsin, Madison, Department of Chemistry and Biochemistry, Madison, Wisconsin, May 12, 2003.

31. Ohio State University, Department of Chemistry and Biochemistry, Columbus, Ohio, May 14, 2003.
32. 5th International Conference on *f*-Elements, Geneva, SWITZERLAND, August 24-29, 2003.
33. California State University, Department of Chemistry, Stanislaus, California, October 30, 2003.
34. California State University, Department of Chemistry, Sacramento, California, October 31, 2003.
35. University of Idaho, Department of Chemistry, Moscow, Idaho, November 20, 2003.
36. Symposium on *Metal-Containing and Metallo-Supramolecular Polymers and Materials* ACS National Meeting, Anaheim, California, March 28 - April 1, 2004.
37. Special ACS symposium in memory of Bill Carnall, Division of Nuclear Chemistry and Technology, ACS National Meeting, Anaheim, California, March 28 - April 1, 2004.
38. Symposium entitled *Inorganic/Organometallic Clusters and Polymers: Synthesis and Applications*, the 87th Canadian Chemistry Conference and Exhibition, London, Ontario, CANADA, May 29 – June 1, 2004.
39. National University of Mexico, Institute of Chemical Sciences, Mexico City, MEXICO, May 11-14, 2004.
40. Plenary Speaker, 2004 International Conference on Rare Earth, Baotou, Inner Mongolia, CHINA, August 8-11, 2004.
41. Peking University, College of Chemical and Molecular Engineering, Beijing, CHINA, August 13, 2004.
42. The 5th International Symposium for Chinese Inorganic Chemists (ISCIC-5), Hong Kong, CHINA, December 10-14, 2004.
43. Arizona State University, Department of Chemistry and Biochemistry, Tempe, Arizona, February 28, 2005.
44. 2005 Spring ACS National Meeting, San Diego, California, March 13-17, 2005.
45. University of California, San Diego, Department of Chemistry and Biochemistry, San Diego, California, April 29, 2005.

46. NSF Inorganic Chemistry Workshop, Lansdowne, Virginia, June 6-10, 2005.
47. Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, Changchun, Jilin, CHINA, October 18-20, 2005.
48. The 5th Chinese Conference on Coordination Chemistry and Bioinorganic Chemistry, Guangzhou, CHINA, November 6-10, 2005.
49. Fujian Institute of Research on the Structure Matter, Fuzhou, CHINA, November 15, 2005.
50. PacifiChem 2005, Honolulu, Hawaii, December 15-20, 2005.
51. Xiamen University, College of Chemistry and Chemical Engineering, Xiamen, CHINA, June, 2006.
52. The 6th International Symposium for Chinese Inorganic Chemists (ISCIC-6), SINGAPORE, December 17-21, 2006.
53. University of British Columbia, Department of Chemistry and Biochemistry, Vancouver, BC, CANADA, March 8, 2007.
54. University of California, Riverside, Department of Chemistry and Biochemistry, Riverside, California, March 23, 2007.
55. 2007 Spring National Meeting of American Chemical Society, Chicago, USA, March 24-29, 2007.
56. Xiamen University, College of Chemistry and Chemical Engineering, Xiamen, CHINA, June, 2007.
57. Fujian Institute of Research on the Structure Matter, Fuzhou, CHINA, July 5, 2007.
58. The 5th National Conference of Structural Chemistry/ACS Crystal Growth and Design Editorial Meeting, Fuzhou, CHINA, October 22-27, 2007.
59. Schering-Baeyer Pharma AG, Berlin, GERMANY, February 7, 2008
60. Simon Fraser University, Department of Chemistry, Burnaby, BC, CANADA, March 4, 2008.
61. International Workshop of Transition Metal Clusters, Rennes, FRANCE, July 3-5, 2008.