

Curriculum Vitae **Ralph A. Zehnder**

Angelo State University
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EDUCATION

- 2003-2005 Postdoctoral Research Associate at the Los Alamos National Laboratory, Los Alamos, NM USA, advisors: Dr. David Hobart, Dr. David Clark
- 2003 Ph.D., Chemistry, University of Siegen, Germany in collaboration with the University of Idaho, Moscow, ID USA
Dissertation: "Heterobinuclear and -trinuclear Complexes containing *ansa*-Chromocene and Ferrocene Units",
advisors: Prof. Pamela Shapiro, Prof. Bernd Wenclawiak
- 1999 M.S. in Chemistry, University of Siegen, Germany in collaboration with Bayer CropScience. Thesis: "Biomimetic Metabolic Reactions",
advisors: Prof. Bernd Wenclawiak, Dr. Hans. P. Stupp

CAREER SUMMARY

- 2018-present Tenured Associate Professor of Chemistry at Angelo State University (ASU), San Angelo, TX USA
- Teaching Chemistry 1311/1312, General Chemistry I and II including lab sections.
 - Teaching Descriptive Inorganic Chemistry 3301.
 - Incorporating TopHat, an online student engagement system into classroom teaching.
 - Incorporating classroom experimental demonstrations into the teaching process.
 - Serving as departmental peer review and tenure review committee chair.
 - Serving on the University Faculty Senate.
 - Serving as liaison for the ASU dual enrollment program to support participating Texas high school teachers.
 - Reaching out to local high schools by visiting and performing chemistry demonstrations.
 - Production of inorganic lanthanide compounds and metal organic frameworks.
 - Mentoring a team of undergraduate students in a research setting.
- 2013-2018 Assistant Professor of Chemistry at Angelo State University (ASU), San Angelo, TX USA
- Attended Pearson's Physical Sciences Forum and Focus Group 2015 in San Francisco and 2016 in San Diego to advance teaching effectiveness.
 - Developed the Descriptive Inorganic Chemistry 3301 course at ASU.
 - Served on various hiring search committees.
 - Served on the university curriculum committee.
 - Served on the university library committee
 - Assisted with the refill of liquid nitrogen for the departmental NMR instrument.
 - Assisted with various on campus recruiting efforts.
- 06-08 2014/2015 Visiting Scientist at the Los Alamos National Laboratory, Los Alamos, NM USA
- Extended lanthanide MOF research onto the actinide elements thorium and uranium
 - Assisted with XAS measurements at the Stanford Synchrotron Radiation Lightsource (SSRL), Palo Alto, CA USA
- 2011-2012 Tenured Associate Professor of Chemistry at the University of Louisiana at Monroe (ULM), Monroe, LA USA
- Taught Chemistry 4013, Advanced Inorganic Chemistry
 - Taught Chemistry 3010, Descriptive Inorganic Chemistry
 - Taught Chemistry 1007 and 1008, General Chemistry I and II.
 - Taught Chem. lab 1009 and 1010 (General Chemistry Laboratory I and II)

- Was involved in the course redesign of Chem1007 and Chem1008, utilizing advanced chemistry homework and testing software.
- Served as chair of the Freshman Programs Committee in the Department of Chemistry.
- Coordinated community outreach efforts. Visited local high schools, performed chemistry demonstrations as a team effort with a number of colleagues and undergraduate students.
- National Chemistry Week Coordinator for the local section of the ACS.

- 2005-2011 Assistant Professor of Chemistry at ULM, Monroe, LA USA
- Developed two online chemistry courses (Chem1007 and Chem1008).
 - Produced a series of edited lecture videos for online Chemistry 1007.
 - Recorded a series of in-class videos for online Chemistry 1008.
 - Taught Chem2041, Quantitative Analytical Chemistry Laboratory, and Chem3001, Seminar for Chemistry Majors.
 - Taught a Directed Study graduate level course (Chem. 4022).
 - Attended two course redesign conferences organized by the Redesign Alliance.
 - Established a research laboratory and a vigorous undergraduate research program.
 - Mentored 25 undergraduate students at ULM.
 - Assisted with the removal and disposal of a Pu-238/Be neutron source by arranging the pickup by the colleagues from the Los Alamos Off-site Source Recovery Project
- Jan.-May 2008 Faculty at St. Frederick High School, Monroe, LA USA
- Taught the Chemistry Honors II course as a dual enrollment class.
- May-Aug. 2006 Visiting Scientist at the Los Alamos National Laboratory, Los Alamos, NM USA
- Continued the previous research regarding lanthanide bis-hydroxy chlorides.
- 2003-2005 Postdoctoral Research Associate, Los Alamos National Laboratory, Los Alamos, NM USA
- Hydrothermal synthesis and characterization of water stable lanthanide complexes. Technique to be applied to produce similar actinide complexes, which might play an important role for the long-term storage of nuclear waste.
 - Dissolution experiments of UO₂ with peroxide in basic media and speciation of resulting products to develop a new process for the recycling of spent nuclear fuel.
 - Used analytical techniques, e.g., electronic spectrosc., FT-IR, FT-RAMAN, and NMR.
 - Synthesis of unique *monomeric* complexes of general formula UO₄L₂⁴⁻.
- 1999 - 2002 Research Assistant, Organometallic Chemistry, University of Idaho, Moscow, ID USA
- Synthesized and characterized new heteronuclear *ansa*-chromocene complexes.
 - Used analytical techniques, e.g., NMR, cyclic voltammetry, electronic spectroscopy, FT-IR and NIR.
 - Mentored an undergraduate student.
 - Teaching assistant, general chemistry, for chemistry and biology majors.
- 1998 - 1999 Analytical Chemistry, BayerCropScience, Monheim, Germany
- Developed an *in situ* system to generate and characterize the metabolites of herbicides.
 - Used oxidative biomimetic reactions to break down herbicides and monitored metabolites with HPLC.
 - Used separation techniques such as, preparative HPLC, Craig distribution and preparative TLC to obtain larger quantities of artificial metabolites.
- 1997 Undergraduate Research at the University of Aberdeen, Aberdeen, Scotland, UK
- Studied a six-step synthesis sequence of Sumanene, a C₆₀ fragment.

MILITARY EXPERIENCE

1991-1993 Service in the German Army with promotion to First Lieutenant and honorable discharge

LANGUAGE SKILLS

Fluent in German and English

AFFILIATIONS

American Chemical Society, Texas Academy of Science

RESEARCH INTERESTS

Synthesis and design of lanthanide and actinide compounds that have relevance in nuclear fuel reprocessing as well as in nuclear waste disposal.
Design of lanthanide and actinide metal organic frameworks (MOFs).

COLLABORATORS

- Dr. Matthias Zeller, crystallographer at Purdue University, West Lafayette, IN
- Dr. Stosh Kozimor, Los Alamos National Laboratory, NM
- Dr. Thomas Albrecht-Schmitt, Florida State University, Tallahassee, FL

FUNDING

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| 2020 | Received a one year ASU internal faculty research advancement grant: \$15,000 |
| 2016 | Received a one year ASU internal faculty research advancement grant: \$15,000 |
| 2015 | Received a DOE Visiting Faculty Program summer stipend: \$15,000 |
| 2014 | Received a one year ASU internal faculty research advancement grant: \$14,981 |
| 2007 | Received a three year research grant from the Louisiana Board of Regents: \$64,678 |

PUBLICATIONS

1. Conversion of Lanthanide Glutarate Chlorides with Interstitial THF into Lanthanide Glutarates with unprecedented Topologies, Zehnder, R.A.; Jenkins, J.; Zeller, M.; Dempsey, C.; Kozimor, S.A.; Jackson, G.; Gilbert, K.; Smith, M.; *Inorg. Chim. Acta* **2018**, 471, 502–512
2. Stress Compensation in an extended Series of Lanthanide Sulfonatoterephthalates $[\text{Ln}(\text{TPSO}_3)(\text{H}_2\text{O})_2]_n$ (Ln = Ce – Lu, except Pm), Hernandez, A.; Jenkins, J.; Maslen, H.; Horner, G.; Zeller, M.; Dempsey, C.; Urteaga, J.; Zehnder, R.A.; *Inorg. Chim. Acta* **2018**, 471, 104–112
3. Network Dimensionality of Selected Uranyl(VI) Coordination Polymers and Octopus like Uranium(IV) Clusters, Zehnder, R.A.; Boncella, J.M.; Cross, J.N.; Kozimor, S.A.; Monreal, M.J.; La Pierre, H.S.; Scott, B.L.; Tondreau, A.M.; Zeller, M.; *Cryst. Growth Des.* **2017**, 17, 5568–5582
4. Strain Alleviation in an Isomorphous Series of Lanthanide 2-nitroterephthalates $[\text{Ln}_2(\text{TPNO}_2)_3(\text{H}_2\text{O})_2] \cdot 2\text{H}_2\text{O}$ (Ln = Pr – Lu, except Pm), Zehnder, R.A.; Fontaine, N.; Mouawad, B.A.; Leonard, J.K.; Zeller, M.; Fronczek, F.R.; de Lill, D.T.; Ballard, A.; Bonnette, D.;* Head, A.; Ghimire, K.; Welch, J.N.; Barber, E.R.; Murray, J.M.; Dempsey, C.; Jenkins, J.; Jackson, G.; Tokunboh, M.; Bach, S.R.; Treadway Harris, J.R.; *Inorg. Chim. Acta* **2017**, 467, 276–286
5. Covalency in Lanthanides. An X-ray Absorption Spectroscopy and Density Functional Study of LnCl_6^{x-} (x = 3, 2), Löble, M.W.; Keith, J.M.; Altman, A.B.; Stieber, S.C.E.; Batista, E.R.; Boland, K.S.; Conradson, S.D.; Clark, D.L.; Pacheco, J.L.; Kozimor, S.A.; Martin, R.L.; Minasian, S.G.; Olson, A.C.; Scott, B.L.; Shuh, D.K.; Tyliczszak, T.; Wilkerson, M.P.; Zehnder, R.A.; *J. Am. Chem. Soc.* **2015**, 137, (7), 2506–2523
6. 1-Chlorofuro[3,2-e][2,1,3]benzoxatellurazole, Watkins, J.M.; Fronczek, F.R.; Zehnder, R.A.; Junk, T.; *Acta Cryst.* **2013**, C69, 156 – 157
7. Effect of Inclining Strain on the Crystal Lattice along an Extended Series of Lanthanide Hydroxysulfates $\text{Ln}(\text{OH})\text{SO}_4$ (Ln = Pr - Yb, except Pm), Zehnder, R.A.; Wilson, C.; Christy, H.; Harris, K.; Chauhan, V.; Schutz, V.; Sullivan, M.; Zeller, M.; Fronczek, F.; Myers, J.; Dammann, K.; Duck, J.; Smith, P. M.; Okuma, A.; Johnson, K.; Sovesky, R.; Stroudt, C.; Renn, R.A.; *Inorg. Chem.* **2011**, 50, 836 - 846
8. Network Dimensionality and Ligand Flexibility in Lanthanide Terephthalate Hydrates, Zehnder, R.A.; Renn, R.A.; Pippin, E.; Zeller, M.; Wheeler, K. A.; Carr, J. A.; Fontaine, N.; McMullen, N.; *J. Mol. Struct.* **2011**, 985, 109 - 119
9. Poly[[tetraaquadi- μ_4 -glutarato- μ_2 -terephthalato-dineodymium(III)] heptadecahydrate], Zehnder, R.A.; Fontaine, N.; Zeller, M.; Renn, R.A.; *Acta Cryst.* **2010**, C66, m371 – m374

10. (Acetato-k²O,O')dihydroxydoytterbium(III) hemihydrate, Zehnder, R.A.; Renn, R.A.; Fronczek, F.; *Acta Cryst.* **2010**, C66, m307 – m310
11. Investigation of the Structural Properties of an Extended Series of Lanthanide Bis-hydroxychlorides Ln(OH)₂Cl (Ln = Nd – Lu, except Pm and Sm), Zehnder, R.A.; Clark, D.L.; Scott, B.L.; Donohoe R.J.; Palmer, D.; Runde, W.; Hobart, D.; *Inorg. Chem.* **2010**, 49, 4781 - 4790
12. Synthesis, crystallographic characterization, and conformational prediction of a structurally unique molecular mixed-ligand U(VI) solid, Na₆[UO₂(O₂)₂(OH)₂](OH)₂•14H₂O, Zehnder, R.A.; Batista, E.A.; Scott, B.L.; Peper S. M.; Goff, G.S.; Runde, W.H.; *Radiochim. Acta* **2008**, 96, 9-11, 575 - 578
13. Ring-borylated 15-electron and 17-electron ansa-chromocene complexes, their physical properties and molecular structures, Shapiro, P.J.; Sinnema, P.J.; Perrotin, P.; Budzelaar, P.M.; Weihe, H.; Twamley, B.; Zehnder, R.A.; Nairn, J.; *Chem.-Eur. J.* **2007**, 13, 6212 - 6222
14. ansa-Chromocene Complexes. 2. Isocyanide Derivatives of Cr(II) and Cr(III), Their Syntheses, X-ray Crystal Structures, and Physical Properties, Shapiro, P.J.; Zehnder, R.; Foo, D.M.; Perrotin, P.; Budzelaar, P.H.M.; Leitch, S.; Twamley, B.; *Organometallics* **2006**, 3, 719 - 732
15. Tetrapotassium dicarbonatodioxoperoxouranium(VI)2.5-hydrate, K₄[UO₂(CO₃)₂(O₂)₂]•2.5H₂O, Zehnder, R.A.; Peper S.M.; Scott, B.L.; Runde, W.H.; *Acta Cryst.* **2005**, C61, i3 - i5
16. A Kinetic Study of the Oxidative Dissolution of UO₂ in Aqueous Carbonate Media, Peper, S.M.; Brodnax, L.F.; Field, S.E.; Zehnder, R.A.; Valdez, S.N.; Runde, W.H.; *Ind. Eng. Chem. Res.* **2004**, 43, 8188 - 8193
17. Isolation and structural Characterization of the first thermally robust and air stable Cr(4+) bent-metallocene complex, Sinnema, P.J.; Nairn, J.; Zehnder, R.A.; Shapiro, P.J.; Twamley, B.; Blumenfeld, A.; *Chem. Comm.* **2004**, 1, 110 - 111.
18. Solvated CrBr₂(thf)₂, a Linear Chain in the Solid State, Twamley, B.; Zehnder, R.A.; Shapiro, P.J.; *Acta Cryst.* **2001**, E57, 80 - 81
19. ansa-Chromocene Complexes. 1. Synthesis and Characterization of Cr(II) Carbonyl and tert-Butyl Isocyanide Complexes, Matare, G.; Foo, D.M.; Kane, K.M.; Zehnder, R.A.; Wagener, M.; Shapiro, P.J.; *Organometallics* **2000**, 19, 1534 - 1539

INVENTION DISCLOSURE

S.M. Peper, W.H. Runde, S.E. Field, R.A. Zehnder, L.F. Brodnax, W.J. Crooks, G.D. Jarvinen, Dissolution of UO₂ in Carbonate Media with Peroxide, Los Alamos National Laboratory, 6/2004

PRESENTATIONS

28 oral presentations and 18 poster presentations at diverse conferences and institutions.
List available if desired.