

# HANS-CONRAD ZUR LOYE

Associate Dean for Research and Graduate Education, College of Arts & Sciences  
David W. Robinson Palmetto Professor of Chemistry and Carolina Distinguished Professor  
Department of Chemistry and Biochemistry  
University of South Carolina

## EDUCATION

Postdoc	1988-89	Northwestern University	Chemistry
Ph.D.	1988	University of California, Berkeley	Chemistry
Sc. B.	1983	Brown University	Chemistry

## EMPLOYMENT HISTORY

Joint Appointment	Savannah River National Laboratory	<b>2020 - present</b>
Carolina Distinguished Professor	University of South Carolina	<b>2018-present</b>
Associate Dean for Research and Graduate Education	College of Arts and Sciences University of South Carolina	<b>2015-present</b>
Associate Dean for Research	College of Arts and Sciences University of South Carolina	<b>2011-2015</b>
Interim Associate Dean for Research	College of Arts and Sciences University of South Carolina	<b>2011</b>
David W. Robinson Palmetto Professor of Chemistry	Department of Chemistry and Biochemistry University of South Carolina	<b>2000-present</b>
Professor	Department of Chemistry and Biochemistry University of South Carolina	<b>2000-present</b>
Associate Professor	Department of Chemistry and Biochemistry University of South Carolina	<b>1996-2000</b>
Associate Professor	Department of Chemistry Massachusetts Institute of Technology	<b>1994-1996</b>
Assistant Professor	Department of Chemistry Massachusetts Institute of Technology	<b>1989-1994</b>
Postdoctoral Fellow	Department of Chemistry Northwestern University	<b>1988-1989</b>

## **CURRENT RESEARCH INTERESTS**

Synthesis of new hierarchical wasteform materials for the effective immobilization of nuclear waste in persistent architectures

Crystal growth of new oxide materials

Crystal growth of new fluorides

Crystal growth of new chalcogenides

Synthesis of new, structurally complex, scintillator materials

Investigation of optical, electronic and magnetic properties of new materials

Cooperative structure-property relationships

We investigate the crystal growth of new materials, including new scintillating and luminescing oxides and fluorides, and new uranium and thorium containing structures. In the latter case, we synthesize new hierarchical wasteform materials for the effective immobilization of nuclear waste in persistent architectures.

## **SUMMARY OF SCIENTIFIC ACCOMPLISHMENTS**

<b>Funding:</b>	Over \$30 Million in research funding to date
<b>Publications:</b>	Over 450 publications in peer reviewed journals to date. Over 200 publications in peer reviewed journals since 2010.
<b>Patents:</b>	5
<b>Citations:</b>	Over 16,000 citations; h-index = 60-62.
<b>Undergraduates:</b>	Over 50 undergraduate researchers trained to date.
<b>Graduate Students:</b>	Over 40 graduate student researchers trained to date.
<b>Postdocs:</b>	Over 13 postdoctoral researchers trained to date.
<b>Research Seminars</b>	> 200

## **I. HONORS AND AWARDS**

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Furman University John Albert Southern Lecturer, **2019**.  
Carolina Distinguished Professor, **2018-present**.  
Breakthrough Leadership in Research Award, **2016-2017**.  
Charles H. Stone Award, ACS Carolina Piedmont Section, **2016**.  
South Carolina Governor's Award for Excellence in Scientific Research, **2016**.  
University of South Carolina Trustee Professorship Award, **2012**.  
Southern Chemist Award, ACS Memphis Section, **2011**.  
Elected to the rank of Fellow of the American Chemical Society, **2011**.  
Guest Researcher at NIMS, Tsukuba, Japan, **2010**.  
Outstanding South Carolina Chemist, ACS South Carolina Section, **2010**.  
Elected to the rank of Fellow of the AAAS, **2009**.  
IPMI Henry J. Albert Award, **2009**.  
Invited Professor, Universite d'Angers, France, **2008**.  
University of South Carolina Educational Foundation Award for Research in Science, Mathematics and Engineering, **2006**.  
Elected full member of Sigma Xi, **2006**.  
Visiting Professor Sun Yat-sen University, **2004-2006, 2008-2011**.  
Visiting Professor at the ICMCB-CNRS-Bordeaux, France, **2003**.  
Guest Professor Shandong Normal University, **2001**.  
David W. Robinson Palmetto Professorship, **2000-present**.  
Visiting Professor at the Université de Picardie, Jules Verne, France, **1999**.  
Exxon Award in Solid State Chemistry, **1994**.  
Paul M. Cook Career Development Professorship, **1993**.  
Camille & Henry Dreyfus New Faculty Award, **1989**.  
Raychem Fellowship, **1987**.  
Earle C. Anthony Fellowship, **1984-1985**.  
Chemistry Fellowship, UC Berkeley, **1983-1984**.  
Graduated Magna Cum Laude with Honors, Brown University, **1983**.  
Elected to Sigma Xi, **1981**.

## II. PROFESSIONAL ACTIVITIES

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Member US Commission on Powder Diffraction (USCPD), **2020-present**.

Editorial Board Member – Inorganics, **2020-present**.

Director, DOE-EFRC “Center for Hierarchical Waste Form Materials” Renewed: **2020-2024**.

Member CAS Return to Work Planning and Management Team – UofSC, **2020**.

Member Future Planning Group – Research Subcommittee – UofSC, **2020**.

Member Battelle-SRNL-UofSC Team: SRNL Planning Committee, **2020**.

External Reviewer for the Notre Dame Center for Sustainable Energy, **2020**.

Chair, SSMC/EPM subcommittee of the NSF-DMR Committee of Visitors (COV). (SSMC = Solid State and Materials Chemistry; EPM = Electronic and Photonic Materials), **2019**.

Guest Editor – Frontiers in Chemistry – Special issue on Flux Crystal Growth, **2019**.

Institutional Director, NSF EPSCoR Track-1, **2017-present**.

Member International Advisory Board *Materials Issues in Nuclear Waste Treatment and Disposal*, CIMTEC, **2017-2018**.

Member External Review Committee of Savannah River National Laboratory (SRNL), **2017**.

External Reviewer of the FSU Chemistry Department, **2017**.

Director, DOE-EFRC “Center for Hierarchical Waste Form Materials” **2016-2020**.

Member Assistant/Associate Dean’s Graduate Council, **2016-present**.

Member External Review Committee of Savannah River National Laboratory (SRNL), **2016**.

Editorial Board Member - Solid State Sciences, **2016-present**.

Member International Advisory Board of the MAPEX Center for Materials and Processes, University of Bremen, Germany, **2015 – present**.

Technical Sessions Chair, 2016 South East Regional Meeting of the American Chemical Society (SERMACS), **2015-2016**.

Chair, Solid State Chemistry Gordon Conference, **2014-2016**.

Vice Chair, Solid State Chemistry Gordon Conference, **2012-2014**.

Breakthrough Magazine – Editorial Advisory Board, **2011-2013**.

Participant, NSF Materials Genome Initiative Workshop, Dec. 13, **2012**.

Oak Ridge National Laboratory (ORNL) SNS/HFIR User Group Executive Committee, **2011-2014**.

Associate Editor, Journal of Alloys and Compounds, **2011-2014**.

ORNL Neutron Scattering Science Review Committee, **2010-present**.

Director, Powder X-ray Diffraction Facility, **2008-present**.

Editor, Journal of the South Carolina Academy of Science, **2008-2012**.

Faculty Fellow, Office of Research and Health Sciences, USC, **2007-2008**.

Leader of the Polymer Nanocomposites Group at USC, **2006-2008**.

President South Carolina Academy of Science, **2006-2007**.

President-elect South Carolina Academy of Science, **2005**.

Vice-President South Carolina Academy of Science, **2004**.

Member Users Executive Committee, Brookhaven National Laboratory (BNL), Center for Functional Nanomaterials, **2004-2006**.

Sabbatical at Brookhaven National Laboratory, BNL-National Synchrotron Light Source, **2003**.

Chair: Solid State Chemistry Subdivision, American Chemical Society (ACS), Division of Inorganic Chemistry, **2003-2004**.

Editorial Board Member – Journal of the South Carolina Academy of Science, **2002-2008**.

Co-organizer of the NSF Summer Program in Solid State Chemistry, **2001-2007**.

Councilor to the South Carolina Academy of Science, **2000-2004**.

Editorial Board Member - Journal of Alloys and Compounds, **1998-2011**.

Associate Editor for Journal of Solid State Chemistry, **1997-present**.

Editorial Board Member - Solid State Ionics, **1997-2002**.

Section Editor for CHEMTRACTS -Inorganic Chemistry, **1997-2007**.

### III. SCHOLARSHIP

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#### A. Thesis

“Magnetic, Chemisorption and Infrared Studies of Ni/TiO<sub>2</sub>: An Example of an Epifacial Reaction”

Ph.D. thesis completed May 1988.

Supervisor: Prof. Angy Stacy

Institution: UC Berkeley

#### B. Publications

##### Submitted

Aslani, C. K., Klepov, V. V., zur Loye, H.-C., “Flux Crystal Growth of a New BaTa<sub>2</sub>O<sub>6</sub> Polymorph, and of the Novel Tantalum Oxyfluoride Salt Inclusion Phase [Ba<sub>3</sub>F]Ta<sub>4</sub>O<sub>12</sub>F: Flux Dependent Phase Formation”, J. Solid State Chem., **2020**, submitted.

Morrison, G., Christian, M. S., Besmann, T. M., zur Loye, H.-C., “Flux Growth of Uranyl Titanates: Rare Examples of TiO<sub>4</sub> Tetrahedra and TiO<sub>5</sub> Square Bipyramids”, J. Phys. Chem., **2020**, submitted.

Smart, M., Smith Pellizzeri, T., Morrison, G., McMillen, C., zur Loye, H.-C., Kolis, J., “Ferrite Materials Containing Kagomé Layers: Chemistry of Ba<sub>2</sub>Fe<sub>11</sub>Ge<sub>2</sub>O<sub>22</sub> and K<sub>2</sub>Co<sub>4</sub>V<sub>9</sub>O<sub>22</sub> Hexaferrites”, Chem. Mater., **2020**, submitted.

Morrison, G., zur Loye, H.-C., Expanding the Chemistry of Salt-Inclusion Materials: Utilizing the Titanyl Ion as a Structure Directing Agent for the Targeted Synthesis of Salt-Inclusion Titanium Silicates”, Cryst. Growth Design, **2020**, submitted.

Carone, D., Usman, M., Klepov, V. V., Smith, M. D., Kocovski, V., Besmann, T. M., zur Loye, H.-C., “New Germanate and Mixed Cobalt Germanate Salt Inclusion Materials: [(Rb<sub>6</sub>F)(Rb<sub>4</sub>F)][Ge<sub>14</sub>O<sub>32</sub>] and [(Rb<sub>6</sub>F)(Rb<sub>3.1</sub>Co<sub>0.9</sub>F<sub>0.96</sub>)] [Co<sub>3.8</sub>Ge<sub>10.2</sub>O<sub>30</sub>F<sub>2</sub>]”, CrystEngComm, **2020**, submitted.

Usman, M., Smith, M. D., zur Loye, H.-C., “Rb<sub>2</sub>Co<sub>1.85</sub>Ge<sub>1.15</sub>O<sub>6</sub>: The First Quaternary, Noncentrosymmetric Rubidium Cobalt Germanate”, J. Chem. Cryst., **2020**, submitted.

## In Print

1. Usman, M., Kocevski, V., Smith, M. D., Besmann, T., zur Loye, H.-C., “Salt-flux Synthesis, Crystal Structure and Theoretical Characterization of  $\text{Rb}_{0.74}\text{Ga}_{6.62}\text{Ti}_{0.38}\text{O}_{11}$ ”, DOI: 10.1016/j.solidstatesciences.2020.106394. *Solid State Sci.*, **2020**, *109*, 106394.
2. Pellizzeri, T. M. S., Morrison, G., McMillen, C. D., zur Loye, H.-C., Kolis, J. W., “Sodium Transition Metal Vanadates from Hydrothermal Brines: Synthesis and Characterization of  $\text{NaMn}_4(\text{VO}_4)_3$ ,  $\text{Na}_2\text{Mn}_3(\text{VO}_4)_3$ , and  $\text{Na}_2\text{Co}_3(\text{VO}_4)_2(\text{OH})_2$ ”, DOI:10.1002/ejic.202000518. *EurJIC*, **2020**, 3408-3415.
3. Keerthisinghe, N., Klepov, V. V., Zhang, E., Smith, M. D., Egodawattee, S., Foulger, S. H., zur Loye, H.-C., “Hydrothermal Synthesis and Properties of  $M^{\text{II}}M^{\text{III}}\text{F}_5(\text{H}_2\text{O})_7$  ( $M^{\text{II}} = \text{Co}^{2+}$  and  $\text{Ni}^{2+}$ ,  $M^{\text{III}} = \text{Mn}^{3+}$ ,  $\text{Ga}^{3+}$ , and  $\text{In}^{3+}$ )”, DOI:10.1016/j.solidstatesciences.2020.106374. *Solid State Sci.*, **2020**, *108*, 106374.
4. Breton, L. S., Klepov, V. V., zur Loye, H.-C., “Facile Oxide to Chalcogenide Conversion for Actinides using the Boron-Chalcogen Mixture Method”, DOI: 10.1021/JACS.0C06483. *J. Am. Chem. Soc.*, **2020**, *142*, 14365-14373.
5. Ayer, G. B., Klepov, V. V., Smith, M. D., Hu, M., Yang, Z., Martin, C. R., Morrison, G., zur Loye, H.-C., “ $\text{BaWO}_2\text{F}_4$ : A Mixed Anion X-ray Scintillator with Excellent Photoluminescence Quantum Efficiency”, DOI:10.1039/D0DT02184A. *Dalton*, **2020**, *49*, 10734-10739.
6. Pace, K. A., Klepov, V. V., Deason, T. K., Smith, M. D., DiPrete, D. P., Amoroso, J. W., zur Loye, H.-C., “Expansion of the  $\text{Na}_3\text{M}^{\text{III}}(\text{Ln}/\text{An})_6\text{F}_{30}$  Series: Incorporation of Plutonium into a Highly Robust and Stable Framework”, DOI:10.1002/chem.202002774. *Chemistry a European Journal* **2020**, *26*, 12941-12944.
7. Pace, K. A., Klepov, V. V., Christian, M. S., Morrison, G., Deason, T. K., Besmann, T. M., DiPrete, D. P., Amoroso, J. W., zur Loye, H.-C., “Targeting Complex Plutonium Oxides by Combining Crystal Chemical Reasoning with Density-Functional Theory Calculations: The Quaternary Plutonium Oxide  $\text{Cs}_2\text{PuSi}_6\text{O}_{15}$ ”, DOI:10.1039/D0CC02674C. *Chem. Commun.*, **2020**, *56*, 9501-9504.
8. Usman, M., Kocsvski, V., Smith, M. D., Morrison, G., Zhang, W., Besmann, T. M., Halasyamani, P. S., zur Loye, H.-C., “Polymorphism and Molten Nitrate Salt-assisted Single Crystal to Single Crystal Ion Exchange in Zeolitic Cesium Ferrogermanate:  $\text{CsFeGeO}_4$ ”, DOI: 10.1021/10.1021/acs.inorgchem.0c00936. *Inorg. Chem.*, **2020**, *59*, 9699-9709.
9. Grass, A., Bellow, J. A., Morrison, G., zur Loye, H.-C., Lord, R. L., Groysman, S., “One Electron Reduction Transforms High-Valent Low-Spin Cobalt Alkylidene into High-Spin Cobalt(II) Carbene Radical”, DOI:10.1039/d0cc03028g. *Chem. Commun.*,

2020,56, 8416-8419.

10. Juillerat, C. A., Kocevski, V., Klepov, V. V., Amoroso, J. W., Besman, T. M., zur Loye, H.-C., “Structure and Stability of Alkali Gallates Structurally Reminiscent of Hollandite”, DOI:10.1111/jace.17327. *J. Am. Ceram. Soc.*, **2020**, *103*, 6531-6542.
11. Klepov, V. V., Juillerat, C. A., Pace, K. A., Morrison, G., zur Loye, H.-C., “Soft” Alkali Bromide and Iodide Fluxes for Crystal Growth”, DOI:10.3389/fchem.2020.00518. *Front. Chem.*, **2020**, *8*:518.
12. Massoni, N., Moloney, M., Grandjean, A., Mixture, S. T., zur Loye, H.-C., “Crystal structure of dicaesium strontium hexacyanidoferrate(II), Cs<sub>2</sub>Sr[Fe(CN)<sub>6</sub>], from laboratory X-ray powder data”, DOI:10.1107/S2056989020006660. *Acta Cryst. E.*, **2020**, *E76*, 900-904.
13. Usman, M., Ayer, G. B., Smith, M. D., zur Loye, H.-C., “Synthesis and Crystal Structure of a 6H Hexagonal Fluoro-perovskite: RbMgF<sub>3</sub>”, DOI: 10.1007/s10870-020-00834-5. *J. Chem. Crystallog.*, **2020**, in print.
14. Yan, H., Smith, M. C., Kuwabara, A., Yamaura, K., Tsujimoto, Y., zur Loye, H.-C., “Flux Crystal Growth, Structure, and Optical Properties of the New Germanium Oxysulfide La<sub>4</sub>(GeS<sub>2</sub>O<sub>2</sub>)<sub>3</sub>”, DOI:10.1021/acs.cgd.0c00332. *Cryst. Growth Design*, **2020**, *20*, 4054-4061.
15. Colliard, I., Morrison, G., zur Loye, H.-C., Nyman, M., “Supramolecular Assembly of U(IV) Clusters and Superatoms”, DOI:10.1021/jacs.0c03041. *J. Am. Chem. Soc.*, **2020**, *142*, 9039-9047.
16. Ayer, G. B., Klepov, V. V., Pace, K. A., zur Loye, H.-C., “Quaternary Cerium(IV) Containing Fluorides Exhibiting Ce<sub>3</sub>F<sub>16</sub> Sheets and Ce<sub>6</sub>F<sub>30</sub> Frameworks”, DOI:10.1039/d0dt00616e. *Dalton*, **2020**, *49*, 5898 - 5905.
17. Pace, K. A., Koch, R. J., Smith, M. D., Morrison, G., Klepov, V. V., Besmann, T. M., Mixture, S. T., zur Loye, H.-C., “Crystal Growth of Alkali Uranyl Borates from Molten Salt Fluxes: Characterization and Ion Exchange Behavior of A<sub>2</sub>(UO<sub>2</sub>)B<sub>2</sub>O<sub>5</sub> (A = Cs, Rb, K)”, DOI:10.1021/acs.inorgchem.0c00536. *Inorg. Chem.*, **2020**, *59*, 6449-6459.
18. Juillerat, C. A., Klepov, V. V., Smith, M. D., zur Loye, H.-C., “Targeted Crystal Growth of Uranium Gallates Via the Systematic Exploration of the UF<sub>4</sub>-GaPO<sub>4</sub>-ACl (A = Cs, Rb) Phase Space”, DOI:10.1039/D0CE00343C. *CrystEngComm*, **2020**, *22*, 3020-3032.
19. Klepov, V. V., Berseneva, A. A., Pace, K. A., Kocesvski, V., Sun, M., Qiu, P., Wang, H., Chen, F., Besmann, T. M., zur Loye, H.-C., “NaGaS<sub>2</sub> – an Elusive Layered Compound with Dynamic Water Absorption and Wide-Ranging Ion Exchange Properties” DOI:10.1002/anie.202001203. *Angew. Chem., Int. Ed.*, **2020**, *59*, 10836-



10841.

20. Usman, M., Kocevski, V., Smith, M. D., Besmann, T. M., zur Loye, H.-C., “New Rubidium Containing Mixed-Metal Titanium Hollandites”, DOI:10.1021/acs.cgd.9b01560. *Cryst. Growth Design*, **2020**, *20*, 2398-2405.
21. Chen, J., Yan, H., Kuwabara, A., Smith, M. D., Iwasa, Y., Ogino, H. Matsuhita, Y., Tsujimoto, Y., Yamura, K., zur Loye, H.-C., “Flux Crystal Growth, Crystal Structure, and Optical Properties of New Germanate Garnet  $\text{Ce}_2\text{CaMg}_2\text{Ge}_3\text{O}_{12}$ ”, DOI:10.3389/fchem.2020.00091. *Front. Chem.*, **2020**, *8*, 91.
22. Berseneva, A., Martin, C., Galitskiy, V., Ejegbavwo, O., Leith, G., Ly, R., Rice, A., Dolgoplova, E., Smith, M. D., zur Loye, H.-C., DiPrete, D., Amoroso, J., Shustova, N., “Boarding-up”: Radiation Damage and Radionuclide Leaching Kinetics in Linker-Capped Metal-Organic Frameworks”, DOI:10.1021/acs.inorgchem.9b01310. *Inorg. Chem.*, **2020**, *59*, 179-183.
23. Klepov, V. V., Pace, K. A., Breton, L. S., Kocevski, V., Besmann, T. M., zur Loye, H.-C., “Nearly Identical but not Isotypic – Influence of the Lanthanide Contraction on  $\text{Cs}_2\text{NaLn}(\text{PS}_4)_2$  (Ln = La–Nd, Sm, Gd–Ho)”, DOI:10.1021/acs.inorgchem.9b03200. *Inorg. Chem.*, **2020**, *59*, 1905-1916.
24. Moloney, M. P., Massoni, N., Egodawatte, S., zur Loye, H.-C., Grandjean, A., “A Solvent Free Approach for the Preparation of Silver Modified Mesoporous Silica for Iodine Entrapment”, DOI:10.1007/s10904-020-01447-3. *J. Inorg. Organomet. P.*, **2020**, in print.
25. Usman, M., Smith, M. D., Kocevski, V., Besmann, T. M., zur Loye, H.-C., “Complex Cobalt Silicates and Germanates Crystallizing in a Porous Three-Dimensional Framework Structure”, DOI:10.1039/C9CE01662G. *CrystEngComm*, **2020**, *22*, 1112 - 1119.
26. Carone, D., Klepov, V. V., Smith, M. D., zur Loye, H.-C., “Flux crystal growth of new lanthanide tungsten oxychlorides,  $\text{La}_{8.64}\text{W}_6\text{O}_{30.45}\text{Cl}$ ,  $\text{Ce}_{8.64}\text{W}_{5.74}\text{O}_{30}\text{Cl}$ , and  $\text{Ln}_{8.33}\text{W}_6\text{O}_{30}\text{Cl}$  (Ln = Pr, Nd): Structural stability in the presence of extreme cation and anion disorder”, DOI:10.1021/acs.inorgchem.9b03015. *Inorg. Chem.*, **2019**, *58*, 16831-16837.
27. Nishioka, S., Kanazawa, T., Shibata, K., Tsujimoto, Y., zur Loye, H.-C., Maeda, K., “A Zinc-based Oxysulfide Photocatalyst  $\text{SrZn}_2\text{S}_2\text{O}$  Capable of Reducing and Oxidizing Water”, DOI:10.1039/c9dt03699g. *Dalton Trans.*, **2019**, *48*, 15778-15781.
28. Morrison, G., Kocevski, V., Misture, S., Spagnuolo, N., Hines, A., Besmann, T., zur Loye, H.-C., “The superwadeites: Elucidation of a structural family related to the Wadeite structure and prediction of  $\text{Cs}_2\text{Ge}_5\text{O}_{11}$ ”, DOI:10.1021/acs.cgd.9b00784. *Cryst.*

Growth Design, **2019**, *19*, 5477-5482.

29. Ayer, G. B., Klepov, V. V., Smith, M. C., zur Loye, H.-C., “Mild Hydrothermal Synthesis of the Complex Hafnium Containing Fluorides  $\text{Cs}_2[\text{M}(\text{H}_2\text{O})_6][\text{Hf}_2\text{F}_{12}]$  (M= Ni, Co, and Zn),  $\text{CuHfF}_6(\text{H}_2\text{O})_4$  and  $\text{Cs}_2\text{Hf}_3\text{Mn}_3\text{F}_{20}$  Containing  $\text{HfF}_7$  and  $\text{HfF}_6$  Coordination Polyhedra”, DOI:10.1021/acs.inorgchem.9b01958. *Inorg. Chem.*, **2019**, *58*, 13049-13057.
30. Juillerat, C. A., Kocevski, V., Karakalos, S. G., Besmann, T. M., zur Loye, H.-C., “Flux Crystal Growth of Uranium(V) Containing Oxyfluoride Perovskites”, DOI:10.1039/C9QI00537D. *Inorg. Chem. Frontiers*, **2019**, *6*, 3203-3214.
31. Usman, M., Smith, M. D., Klepov, V. V., zur Loye, H.-C., “One-Dimensional Quaternary and Penternary Alkali Rare Earth Thiophosphates Obtained via Alkali Halide Flux Crystal Growth”, DOI: 10.1021/acs.cgd.9b00637. *Cryst. Growth Design*, **2019**, *19*, 5648-5657.
32. Juillerat, C. A., Kocevski, V., Besmann, T. M., zur Loye, H.-C., “Observation of the Same New Sheet Topology in Both the Layered Uranyl Oxide-Phosphate  $\text{Cs}_{11}[(\text{UO}_2)_{12}(\text{PO}_4)_3\text{O}_{13}]$  and the Layered Uranyl Oxyfluoride-Phosphate  $\text{Rb}_{11}[(\text{UO}_2)_{12}(\text{PO}_4)_3\text{O}_{12}\text{F}_2]$  Prepared by Flux Crystal Growth”, DOI:10.3389/fchem.2019.00583. *Front. Chem.*, **2019**, *7*, article 583.
33. Spagnuolo, N. R., Morrison, G., zur Loye, H.-C., “Synthesis and Crystal Structure of  $[(\text{Cs}_6\text{F})(\text{Cs}_3\text{AgF})][\text{Ge}_{14}\text{O}_{32}]$  Through Alkali Halide Flux Growth”, DOI:10.1016/j.solidstatesciences.2019.105973. *Solid State Sci.*, **2019**, *97*, 105973.
34. Ejegbavwo, O., Martin, C., Olorunfemi, O., Leith, G., Ly, R., Rice, A., Dolgoplova, E., Smith, M. E., Karakalos, S., Birkner, N., Powell, B., Pandey, S., Koch, R., Misture, S., zur Loye, H.-C., Phillpot, S., Brinkman, K., Shustova, N., “Thermodynamics and Electronic Properties of Heterometallic Multinuclear An-MOFs with “Structural Memory”, DOI:10.1021/jacs.9b04737. *J. Am. Chem. Soc.*, **2019**, *141*, 11628-11640.
35. Klepov, V. V., Smith, M. C., zur Loye, H.-C., “Targeted Synthesis of Uranium(IV) Thiosilicates”, DOI:10.1021/acs.inorgchem.9b01307. *Inorg. Chem.*, **2019**, *58*, 8275-8278.
36. Usman, M., Smith, M. D., Morrison, G., Klepov, V. V., Zhang, W., Halasyamani, P. S., zur Loye, H.-C., “Molten Alkali Halide Flux Growth of an Extensive Family of Non-Centrosymmetric Rare Earth Sulfides: Structure, Magnetic and Optical (SHG) Properties”, DOI:10.1021/acs.inorgchem.9b00849. *Inorg. Chem.*, **2019**, *58*, 8541-8550.
37. Morrison, G., Spagnuolo, N., Karakalos, S., zur Loye, H.-C., “ $\text{Cs}_3\text{RE(III)Ge}_3\text{O}_9$  (RE = Pr, Nd, Sm-Yb) and  $\text{Cs}_{2.5}\text{Tb(III/IV)Ge}_3\text{O}_9$ : A rare example of a mixed-valent Tb(III)/Tb(IV) oxide”, DOI:10.1021/acs.inorgchem.9b01033. *Inorg. Chem.*, **2019**, *58*,

8702-8709.

38. Usman, M., Morrison, G., zur Loye, H.-C., “La<sub>2</sub>USe<sub>3</sub>S<sub>2</sub>: A Serendipitously Grown Lanthanide/Actinide Chalcogenide from a Eutectic Halide Flux”, DOI:10.1007/s10870-019-00780-x. *J. Chem. Cryst.*, **2019**, *49*, 169-173.
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## C. Patents and Invention Disclosures

1. Polar Oxysulfide for Nonlinear Optical Applications  
HC zur Loye, Y Tsujimoto - US Patent App. 16/561,190, 2020  
Single crystals of a new noncentrosymmetric polar oxysulfide  $\text{SrZn}_2\text{S}_2\text{O}$  (sg Pmn2)  
Patent Issued August 11, 2020, **US Patent Number: 10,737,948 B2**
2. Latshaw, A., Morrison, G. zur Loye, H.-C. "New Tetragen Scintillators" USCRF No 868.

Date	App/Pub Number	Status
2017-11-14	US15811939	Pending
2018-05-17	US20180134957A1	Application

3. Chance, W. M., zur Loye, H.-C., U.S. Patent Application Entitled: "synthesis and crystal structure of iron zeolitic frameworks",  
  
U.S. Appl. No: 15/218,742; Filed: **July 25, 2016**; Ref: USC-421.  
Patent Issued February 19, 2019, **US Patent Number: 10,207,934 B2**.
4. zur Loye, H.-C., Hansen, T., "Polymer Composite Materials and Methods For Producing Same", **U.S. Patent # 7,951,860**, Issued May 31, **2011**.
5. Barber, III; Arthur Peter, Ploehn; Harry J., zur Loye; Hans-Conrad  
Invention Disclosure: Layered Mixed Metal Phosphonates for High Dielectric Strength Polymer Nanocomposites", USCRF No 732.  
**U.S. Patent # 8,080,600**; Issued on December 20, **2011**. can be viewed at:  
<http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO1&Sect2=HITOFF&d=PALL&p=1&u=%2Fnetacgi/nph-rchnum.htm&r=1&f=G&l=50&s1=8,080,600.PN.&OS=PN/8,080,600&RS=PN/8,080,600>
6. Invention Disclosure #854 "Wide Temperature High Energy Density Capacitor", **2010**.
7. Invention Disclosure #824 "Metal-Organic Coordination Compounds for Ferroelectric and/or Dielectric Applications", **2010**.
8. Pez, G. P., Zhang, B., zur Loye, H.-C., "Use of Complex Metal Oxides in the Autothermal Generation of Hydrogen", European Patent Application 06012910.3, zur Loye, H.-C., Zhang, P., " Use of Complex Metal Oxides in the Autothermal Generation of Hydrogen", U.S. Patent Application. **2005**.  
Filing date: June 22, **2006**; Priority US/24.06.05/ USA 165720. Issued October 21, **2008**, **U.S. Patent # 7,438,889**. Patent for SCRF#359: Use of Metal Oxides in the Autothermal Generation of Hydrogen, Issued in Europe (France, Germany and Spain) on 2/8/2012.

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10. zur Loye, H.-C., Hansen, T. J., Stone, J. W., Zhang, B., "Polymer Composite Materials Containing Synthetic Oxide Particles and Process for Producing Same", U.S. Patent application July 22, 2005.
11. zur Loye, H.-C., Barber, P. A., Hansen, T. J., Stone, J. W., "Process for Creating Composite Materials to Produce Polymer Nanocomposite Films that Exhibit Improved Light Fastness Properties", USCRF No. 494, 2005. - International Application No. PCT/US2006/013258.
12. zur Loye, H.-C., Stone, J., Zhang, P., Provisional Patent Application, USCRF No. 425, "Polymer nanocomposites with layered P-containing nanomaterials", April 20, 2004. Now: "Polymer Composite Materials Containing Metal Phosphonates", provisional patent application (PPA): 425PPA01.
13. zur Loye, H.-C., Hansen, T., Provisional Patent Application, USCRF No. 424, "Polymer-layered oxide nanocomposites", April 20, 2004. Now: "Polymer Composite Materials Containing Synthetic Oxide Particles and Process for Producing Same", provisional patent application (PPA): 424PPA01.
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#### **D. Other Publications**

1. zur Loye, H.-C., "Materials Discovery through Crystal Growth", Foreword, <http://dx.doi.org/10.1016/j.jssc.2015.12.022>. J. Solid State Chem., 2016, 236, 1.
2. zur Loye, H.-C., Strauss, S., "Duward F. Shriver (1934-2013)", Angew. Chem. Int. Ed., 2013, 52, 2-3.
3. zur Loye, H.-C., "The Challenging Math of Climate Change", Guest Columnist, *The State Newspaper*, Sunday March 4, 2007, A15.
4. zur Loye, H.-C., "Metal Oxides Symposium - Foreword", J. Solid State Chem., 2003, 175, 1-2.
5. Murphy, C. J., zur Loye, H.-C., "Nanomaterials - Synthesis, assembly, and optical/electronic properties" – Foreword", J. Cluster Sci., 2003, 14, 73-74.

6. Kanatzidis, M. G., zur Loye, H.-C., Kauzlarich, S., "Editorial", *J. Solid State Chem.* **2000**, *149*, 1-2.

## **E. Conference Presentations**

1. zur Loye, H.-C., "Flux Crystal Growth and Structure Determination of the New Quaternary Plutonium Silicate  $\text{Cs}_2\text{PuSi}_6\text{O}_{15}$ ", Virtual Meeting of the American Chemical Society, San Francisco, CA, August 17-20, **2020**.
2. zur Loye, H.-C., "Crystal Growth of Complex Uranium Containing Oxides from Molten Salts at High Temperature", Virtual Meeting of the American Chemical Society, San Francisco, CA, August 17-20, **2020**.
3. zur Loye, H.-C., "New quaternary uranium and plutonium fluorides crystallized via mild hydrothermal methods", Virtual Meeting of the American Chemical Society, San Francisco, CA, August 17-20, **2020**.
4. zur Loye, H.-C., "Materials Assembly and Design Excellence in South Carolina (MADE IN SC)", 26th NSF EPSCoR National Conference, Columbia, SC, October 27-29, **2019**.
5. zur Loye, H.-C., "Synthesis, Structure and Ion Exchange Potential of New Uranyl Salt Inclusion Phases", DOE EFRC PI Meeting, Washington DC, July 28-30, **2019**.
6. zur Loye, H.-C., "Hierarchical Structures with Controlled Optical and Magnetic Properties", NSF EPSCoR Reverse Site Meeting, Washington DC, April 28-30, **2019**.
7. zur Loye, H.-C., "Hierarchical Structures with Controlled Optical and Magnetic Properties", EPSCoR Meeting, Greenville, SC, April 11-13, **2019**.
8. zur Loye, H.-C., "Crystal Growth, Structure Determination and Magnetic Properties of New Complex Fluorides Containing U(IV) and Th(IV)", 24<sup>th</sup> Winter Fluorine Conference, Clearwater Beach, FL, January 13-18, **2019**.
9. zur Loye, H.-C., "Cation interactions (CCI) in actinide containing materials", SERMACS Meeting Augusta, GA, October 30-November 3, **2018**.
10. zur Loye, H.-C., Egodawatte, S., "Scintillators in optogenetics applications", SERMACS Meeting Augusta, GA, October 30-November 3, **2018**.
11. zur Loye, H.-C., Abeysinghe, D., Morrison, G., Huq, A., "In situ Neutron Diffraction Studies: Crystal Growth and Ion Exchange Uranyl SIMS and  $\text{La}_4\text{Mo}_2\text{O}_{11}$ ", Denver X-

ray Conference – Denver CO, August 6-8, **2018**.

12. zur Loye, H.-C., “Perovskites and Perovskite Related Iridates”, ACA Meeting, Toronto Canada July 20-22, **2018**.
13. zur Loye, H.-C., “Directed Synthesis of New Actinide Containing Oxides, Fluorides and Chalcogenides”, DOE PI Meeting – Washington DC July 8-11, **2018**.
14. zur Loye, H.-C., “Salt Inclusion Materials: Hierarchical Materials with Potential for Sequestering Radionuclides”, American Conference on Neutron Scattering, Maryland June 24-28, **2018**.
15. zur Loye, H.-C., Uranyl Salt Inclusion Materials: Silicates, Germanates, and Phosphates as Potential Novel Hierarchical Wasteforms”, MRS Meeting, Phoenix, AZ, April 2-April 6, **2018**.
16. zur Loye, H.-C., “Synthesis, Structure and Ion Exchange Potential of New Uranyl Salt Inclusion Phases”, DOE Mid Term Review April 9, **2018**.
17. zur Loye, H.-C., “Center for Hierarchical Wasteform Materials”, DOE Mid Term Review April 9, **2018**.
18. zur Loye, H.-C., **Keynote Speaker** “Flux Crystal Growth of New Uranium Containing Oxides”, SERMACS Meeting, Charlotte, NC, November 7-11, **2017**.
19. zur Loye, H.-C., **Keynote Speaker** “Crystal Growth of Complex Oxides: Effective Strategies for the Discovery of New Phases”, SERMACS Meeting, Charlotte, NC, November 7-11, **2017**.
20. zur Loye, H.-C., “Salt-Inclusion Materials: A Potential Novel Hierarchical Wasteform”, Meeting of the American Chemical Society, Washington DC, August 16-19, **2017**.
21. zur Loye, H.-C. “Salt-Inclusion Materials: A Potential Novel Hierarchical Wasteform”, 2017 Joint Nanoscience and Neutron Scattering User Meeting, Oak Ridge National Laboratory, Oak Ridge, July 31 – August 2, **2017**.
22. zur Loye, H.-C., “Center for Hierarchical Wasteform Materials (CHWM)”, 2017 EFRC-Hub-CMS PI Meeting, Washington DC, July 23-25, **2017**.
23. zur Loye, H.-C., “Salt-Inclusion Materials: A Potential Novel Hierarchical Wasteform”, PACRIM, Hawaii, Kona, May 21-28, **2017**.
24. zur Loye, H.-C., “New Ferrites from Hydrofluxes: From Zeolite to Hexaferrite Related Structures”, Meeting of the American Chemical Society, Boston, August 16-19, **2015**.



25. zur Loye, H.-C., “Two Step Reduction Process for the Synthesis of New Organic/Inorganic Hybrid Materials Containing Metals in Reduced Oxidation States”, American Crystallographic Association Meeting, Philadelphia, July 25-30, **2015**.
26. zur Loye, H.-C., “New Ferrites from Hydrofluxes: From Zeolite to Hexaferrite Related Structures”, 2015 North American Solid State Chemistry Conference, Tallahassee, FL, May 22-24, **2015**.
27. zur Loye, H.-C., “In-situ Neutron Diffraction Study of  $\text{Sr}_2\text{Fe}_{1.5}\text{Mo}_{0.5}\text{O}_{6-\delta}$  Under High Temperature SOFC Operating Conditions“, DOE Workshop “Frontiers in Materials Discovery, Characterization, and Application, Chicago, August 2-3, **2014**.
28. zur Loye, H.-C., “Crystal Growth, Structure Determination, Optical And Magnetic Properties Of Complex Uranium Containing Mixed Metal Oxides, Fluorides, and Oxychlorides”, 2014 Materials Chemistry Principal Investigator’s Meeting”, Gaithersburg, MD, July 14-17, **2014**.
29. zur Loye, H.-C. “Crystal growth, structure determination and magnetic properties of U(IV) containing mixed metal fluorides”, Presented at the meeting of the American Chemical Society, Dallas, TX, March 15-18, **2014**.
30. zur Loye, H.-C., “Crystal Growth of New Uranium containing Oxides and Oxychlorides”, Presented at SERMACS, Atlanta, GA, November 10-15, **2013**.
31. zur Loye, H.-C., “Crystal Growth of Materials Containing Lower-Valent Cations Involving a Solvothermal Reduction Step  $\text{Cs}_2\text{V}_3\text{O}_8$  and  $\text{U}_3\text{F}_{12}\cdot\text{H}_2\text{O}$  and  $\text{UF}_4\cdot 0.33\text{H}_2\text{O}$ ”, Presented at the meeting of the American Chemical Society, Indianapolis, IN, September 7-12, **2013**.
32. zur Loye, H.-C., “Crystal Growth, Structure Determination and Magnetic Properties of New Complex Oxides and Fluorides Containing U(IV) and U(VI)” Presented at the meeting of the American Chemical Society, New Orleans, LS April 6-10, **2013**.
33. zur Loye, H.-C., “Crystal Growth via a “Novel” Hydroflux Method”, Presented at the meeting of the American Chemical Society, Philadelphia, PA, August 19-23, **2012**.
34. zur Loye, H.-C., “Crystal Growth via a “Novel” Hydroflux Method”, Presented at the Meeting of the American Crystallographic Association, Boston, July 29-August 1, **2012**.
35. zur Loye, H.-C., “Crystal Growth of Complex Oxides: Effective Strategies for the Discovery of New Phases”, Presented at the Meeting of the American Chemical Society, Denver, CO, August 28-September 1, **2011**.

36. Bugaris, D., Liu, Q., Xiao, G. Chen, F., zur Loye, H.-C., "Single Crystal Neutron Diffraction Studies of Perovskite Oxides of Interest to Solid Oxide Fuel Cells", American Crystallographic Association, New Orleans, May 29-31, **2011**.
37. zur Loye, H.-C., "Crystal Growth from High Temperature Solutions: New Iron, Cobalt and Uranium Containing Oxides and New Mixed Metal Hydroxides", Presented at the Meeting of the American Chemical Society, Anaheim, CA, March 26-31, **2011**.
38. zur Loye, H.-C., Ploehn, H. J., Barber, P., Anguchamy, Y., Houghton, H., Gong, S., Balasubramanian, S., "Polymer Nanocomposite Dielectric Materials for the Preparation of High Energy Density Capacitors " Air Force Review Meeting, Washington, DC, September 20-24, **2010**.
39. zur Loye, H.-C., Ploehn, H. J., Barber, P., Anguchamy, Y., Houghton, H., Gong, S., Balasubramanian, S., "Polymer Nanocomposite Dielectric Materials for the Preparation of High Energy Density Capacitors", Presented at the meeting of the American Chemical Society, Washington, DC, August 15-20, **2009**.
40. zur Loye, H.-C., "Crystal Growth of Complex Oxides: Effective Strategies for the Discovery of New Phases", 17th American Conference on Crystal Growth and Epitaxy, Lake Geneva, WI, August 9 - 14, **2009**.
41. zur Loye, H.-C., "Crystal Growth of Iron and Cobalt Containing Oxides", 17th American Conference on Crystal Growth and Epitaxy, Lake Geneva, WI, August 9 - 14, **2009**.
42. zur Loye, H.-C., Ploehn, H. J., Barber, P., "Polymer Nanocomposite Dielectric Materials for the Preparation of High Energy-Density Capacitors", Materials Research Society Meeting, Boston, December 1-3, **2008**.
43. zur Loye, H.-C., "NSF Overview Workshop for Faculty and Staff", University of South Carolina, September 23, **2008**.
44. zur Loye, H.-C., "Exploration of Phase Space using Hydroxide Fluxes: New Structures and Luminescence", Gordon Research Conference on Solid State Chemistry, Colby Sawyer College, July 27 to August 1, **2008**.
45. zur Loye, H.-C., "Solvothermal Synthesis, Structural Determination, Optical Properties and Thermochromic Behavior of Several New Mixed-Metal Halometallates", 2007 SERMACS Meeting in Greenville, SC, October 24-27, **2007**.
46. zur Loye, H.-C., "Exploration of Phase Space Using Hydroxide Fluxes: The Influence of Cation Size on Structure and Properties", 2007 SERMACS Meeting in Greenville, SC, October 24-27, **2007**.

47. zur Loye, H.-C., "Exploration of Phase Space Using Hydroxide Fluxes: Materials Discovery by Crystal Growth", 11th European Conference on Solid State Chemistry, Caen, France, Sept. 11-13, **2007**.
48. zur Loye, H.-C., Ploehn, H., "Polymer Dielectrics", Dielectric Polymer Nanocomposite Workshop, Dayton Ohio, June 1, **2007**.
49. zur Loye, H.-C., "Materials Discovery by Crystal Growth", Meeting of the American Chemical Society, Chicago, IL, March 24-29, **2007**.
50. zur Loye, H.-C., "Materials Discovery by Crystal Growth", Materials Research Society Meeting, Boston, MA, Nov. 27-Dec 2, **2006**.
51. zur Loye, H.-C., "Exploration of Phase Space Using Hydroxide Fluxes", International Symposium on Structure-Property Relationships in Solid State Materials", Bordeaux, France, June 27-30, **2006**.
52. zur Loye, H.-C. "Polymer Platelet Nanocomposites with Improved Gas Barrier Properties: New Product Opportunities", Innoventure, Greenville, SC, March 28-29, **2006**.
53. zur Loye, H.-C., "New Polymer Nanocomposites Containing Covalently-Modified Organo-Platelets", USC NanoCenter Polymer Nanocomposites Symposium, Columbia, SC, April 7-8, **2005**.
54. zur Loye, H.-C., "PET-Based Nanocomposites: Strategies for Achieving Viable Plastics with Enhanced Barrier Properties", Nova Pack Europe 2004, Düsseldorf, Germany, October 18-19, **2004**.
55. zur Loye, H.-C., Gemmill, W. R., Smith, M. D., "Crystal Growth of Rare Earth Ruthenates and Osmates from Sodium Hydroxide Fluxes", Presented at the meeting of the American Chemical Society, Philadelphia, MA, August 22-26, **2004**.
56. zur Loye, H.-C., Fei, D., Hansen, T., Liu, C., Perkins, D., Ploehn, H., Rajeev, R., Scrivens, W., Stone, J., "PET Based Nanocomposites: Strategies for Achieving Viable Plastics with Enhanced Barrier Properties", Presented at the ICCE-11 Meeting, Hilton Head, SC, August 8-13, **2004**.
57. zur Loye, H.-C., Su, Cheng-Yong, Smith, M. D., "Columnar Supramolecular Architectures Self-Assembled from S4-Symmetric Coordination Nanotubes Encapsulating Neutral Guest Molecules", Presented at the Meeting of the South Carolina Academy of Science, Clemson, SC, March 21, **2003**.
58. zur Loye, H.-C., Stitzer, K. E., Smith, M. D., "Crystal Growth of Quaternary Ruthenium and Osmium Containing perovskites from Reactive Hydroxide Fluxes",

Presented at the Meeting of the Materials Research Society Meeting, Boston, MA, December 1-6, **2002**.

59. zur Loye, H.-C., "Assembly of Mixed-Metal Coordination Polymers Using Metal Containing Building Blocks", Presented at the South Eastern Regional Meeting of the American Chemical Society Meeting, Charleston, SC, November 13-16, **2002**.
60. zur Loye, H.-C., Stitzer, K. E., Kim, S.-J., Gemmill, W., El Abed, A., Davis, M., Darriet, J., Smith, M. D., "Crystal Growth of Quaternary Ruthenium and Osmium Containing Perovskites from Reactive Hydroxide Fluxes", Presented at the meeting of the American Chemical Society, Boston, MA, August 18-22, **2002**.
61. zur Loye, H.-C., Ciurtin, D. M., Smith, M. D., Fiscus, J. E., "New Organic/Inorganic Coordination Polymers Constructed from New N,N'-bipyridine Ligands", Presented at the meeting of the American Chemical Society, Orlando, FL, April 7-11, **2002**.
62. zur Loye, H.-C., "Recent Advances in Inorganic/Organic Coordination Polymers: New Structures with Interesting Properties", Presented at the South Eastern Regional Meeting of the American Chemical Society Meeting, Savannah, GA, September **2001**.
63. zur Loye, H.-C., "Structures of Precious Metal Containing Oxides", Presented at the International Precious Metals Institute Meeting in Tucson, AZ, June **2001**.
64. zur Loye, H.-C., "New 2H-Perovskite Related Oxides: Crystal Growth, Structures and Properties of  $\text{Ba}_8\text{CoRh}_6\text{O}_{21}$  and  $\text{Sr}_6\text{Rh}_5\text{O}_{15}$ " Presented at the Materials Research Society Meeting, Boston, MA, November 27 – December 1, **2000**.
65. zur Loye, H.-C., "Chemistry and Structures of a Family of Oxides Related to the 2H Perovskite Structure", Presented at the Meeting of the American Chemical Society, San Francisco, CA, March 26-30, **2000**.
66. zur Loye, H.-C., "Magnetic Properties of New Low Dimensional Oxides", Presented at SERMACS 1999, Knoxville, TN, October 17-18, **1999**.
67. zur Loye, H.-C., "Crystal Growth Of Low Dimensional Oxides Related To The 2-H Perovskite Structure In Carbonate And Hydroxide Fluxes", Presented at the Eleventh American Conference on Crystal Growth and Epitaxy, Tucson, Arizona, August 1-6, **1999**.
68. zur Loye, H.-C., "Magnetic Properties of Several new Low-Dimensional Oxides", Presented at the Materials Research Society Meeting, Boston, MA, November 29 – December 3, **1998**.
69. zur Loye, H.-C., "Rational Synthesis of One-Dimensional Oxides", Presented at the South Eastern Regional Meeting of the American Chemical Society Meeting, Research Triangle Park, NC, November 6-7, **1998**.

70. zur Loye, H.-C., "Synthesis of Transition and Main Group Metal Carbides and Nitrides", Presented at the Meeting of the American Chemical Society Meeting , Boston, MA, August 23-27, **1998**.
71. zur Loye, H.-C., "Oxide Ion Conductivity in Layered Oxides", Presented at the Solid State Oxide Fuel Cells NATO Advanced Study Institute in Erice, Italy, July 14-26, **1997**.
72. zur Loye, H.-C., "Synthesis of Transition and Main Group Metal Nitrides using a Microwave Generated Nitrogen Plasma", Presented at the Meeting of the American Chemical Society, San Francisco, CA, April 13-17, **1997**.
73. zur Loye, H.-C., Houmes, J. D., Bem, D. S., "Synthesis of Transition Metal Nitrides: The Use of Oxide Precursors and Microwave Nitrogen Plasmas", Presented at the International Symposium on Nitrides, Saint-Malo, France, May 29-31, **1996**.
74. zur Loye, H.-C., Houmes, J. D., Bem, D. S., "Synthesis of New Transition Metal Nitrides Using Solid State Oxide Precursors: Structures and Properties", Presented at Pacificchem 95, Honolulu, Hawaii, December 17-22, **1995**.
75. zur Loye, H.-C., Houmes, J. D., Bem, D. S., "Structures of New Nitrides Prepared Using Solid State Oxide Precursors", Presented at the Materials Research Society Meeting, Boston, MA, November 27-December 1, **1995**.
76. zur Loye, H.-C., Bem, D. S., Houmes, J. D., "Synthesis of New Transition Metal Nitrides using Solid State Oxide Precursors: Structure and Properties", Presented at the Meeting of the American Chemical Society, Chicago, IL, August 20-24, **1995**.
77. zur Loye, H.-C., Pell, J. W., Kendall, K. R., Navas, C. J., "Sol-Gel Route to Oxygen Ion Conductors in Thin Film Form", Presented at the Meeting of the American Chemical Society, Anaheim, CA, April 2-6, **1995**.
78. zur Loye, H.-C., Kendall, K.R., Navas, C.J., "Synthesis and Characterization of Oxygen-Deficient Aurivillius Phases", Presented at the Materials Research Society Meeting, Boston, MA, November 27-December 2, **1994**.
79. zur Loye, H.-C., Nguyen, T.N., "Structure and Magnetic Properties of a Family of One-Dimensional Oxides,  $Sr_3M'M''O_6$  ( $M' = Co, Ni, Zn$  and  $M'' = Pt, Ir$ )", Presented at the Materials Research Society Meeting, Boston, MA, November 27-December 2, **1994**.
80. zur Loye, H.-C., "Oxygen Ion Conducting Materials" 2nd NSF Materials Chemistry Workshop", St. Louis, Missouri, 13-16 October, **1994**.

81. zur Loye, H.-C., "A Research Overview" Exxon Solid State Chemistry Award Talk, Presented at the Meeting of the American Chemical Society, Washington, D.C., August 21-25, **1994**.
82. zur Loye, H.-C., Nguyen, T.N., "Synthesis, Structure and Properties of a Family of One-Dimensional Chain Compounds:  $\text{Sr}_3\text{MPtO}_6$  and  $\text{Sr}_3\text{MlIrO}_6$  M = Co, Ni, Cu, and Zn", Presented at the Meeting of the American Chemical Society, Washington, D.C., August 21-25, **1994**.
83. zur Loye, H.-C., "New Oxygen Ion Conductors with Intrinsic Vacancies", Presented at the Solid State Chemistry Gordon Conference, Brewster Academy, July 17-22, **1994**.
84. zur Loye, H.-C., "Synthesis of New Ternary Nitrides Using Solid State Oxide Precursors", Presented at the Meeting of the American Chemical Society, San Diego, CA, March 13-18, **1994**.
85. zur Loye, H.-C., "Synthesis of New Nitrides using Solid State Oxide Precursors", Presented at the Materials Research Society Meeting, Boston, MA November 29 - December 3, **1993**.
86. zur Loye, H.-C., "Oxygen Ion Conductivity in a New Class of Layered Bismuth Oxides", Presented at the 9th International Conference on Solid State Ionics, The Hague, The Netherlands, September 12-17, **1993**.
87. zur Loye, H.-C., "New Materials for Solid Oxide Fuel Cells: Novel Intergrowth Structures with Intrinsic Oxygen Vacancies" Presented at the ACS Northeast Regional Meeting, Boston, MA, June 22-25, **1993**.
88. zur Loye, H.-C., Nguyen, T.N., "Electrosynthesis in High Temperature Solutions", Presented at the Meeting of the American Chemical Society, Denver, CO, March 28 - April 2, **1993**.
89. zur Loye, H.-C., Giaquinta, D.M., "Synthesis and Characterization of Layered Transition Metal Oxides", Presented in the CMSE Colloquium Series, MIT, March 19, **1993**.
90. zur Loye, H.-C., Thomas, J.K., Krause, W.E., "New Materials for Solid Oxide Fuel Cells: Novel Intergrowth Structures with Intrinsic Oxygen Vacancies", Presented at the Florida Advanced Materials Chemistry Conference, Palm Coast, FL, March 8-12, **1993**.
91. zur Loye, H.-C., Thomas, J.K., Krause, W.E., "Cation Ordering in Brownmillerite-Perovskite Intergrowth Structures", Presented at the Materials Research Society Meeting, Boston, MA, November 30-December 4, **1992**.

92. zur Loye, H.-C., Giaquinta, D.M., "Flux Synthesis of New Layered Indates: Structures and Properties", Presented at the Meeting of the American Chemical Society, Washington, DC, August 23-28, **1992**.
93. zur Loye, H.-C., Giaquinta, D.M., Papaefthymiou, G.C., Davis, W.M. "Synthesis, Structure and Magnetic Measurements of Some Layered Bismuth Transition Metal Oxides:  $\text{Bi}_2\text{M}_{4-x}\text{M}'_x\text{O}_{9+\delta}$ ", Presented at the Meeting of the American Chemical Society, San Francisco, April 5-10, **1992**.
94. zur Loye, H.-C., "Electronic Properties of Layered Bismuth Transition Metal Oxides", Presented at the Florida Advanced Materials Chemistry Conference, Palm Coast, FL, February 17-20, **1992**.
95. zur Loye, H.-C. "Dielectric Response and Conductivity of Poly(Propylene Oxide) Sodium Polyiodide Complexes: Discussion of a Charge Transport Mechanism." Presented at the Solid State Ionics Gordon Research Conference, Colby-Sawyer College, June **1990**.
96. zur Loye, H.-C., Lyons, L.J., Hardy, C. Tonge, J.S., Shriver, D.F., "Polymer Alkali-Metal Polyiodides with Variable Ionic and Electronic Conductivities." Presented at the Materials Research Society Meeting, Boston, MA, November 28 - December 2, **1988**.
97. zur Loye, H.-C.; Staley, R.; Stacy, A.M.; "Magnetic, Infrared and Chemisorption Study of an Epifacial Reaction: Ni on  $\text{TiO}_2$  under Reducing Conditions." presented at the Meeting of the American Chemical Society, New Orleans, Louisiana, August 30 - September 4, **1987**.

#### **F. Invited Seminars at Universities and Industrial Research Centers**

1. Clemson University, via zoom, October, **2020**
2. UofSC, via zoom, June **2020**
3. Notre Dame, via zoom, June **2020**
4. Portland State University, February **2020**
5. Winthrop University, February **2020**
6. Furman University, November **2019**
7. Helmholtz Zentrum Dresden, Rossendorf, May **2019**
8. Leipzig, May **2019**
9. Dresden, May **2019**
10. Purdue University, March **2019**
11. University of Alabama, November **2018**
12. Georgetown University, November **2018**
13. Claflin University, February **2018**

14. Wayne State University, October **2017**
15. SRNL, September **2017**
16. University of Louisville February **2017**– Brown& Williamson Distinguished Guest Speaker
17. Oak Ridge National Laboratory August **2016**.
18. Oak Ridge National Laboratory, March **2016**.
19. University of Southern California, October **2015**.
20. Florida State University, October **2013**.
21. University of South Carolina, September **2013**.
22. Chicago – DOE, April **2012**.
23. University of South Carolina, March **2012**.
24. University of Georgia, February **2012**.
25. University of Memphis – ACS Section, December **2011**.
26. ORNL-JINS, October **2011**.
27. University of Houston, September **2011**.
28. Northwestern University, February **2011**.
29. UNC Wilmington, January **2011**.
30. NC State University, October **2010**.
31. Kyoto University, May **2010**.
32. NIMS, Tsukuba, Japan, May **2010**.
33. Max Planck Institut, Stuttgart, Germany, May **2009**.
34. Universite d'Angers, France, October **2008**.
35. Universite d'Angers, France, October **2008**.
36. ICMCB, Bordeaux, France, October **2008**.
37. Zhuhai University, May **2008**.
38. Sun Yat-sen University, May **2008**.
39. Francis Marion University, April **2008**.
40. University of South Carolina, April **2008**.
41. SRNL, April **2008**.
42. Universität Mainz, June **2007**.
43. Universität Köln, June **2007**.
44. Universität Bochum, June **2007**.
45. University of South Carolina, April **2006**.
46. Wright Patterson Air Force Base, March **2006**.
47. George Washington University, February **2006**.
48. Mississippi State University – Engineering, October **2005**.
49. Mississippi State University – Chemistry, October **2005**.
50. Oak Ridge National Laboratory, October **2005**.
51. Shandong Normal University, May **2005**.
52. Lanzhou University, May **2005**.



53. Sun-yat Sen University, May **2005**.
54. University of South Carolina, March **2005**.
55. UC Riverside, November **2004**.
56. Argonne National Laboratory, June **2004**.
57. UC Berkeley, April **2004**.
58. Washington University in St. Louis, April **2004**.
59. Francis Marion University, February **2004**.
60. University of South Carolina, January **2004**.
61. Brookhaven National Laboratory, October **2003**.
62. ICMCB, Bordeaux, France, July **2003**.
63. Louisiana State University, April **2003**.
64. University of Missouri, Columbia, October **2002**.
65. Air Products, September **2002**.
66. Oxford University, January **2002**.
67. Shandong University, May **2001**.
68. Shandong Normal University, May **2001**.
69. Nankai University, May **2001**.
70. UNC Wilmington, October **2000**.
71. University of Muenster, August **2000**.
72. Auburn University, May **2000**.
73. University of Windsor, January **2000**.
74. Air Products, December **1999**.
75. Oak Ridge National Laboratory, October **1999**.
76. Francis Marion University, October **1999**.
77. University of South Carolina, September **1999**.
78. Universite de Picardie Jules Verne, June **1999**.
79. SUNY Stony Brook, June **1998**.
80. Wake Forest University, February **1998**.
81. Purdue University, June **1997**.
82. Clemson University, October **1996**.
83. University of Iowa, June **1996**.
84. Los Alamos National Laboratory, April **1996**.
85. University of South Carolina, April **1996**.
86. Argonne National Laboratory, October **1995**.
87. University of Wisconsin, Madison, October **1995**.
88. Boston College, September **1995**.
89. NRL, Washington, DC, April **1995**.
90. UC Berkeley, April **1995**.
91. UC Davis, April **1995**.
92. Stanford University, April **1995**.

93. University of Texas, Austin, February **1995**.
94. University of Houston, February **1995**.
95. Texas A&M University, February **1995**.
96. McMaster University, February **1995**.
97. 3M, December **1994**.
98. Georgia Tech, November **1994**.
99. University of Victoria, October **1994**.
100. University of Washington, October **1994**.
101. DuPont, September **1994**.
102. Los Alamos National Laboratory, April **1994**.
103. University of Connecticut, April **1994**.
104. Rutgers University, March **1994**.
105. Pennsylvania State University, March **1994**.
106. Brandeis University, January **1994**.
107. Massachusetts Institute of Technology, October **1993**.
108. Dow Chemical Company, April **1993**.
109. Michigan State University, April **1993**.
110. University of Michigan, April **1993**.
111. Northwestern University, April **1993**.
112. Brown University, March **1993**.
113. SUNY Albany, December **1991**.
114. Massachusetts Institute of Technology, October **1991**.
115. Massachusetts Institute of Technology, December **1989**.
116. AT&T Bell Laboratories, March **1989**.
117. Massachusetts Institute of Technology, February **1989**.
118. Ohio State, February **1989**.
119. University of Oregon, January **1989**.
120. Colorado State, December **1988**.
121. University of Rochester, December **1988**.
122. UC Irvine, November **1988**.
123. Northwestern University, September **1988**.
124. Union Carbide, Terrytown, N.Y., December **1987**.

**G. Other Seminars and Presentations**

College of Arts and Sciences Alumni Council Presentation on Creating Industrial Relationships, April 14, **2015**.

## IV. SERVICE

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### A. Committees

#### University

2019-2021	Top Scholar Mentor
2016-2019	USC NSF GRFP Scholarship Committee
2015-2017	McNAIR Center Steering Committee
2013-2017	USC/SRNL Collaboration Steering Committee
2011-2014	Rising Star Selection Committee
2012-2014	Visiting Scholars Grant Program Selection Committee
2011-present	Committee of Associate Deans
2007-2008	McNair Finalist Mentor
2007	Organizer CAREER Proposal Review and Mentoring
2007	Member South Carolina EPSCoR/IDeA Coalition
2006	Member NSF Advisory Group, USC
2006-2007	Member Search Committee, Dean of the Graduate School, USC
2006-2007	Research Faculty Advisory Group for Innovista
2006-2011	Russell Research Award and USC Educational Foundation Research Award for Science, Mathematics and Engineering Committee. <b>Chair 2010-2011.</b>
2002-2016	University Health and Safety Oversight Committee
2000-2003	Research & Productive Scholarship Selection Committee
1998-2000	Department of Chemistry Senator in the Faculty Senate
1997-present	University Radiation Safety Committee, Chair, <b>2002-2008, 2009-present.</b>

#### College

2016	Chair, Search Committee for the Associate Dean for Arts, Humanities and Social Sciences.
2015-2017	College Representative for Recruitment of Graduate Students via Shorelight Education
2013-2017	USC/SRNL Collaboration Steering Committee
2013	HHMI Proposal Committee
2012-present	Member Information Technology Advisory Committee (ITAC)
2012-2015	COEE Math Smart Chair Search Committee
2010	CAS Doctoral Education Retreat Planning Committee
2009-present	CAS Academic Planning Council, ex-officio 2012-present.
2008-2009	Polymer Nanocomposite FEI-CoEE Search Committee
2006-2007	Member Search Committee, Polymer Nanocomposite Center of Excellence Chair, USC

### **Department**

2013-2014	Member Materials Chemist Search Committee.
2012-2013	Inorganic Search Committee.
2011	GAANN Group
2008-2013	Industrial Advisory Board, USC Chemistry
2008	Physical Chemistry Faculty Search Committee
2007-2011	Junior Faculty Mentor (Linda Shimizu and Sheryl Wiskur)
2005-2011	USC Chemistry Department Executive Committee. <b>2006-2011, chair.</b>
2004-2005	Organic Chemistry Faculty Search Committee
2002-2003	Nanoscience Faculty Search Committee
2001-2002	Chair, Tenure and Promotion Committee
1999-2000	Departmental Moving Committee
1999-2000	Nanoscience Director Search Committee

1999	Ad Hoc committee on Post Tenure Review
1999-present	Seminar Committee
1997-present	Chemistry Major Advisor
1997-2001	Departmental Web Page and Publications Committee
1997-2000	Bouknight Scholarship Selection Committee
1996-2002	Building Committee
1996-2002	Admissions Committee, Chair, <b>1998-2002</b> .
1996-2007	Departmental X-ray Policies, Chair, <b>2000-2007</b> .
1996-2002	Development Committee

## **B. Sessions Chaired at Meetings**

Materials Research Society, MRS, Meeting Phoenix AZ, April 2-6, **2018**.

North American Solid State Chemistry Conference, Santa Barbara, CA, August 17-19, **2017**.

DOE Materials Chemistry PI Meeting, Gaithersburg, MD, July 12-14, **2016**.

Gordon Research Conference, Session Chair, Colby Sawyer College, July 22-27, **2012**.

ACS Award in Inorganic Chemistry, ACS Meeting, Anaheim, CA, March **2011**.

SERMACS Meeting, Session Chair, Greenville, SC, October 24-27, **2007**.

Gordon Research Conference, Session Chair, Oxford, England, September 2-7, **2007**.

South Carolina Academy of Science, Annual Meeting, Columbia, SC, April 20, **2007**.

Solid State Chemistry, ACS Meeting, Chicago, IL, March **2007**.

Exxon Mobil Solid State Chemistry Faculty Fellowship Award Symposium, ACS Meeting, Philadelphia, PA, August **2004**.

Metal Oxides, Chair, ACS Meeting, Boston, MA, August **2002**.

Solid State Chemistry of Inorganic Materials: Chair "Session in Honor of George Honig", MRS Meeting, Boston, MA, November **2000**.

New Methods in Solid State Chemistry, ACS Meeting, San Francisco, CA, March **2000**.

Rational Synthesis of Solid State Materials, SERMACS, Research Triangle Park, November **1998**.

Solid State Chemistry of Inorganic Materials: Chair “Synthesis and Reactivity” Poster Session, MRS Meeting, Boston, MA, December **1996**.

Nitrides and Carbides. Pacific Basin Conference, Honolulu, HI, December **1995**.

Covalent Ceramics: Non-Oxides. MRS Meeting, Boston, MA, December **1995**.

### **C. Symposia and Meetings Organized**

Symposium Co-organizer and Co-chair, “Glass and Ceramics for Nuclear Waste Treatment and Sequestration”, 14<sup>th</sup> Pacific Rim Conference on Ceramic and Glass Technologies, Vancouver, BC, Canada, May 23-28, **2021**.

Symposium Co-organizer and Co-Chair “Heavy Element Chemistry Relevant to Nuclear Waste Disposal” Division of Nuclear Chemistry, Meeting of the American Chemical Society, San Francisco, August 16-20, **2020**.

Conference Chair and Meeting Organizer: Gordon Research Conference on Solid State Chemistry, Colby-Sawyer College, July 17- July 22, **2016**

Member of the South East Regional Meeting of the American Chemical Society, SERMACS, **2016** Organizing Committee.

Symposium Co-Chair, Co-Organizer, “17th American Conference on Crystal Growth and Epitaxy”, Session on “Novel Materials”, Lake Geneva, WI, August 9-14, **2009**.

Symposium Co-Organizer and Co-Chair "Solid State Chemistry", 2007 SERMACS Meeting, Greenville, SC, October 24-27, **2007**.

Organizer and Program Chair of the 2006 Meeting of the South Carolina Academy of Science, Columbia, SC, March 9-10, **2006**.

Exxon Mobil Solid State Chemistry Faculty Fellowship Award Symposium, Meeting of the American Chemical Society, Philadelphia, PA, August 22-26, **2004**.

Nanoscience Symposium, Co-chair, Co-Organizer, SERMACS Meeting, Charleston, SC, **2002**.

Symposium Organizer and Chair: Metal Oxide Symposium, Meeting of the American Chemical Society, Boston, MA, August **2002**.

Symposium Co-Chair, Co-Organizer, “Inorganic Chemistry of Solid State Materials II”, MRS Meeting, Boston, MA, December **1998**.

Symposium Co-Chair, Co-Organizer, “Advanced Battery and Fuel Cell Materials”: XVII Congress and General Assembly of the IUCr, Seattle, WA, August 9-17, **1996**.

### **D. Professional Memberships**

American Chemical Society

Materials Research Society  
Sigma Xi  
American Association for the Advancement of Science  
South Carolina Academy of Science  
American Crystallographic Association  
International Precious Metals Institute

**E. Workshops**

DOE Workshop: "Frontiers in Materials Discovery, Characterization, and Application, Invited Participant, Chicago, IL, August 2-3, **2014**.

NSF Overview Workshop for Faculty and Staff, University of South Carolina, **2008**.

Air Force Research Laboratory Dielectric Polymer Nanocomposite Workshop, Invited Participant and Presenter. Dayton, OH, June 1, **2007**.

"The Status of Solid State Chemistry and Its Impact in the Physical Sciences", Section Leader on Undergraduate and Graduate Education, Northwestern University, May 18-20, **2006**.

NanoSummit, Washington DC, June 23-24, **2004**.

DOE/EPSCoR Workshop at Argonne National Laboratory, Invited Participant. June 14-15, **2004**.

BES Workshop on Future Directions of Design, Discovery and Growth of Single Crystals for Basic Research, Invited Participant. Ames Lab, Iowa, October 10-12, **2003**.

Elsevier's Editors Conference, Invited Participant. The Lodge, Sonoma, CA, USA, Saturday April 26, **2003**.

**F. Proposals Reviewed For**

National Science Foundation  
DOE Review Panels  
Research Corporation  
Cottrell  
CRDF-CGP  
NSF DMR Panels

ACS Petroleum Research Fund  
Oak Ridge Associated Universities  
NSF Review Panel: Small Business Innovative Research (SBIR)  
NSF Review Panel: Major Research Instrumentation (MRI)  
NSF Review Panel: Instrumentation for Materials Research (IMR)  
NSF Review Panel: Materials Research Science and Engineering Centers (MRSEC)  
NSF Review Panel: Inter-American Materials Collaboration  
NSF Review Panel: IGERT  
NSF Review Panel: Career Awards  
ACS Exxon/Mobil Award in Solid State Chemistry  
ACS - Travel Awards  
South Carolina EPSCoR  
DOE Nuclear Program  
Helmholtz Foundation  
Air Force  
Navy  
Army  
Österreichische Forschungsförderungsgesellschaft  
SNS – Neutron Scattering  
Romanian Science Foundation  
US Civilian Research and Development Foundation  
Louisiana EPSCoR  
NSERC

**G. Papers and Books Reviewed For**

Accounts of Chemical Research  
Adv. Mat. Opt. Elect.  
American Chemical Society  
Angewandte Chemie  
Chapman & Hall  
Chemical Communications  
Chemistry a European Journal  
Chemistry of Materials  
Crystal Engineering Communications  
Crystal Growth and Design  
Dalton  
European Journal of Inorganic Chemistry  
Freeman Press  
Inorganic Chemistry  
Inorganica Chimica Acta



Journal of Alloys and Compounds  
 Journal of Chemical Crystallography  
 Journal of Crystal Growth  
 Journal of Electroceramics  
 Journal of Materials Chemistry  
 Journal of Molecular Structure  
 Journal of Physical Chemistry  
 Journal of Solid State Chemistry  
 Journal of the American Chemical Society  
 Journal of the European Ceramics Society  
 Materials Research Bulletin  
 Materials Research Society  
 New Journal of Chemistry  
 Polyhedron  
 Polymer Engineering Science  
 Science of Advanced Materials  
 Solid State Communications  
 Solid State Ionics  
 Spectro Chimica Acta  
 Zeitschrift für Anorganische und Allgemeine Chemie

## V. RESEARCH GRANTS

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### A. Funded (As Principal Investigator)

PI	DOE	EFRC: Center for Hierarchical Waste Form Materials (CHWM)	\$11,200,000	2020
PI	SC EPSCoR	Gear	60,000	2020
PI	VP Research	Magellan Mini Grant “Discovery and Characterization of Novel Crystal Structures through Flux Crystal Growth, Tessa Posey	\$500	2018

PI	VP Research	Magellan “Materials Discovery and Characterization of Luminescent and Scintillating Crystals by Flux Crystal Growth, Grayson Gimblet	\$1,800	2018
PI	Honors College Research Grant	Materials Discovery and Characterization of Reduced Oxides by Flux Crystal Growth – Grayson Gimblet	\$1,500	2018
PI	Honors College Research Grant	Production of Scintillating Nanoparticles – Tessa Posey	\$1,500	2018
PI	ASPIRE	Top-Seeded Solution Crystal Growth Instrument for the Synthesis of Single Crystals of Novel Oxyfluoride Scintillator Materials	\$15,000	2018
PI	DOE	Directed Synthesis of New Actinide Containing Oxides, Fluorides and Chalcogenides	\$477,000	2018
PI	NSF	New Lanthanide-Containing Silicate Fluoride Scintillators for Radiation Detection	\$499,773	2018
PI	SRNL	Site Review of SRNL	\$9,848	2017
PI	DOE	EFRC: Center for Hierarchical Waste Form Materials (CHWM)	\$8,000,000	2016
PI	DOE	Supplement to DE-SC0008664 "Directed Synthesis of New Uranium Containing Materials" to support the purchase of a replacement desktop powder diffractometer	\$30,000	2016
PI	NSF	EAGER: Synthesis of New Ferrolites: Zeolites Containing an All-Iron Framework The First of	\$155,548	2016

a New Family of Transition Metal Based Zeolites?				
PI	ORNL-HFIR	Investing the magnetic structure and moment of $\text{Ln}_2\text{NiIrO}_6$ (Ln = La, Pr, Nd)	3 days beam time	2016
PI	ORNL-SNS	In-situ Investigation of Flux Crystal Growth through Neutron Diffraction	7 days beam time	2016
PI	SC-EPSCoR	SAN: In-situ Investigation of Molten Flux Crystal Growth of Various Systems through Neutron Diffraction	\$5,129	2016
PI	APS	Resonant Elastic Magnetic X-ray Scattering Investigation of the Novel Series $\text{Ln}_2\text{NiIrO}_6$ (Ln = Sm, Eu, Gd)	3 days	2015
PI	SC-EPSCoR	SAN: Travel Program to Enable Student and Faculty to attend Materials Conference	\$5,000	2015
PI (w/ Ploehn, Chandrashekhar)	ASPIRE	Development of New Hexaferrite Related Multiferroics	\$99,906	2015
PI	DOE	Directed Synthesis of New Uranium Containing Materials: The Use of Functional Building Blocks as Synthetic Tools Coupled with Targeted Crystal Growth Methods to Create New Complex U(VI), U(IV) and U(III) Containing Materials	\$450,000	2015
PI (w/ A. Latshaw)	ORNL-SNS	In-situ Investigation of Flux Crystal Growth through Neutron Diffraction	2 days beam time	2015
PI (w/ M. Chance)	ORNL-SNS	Neutron Diffraction Investigation of a Series of Alkali-Barium Ferrites Structurally Related to Sodalite	4 days beam time	2014

PI	NSF-EPSCoR	Acquisition of a High Sensitivity Analytical Balance to Support Research of an African American Student	\$6,000	2014
PI	NSF	Supplement: Crystal Growth of Luminescent Oxides	\$7,265	2014
PI (w/ Shimizu, Smith)	ASPIRE	Purchase of a Bruker D8 Quest Single Crystal Diffractometer	\$100,000	2014
PI	EFRC	EFRC Seed Fund: Organic/Inorganic Hybrid Nanodielectrics for Solid-State Ultracapacitors	\$40,000	2013
PI	DOE	Supplemental Funding Request for DOE/BES Project 46894	\$96,000	2013
PI (w/ Frank Chen, Andreas Heyden)	ORNL-SNS	<i>In Situ</i> Investigation of the Structure of $\text{Sr}_{0.9}\text{Ti}_{0.8}\text{Nb}_{0.2}\text{O}_3$ Theoretical Prediction of Phase Stability under Reducing Conditions	3 days beam time	2013
PI	NSF	Crystal Growth of Luminescent Oxides	\$460,000	2012
PI (w/ F. Chen, W.M. Chance, C. Yang, G. Xiao, L. Zhang)	ORNL-SNS	In-Situ Investigation of the phase transition between P-PSCFN ( $\text{Pr}_{0.4}\text{Sr}_{0.6}\text{Co}_{0.2}\text{Fe}_{0.7}\text{Nb}_{0.1}\text{O}_{3-\delta}$ ) and K-PSCFN ( $\text{Pr}_{0.8}\text{Sr}_{1.2}(\text{Co,Fe})_{0.8}\text{Nb}_{0.2}\text{O}_{4+\delta}$ )	4 days beam time	2012
PI (w/ T. Egami, Q. Zhao)	ORNL-SNS	Investigation of the Structure Transition in $\text{Sr}_5\text{Co}_4\text{O}_{12}$	2 days beam time	2012
PI (w/ A. Cortese, T. Egami, G. Granroth)	ORNL-SNS	Investigation of the Oxidation States in $\text{Sr}_5\text{Co}_4\text{O}_{12}$	2 days beam time	2012
PI	SC-EPSCoR	SAN: Student and Faculty Exchange Program	\$4,000	2012

PI	ORNL-SNS	High Resolution Optical Microscope to Support the Single Crystal Facility at Claflin University	\$6,000	2012
PI	ORNL-SNS	Investigation of Perovskite- $K_2NiF_4$ Phase Transition	1 day beam time	2012
PI (w/ T. Egami, Q. Zhao)	ORNL-SNS	Investigation of the Structure Transition in $Sr_5Co_4O_{12}$	2 days beam time	2012
PI (w/ Bryson, Shimizu, Wang)	Dept. of Education	GAANN Fellowship Program in the USC Department of Chemistry and Biochemistry	\$399,798	2012
PI (w/ W.M. Chance, F. Chen, G. Xiao, C. Yang, L. Zhang)	ORNL-SNS	Investigation of the phase transition between P-PSCFN ( $Pr_{0.4}Sr_{0.6}Co_{0.2}Fe_{0.7}Nb_{0.1}O_{3-\delta}$ ) and K-PSCFN ( $Pr_{0.8}Sr_{1.2}(Co,Fe)_{0.8}Nb_{0.2}O_{4+\delta}$ )	1 day beam time	2012
PI	DOE	A Synthetic Strategy to Prepare New Complex Uranium- and Thorium-Containing Oxides: Predictive Solid State Synthesis of New Composition using Radius Ratio Rules and Materials Discovery based on Crystal Growth from High Temperature Solutions	\$420,000	2011
PI	ORNL-SNS	In Situ Investigation of Oxygen Vacancies in the SOFC Material $Sr_2Fe_{1.5}Mo_{0.5}O_{6-\delta}$ under Oxidizing and Reducing Conditions at High Temperatures	3 days beam time	2011
PI	ORNL-SNS	IPTS-4790, "Magnetic structure determination of the double perovskites $La_2NaOsO_6$ and $La_2NaRuO_6$ "	2 days beam time	2011
PI	NSF	REU: Materials Discovery by Crystal Growth: A Synthetic Strategy to Prepare Complex	\$11,250	2010

Oxides from High Temperature Solutions				
PI	USC	MGS – Crystal Growth of Antimony and Gallium Containing Complex Oxides	\$3,000	2010
PI	SRNL-SCUREF	SC0230 – Amide Borohydride Structural Analysis	\$51,171	2009
PI	SRNL-SCUREF	SC0240 Perform Analysis of Ionic Liquids	\$11,470	2009
PI	NSF	Supplement to DMR: 0804209 to Support Summer Undergraduate Research	\$7,708	2009
PI	SCAS	Operating Support for the Journal of the South Carolina Academy of Science	\$2,000	2009
PI	SRNL-SCUREF	Amide/Borohydride Structural Analysis	\$37,391	2008
PI	VP Research	Magellan Scholar Fellowship: Adam Fox, “Crystal Growth of Palladium (IV) Oxides”	\$2,500	2008
PI	Air Force SBIR	Nanodielectrics for High Energy Density Capacitors	\$2,500	2008
PI (w/ H. Ploehn)	Air Force	Reduced Size and Weight Devices for Weapons Systems Activation: New Nanocomposite Materials for High Energy Storage Systems	\$700,667	2007
PI	NSF	Materials Discovery by Crystal Growth: A Synthetic Strategy to Prepare Complex Oxides from High Temperature Solutions	\$260,000	2007
PI (w/ H. Ploehn)	DoD EPSCoR	Polymer Nanocomposites as Future Materials for Defense and Energy Applications: High Energy Density Storage Systems	\$750,000	2007

		with Reduced Size and Weight for Pulse Power Applications		
PI	Michelin	Synthesis of Covalently Modified Organo Platelet Materials for Use in Rubber Based Nanocomposites	\$42,803	2007
PI	NSF	Preparation of New Organic/Inorganic Hybrid Materials: A Multi-Disciplinary Approach to Integrate Research and Undergraduate Education	\$195,000	2006
PI	PBI Performance Products	Synthesis of Perovskite Materials	\$7,100	2006
PI (w/ H. Ploehn)	Air Force	Polymer Nanocomposites as Future Materials for Defense and Energy Applications	\$901,480	2006
PI	VP Research	Magellan Scholar Fellowship: Meredith Tershansy, “The Synthesis, Structural Determination, and Optical Characterization of New Mixed- Metal Bismuth Halide Systems”	\$3,000	2006
PI	VP Research	Magellan Scholar Fellowship: Zeeshan Kalik, “Organic Ligand Synthesis and Preparation of New Organic/Inorganic Hybrid Materials”	\$3,000	2006
PI	SC EPSCoR	Support for a Summer Research Experience of a K-12 Teacher	\$2,000	2006
PI	NSF	Supplement to NSF Grant to Support Middle School Teacher for the summer	\$6,497	2006
PI	Michelin	Synthesis of Covalently Modified Organo Platelet Materials for Use in Rubber Based Nanocomposites	\$85,600	2006

PI	NIST	Investigation of Structural Phase Transitions in Ba <sub>2</sub> LuBiO <sub>6</sub> and Ba <sub>2</sub> YbBiO <sub>6</sub>	3 days beam time	2006
PI	Nanocenter	Polymer Nanocomposites Group	\$90,000	2006
PI	SC EPSCoR	Support for the South Carolina Academy of Science Annual Meeting to be held at USC-Columbia March 10, 2006	\$2,000	2006
PI	SC EPSCoR	Planning Grant to Develop an I/UCRC and GOALI for Polymer Nanocomposites	\$3,000	2005
PI	BNL	TEM time – Center for Functional Nanomaterials "TEM Investigation of Titanium Phosphonate ‘Nano-rolls’"	4 days beam time	2004
PI	NSF	Synthesis of New Platinum Group Metal Oxides	\$390,000	2004
PI	BRIN EPSCoR	Systematic Investigation of Modified Amino Acid–Rare Earth Framework Materials: Potential MRI Imaging Agents	\$5,100	2004
PI	BNL	NSLS time – Center for Functional Nanomaterials Proposal	12 days beam time	2003
PI	BNL	NSLS time – general user proposal	24 days beam time	2003
PI	DOE/ EPSCoR	Structural Investigations of Complex Oxides Using Synchrotron Radiation	\$494,934	2003
PI	NIST	Neutron Diffraction Time	3 days beam time	2003
PI	Nano Thrust	Polymer Nanocomposites	\$60,000	2003
PI	NSF	RUI - Preparation of New Organic/Inorganic Hybrid Materials: A Multi-Disciplinary	\$170,000	2003-06



Approach to Integrate Research and Undergraduate Education				
PI	Air Products	Investigation of the Reaction between Carbon Dioxide and Transition Metal Oxides	\$50,000	2002-03
PI	USCRF	Polymer Nanocomposites	\$50,000	2002-03
PI (w/ LeRoy Peterson)	BRIN/EPSCoR	A Joint Francis Marion University/University of South Carolina Program to Synthesize and Characterize New Organic/Inorganic Coordination Framework Materials	\$75,000	2002
PI	PRF	Proposal for Support of the ACS Symposium – Metal Oxides held at the 2002 Fall ACS meeting in Boston, MA, August 18-22, 2002	\$2,400	2002
PI	NSF	Proposal for Support of the ACS Symposium - Metal Oxides to be held at the 2002 Fall ACS meeting in Boston, MA, August 18-22, 2002	\$5,000	2002
PI	Air Products	Investigation of the Reaction between Carbon Dioxide and Transition Metal Oxides	\$79,000	2001
PI	PRF	Supplement for PRF grant to support summer researcher	\$8,000	2001
PI	NSF	Synthesis of New Perovskite Related Oxides	\$389,000	2001
PI	PRF	Synthesis of Functionalized Organic-Inorganic Coordination Polymers	\$60,000	2000
PI	Air Products	Investigation of the Reaction between Carbon Dioxide and Transition Metal Oxides	\$78,421	2000

PI	CHE, SC Research Grant Program	Organic-Inorganic Coordination Polymers	\$131,870	2000
PI (w/ B. Haran, B. Popov)	CHE, SC Research Grant Program	Studies on High Performance Supercapacitors Based on RuO <sub>x</sub> - Carbon Electrodes	\$103,200	1999
PI	Air Products	Investigation of the Reaction between Carbon Dioxide and Transition Metal Oxides	\$77,651	1999
PI	DOE EPSCoR	DOE EPSCoR	\$100,000	1999
PI (w/ R. Adams, U. Bunz, C. Murphy, D. Reger, K. Shimizu)	NSF	Purchase of a Single Crystal CCD Area Detector X-ray Diffraction System	\$134,200	1999
PI	NSF	Investigation of New Magnetic Oxides with Low-Dimensional Structures	\$378,262	1998
PI	Air Products	Investigation of the Reaction between Carbon Dioxide and Transition Metal Oxides	\$135,907	1998
PI (w/ U. Bunz, K. Shimizu)	Venture Fund	New Layered Organic-Inorganic Materials: An Assembly of Inorganic Building Blocks and Supramolecular Materials	\$30,000	1998
PI	BNL	Synchrotron Time: Diffraction Studies of One-Dimensional Oxides	10 days beam time	1997
PI (w/ R. Adams, B. Dunlap, C. Murphy, J. Tour)	NSF	Purchase of a Squid Magnetometer	\$85,700	1996

**B. Funded (As Co-PI/Contributor)**

<b><u>Role</u></b>	<b><u>Granting Agency</u></b>	<b><u>Project Title</u></b>	<b><u>Award Amount</u></b>	<b><u>Year</u></b>
Institutional Director	NSF-EPSCoR	Made in SC	20,000,000	2018
Co-PI with Haj-Hariri, Ritter, Reynolds, Mousseau	SRNL	External Review of the Core Competencies of SRNL	\$33,979	2016
Co-PI (w/ Clemson, Alabama)	NSF-EPSCoR	Radioluminescent Particles for Optical Emission in Optogenetics	\$375,000	2016-20
Co-PI (w/ A. Bombardi, C. Mazzoli)	Diamond	Exploring the valence disproportionation in 2H-perovskites related oxides	3 days beam time	2013
Co-PI (w/ A. Bombardi, C. Mazzoli)	Diamond	Investigation of the Resonant Behavior of Ruthenates 2H Perovskites	3 days beam time	2013
Co-PI (w/ Chen, Heyden)	ASPIRE	Design and Discovery of Novel Electrode Materials for Reversible Solid Oxide Cells	\$100,000	2013
Co-PI (w/ H. J. Ploehn, B. Benicewicz)	NASA REAP	Polymer-Grafted Platelet Nanocomposites for Engineered Materials and Structures in Extreme Environments	\$30,000	2012
Co-PI (w/ H. J. Ploehn, B. Benicewicz)	ASPIRE	A Materials Toolbox Approach for Synthesis and Characterization of Polymer Nanocomposites	\$100,000	2012
Co-PI (w/ Takeshi Egami, many Co-PIs)	DOE/ EPSCoR	Neutron Scattering Research Network for EPSCoR States	\$90,000	2011
Co-PI (w/ Dawson, Adams, Garashchik,	NSF	Computer Cluster for wide range chemical applications	\$285,958	2010

Rassolov, Shimizu)					
Co-PI (w/ F. Chen, Reifsnider, Weidner)	NASA	Development of High Power Density Regenerative Bi-electrode Supported Solid Oxide Cells to Support NASA's Planetary Exploration Missions	\$740,000 + \$543,750 cost share	2010	
Co-PI (w/ Lavigne, Reger, Shimizu, Wang)	EPSCoR	Acquisition of a Modulated DSC	\$45,000	2008	
Co-Pi (w/ P. Maggard)	NSF	Sermacs Funding: Solid-State Chemistry: New Materials and Advances	\$4,770	2007	
Co-Pi (w/ H. Ploehn)	USC OH&HS	Acquisition of a Micro-Compounder for Polymer Materials Research	\$85,680	2006	
Co-Pi (w/ H. Ploehn, W. Sandberg)	NSF	Polymer Nanocomposite Manufacturing Partnership	\$600,000	2006	
Co-Pi (w/ Shiou-Jyh, Wilkinson)	NSF	Subcontract for NSF Solid State Chemistry Summer Program	\$550,000	2003-05	
Co-Pi (w/ Papatnasiou, Ploehn, Scrivens)	Opportunity Grant	Polymer/Clay Nanocomposites	\$187,993	2001	
Co-Pi (w/ Shiou-Jyh Hwu, Wilkinson)	NSF	NSF Solid State Chemistry Summer Program	\$290,000	2001	
Co-Pi (w/ Bunz, Reger, Shimizu)	USC	Seed Funds	\$50,000	2001	

Co-Pi (w/ C. J. Murphy)	NSF	REU Site-Undergraduate Research in Nanoscience	\$180,000	2001
Co-Pi (w/ Murphy, Bunz)	NSF REU	NSF Research Experience for Teachers. Supplement to NSF REU	\$10,000	2001
Co-Pi (w/ many Chemistry co-PIs)	NSF REU	Undergraduate Research in Nanoscience	\$150,000	1998
Co-Pi (w/ S. Kauzlarich, A. Sleight, E. McCarron III)	NSF	Solid State Chemistry of Inorganic Materials II – Symposium DD	\$10,000	1998
Co-Pi (w/ M. Myrick, B. Popov, T. Bryson)	DOD	Remote Sensing of Chemical Warfare Agents	\$1.3 million	1997
Multi-Investigator, Chem. & Chem. Eng. (w/ M. Amiridis)	DOE	EPSCoR: Hydrogen Production via Direct Cracking of Hydrocarbons	\$2.0 million	1997
Co-Pi (w/ Dunlap, Tour, Angel, Berg, Murphy, Myrick, Ploehn, Shaw)	NSF	EPSCoR-Optics	\$1,518,096	1996

## VI. TEACHING

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### A. Graduate Student Supervision

Dr. Christian A. Juillerat, August **2020**, “Exploratory Molten Flux Crystal Growth of Complex Uranium Oxides”.

Dr. Timothy Ferreira, August **2018**, “Crystallomagnetic Studies of First and Third Row Transition Metal Containing Oxides Grown Via the Molten Flux Method”.

Dr. Justin Felder, May **2018**, “Hydrothermal Synthesis: A Gateway to Metastable Crystals with Unusual Properties”.

Dr. Dileka Abeysinghe, August **2017**, Materials Discovery of Reduced Early Transition Metal Compounds: Crystal Growth and Characterization”.

Dr. Allison M. Latshaw, August **2016**, “Materials Discovery by Crystal Growth: Synthesis, Structure Determination, Magnetic, and Optical Properties of Complex Lanthanide Containing Oxides, Oxyhydroxides, and Oxyfluorides”.

Dr. Anthony J. D. Cortese, May **2016**, “Crystal Growth and Characterization of Reduced Early Transition Metal Compounds Grown via Hydrothermal and Molten Flux Methods”.

Dr. Cory M. Read, May **2015**, “Discovery of Novel Uranium-Containing Oxides and Related Materials by Flux Crystal Growth”.

Dr. Michael Chance, May **2014**, “Hydroflux Synthesis: A New and Effective Technique for Exploratory Crystal Growth”.

Dr. Shae Vaughn, May **2012**, “Synthesis of Inorganic-Organic Hybrid Materials Designed for Radiation Detection, Luminescence and Gas Storage”.

Dr. Rachael Severance, May **2012**, “Separation and Coordination Chemistry of Actinides”.

Dr. Qingbiao Zhao, Ph.D., May **2011**, “Crystal Growth, Structure Determination and Physical Property of Complex Oxides.”

Dr. Arief Wibowo, Ph.D., May **2011**, “Bismuth-, Tin- and Lead-Containing Metal-Organic Materials: Synthesis, Structure, Photoluminescence, Second Harmonic Generation, and Ferroelectric Properties.”

Zhichao Shan, M.S., May **2011**, “Photoluminescence Properties of Rare Earth Niobium Containing Oxides and Flux Synthesis of Rare Earth Transition Metal Containing Oxides”.

Dr. Irina Roof, Ph.D., May **2010**, "Materials Discovery by Crystal Growth: Synthesis, Structure Determination and Physical Properties of Complex Oxides of Niobium, Tantalum, Iron and Uranium."

Dr. Peter Barber, Ph.D., May **2010**, "Synthesis and Characterization of Mixed-Metal Phosphonates for Polymer Dielectric Composite Materials."

Shushan Gong, May **2010**, M.S., "Preparation of Polymer Composites as Dielectric Materials for Capacitors."

Dr. Joseph Ellsworth, Ph.D., May **2008**, "Coordination Polymers: Hybrid Materials Composed of Organic Ligands and Transition Row Metals."

Dr. Tara Hansen, Ph.D., December **2007**, "Synthesis and Characterization of Oxide Materials: Polymer-Layered Oxide Nanocomposites and Lanthanide Containing Platinates."

Dr. Samuel Mugavero, III, Ph.D., August **2007**, "Synthesis and Characterization of Complex Oxides of Iridium and Palladium."

Dr. William Gemmill, Ph.D., August **2006**, "Synthesis, Structural Characterization, and Magnetic Properties of Complex Oxides of Ruthenium and Osmium."

John Stone, May **2006**, M.S., "Preparation and Characterization of Polymer Nanocomposites Containing Metal Phosphonates."

Dr. Andrea M. Goforth, Ph.D., December **2005**, "Synthesis, Structural Characterization, and Optical Properties of Several Novel Mixed-Metal Iodobismuthate Materials."

Judith N. Mwamuka, M.S., May **2004**, "Control of Inorganic Crystal Growth for Magnetic and Biological Applications."

Dr. Matthew Davis, Ph.D., **2004**, "The Chemistry of Novel Perovskite-Related Oxides: Synthesis, Structural Determination and Magnetic Property Characterization."

Dr. Katharine Stitzer, Ph.D., **2002**, "Crystal Growth, Structure Determination, and Magnetic Properties of Ternary and Quaternary Rh, Ir, Ru and Os Containing Oxides".

Dr. Delia Ciurtin, Ph.D., **2002**, "Synthesis and Characterization of New Inorganic-Organic Coordination Polymer".

Dr. Jeff Fiscus, Ph.D., **2002**, "Synthesis, Characterization and Application of Solid State Materials: Oxides, Catalysts and Coordination Polymers".

Dr. Shalawn Kirkland Jackson, Ph.D., **2001**, "Synthesis and Characterization of Transition Metal Nitride Materials".

Ioana Vidican, M.S., December **2000**, "High Performance Mix Design Using Chemistry".

Patrick Smallwood, M.S., December **1999**, Master's Degree, "The Flux Synthesis of Transition Metal Oxides and Investigation of the Reaction of Ternary Transition Metal Oxides with Carbon Dioxide".

Dr. Jennifer Pell, Ph.D., May **1999**, "I. Sol Gel Deposition of Oxide Ion Conducting Thin Films. II. Liquid Precursors to Hafnium and Tantalum Carbides".

Dr. Carlos Navas, Ph.D., February **1999**, "Synthesis, Electrical Conductivity and Nonstoichiometry of Doped Layered Perovskites".

Dr. Joel D. Houmes, Ph.D., September **1996**, "New Routes to Nitride Material: Oxide Precursors and Nitrogen Plasmas".

Dr. Kurt R. Kendall, Ph.D., September **1996**, "Rational Design and Synthesis of New Oxide Ion Conductors".

Dr. David S. Bem, Ph.D., May **1995**, "Synthesis of New Ternary Nitrides."

Dr. Julie K. Thomas, Ph.D., September **1994**, "Oxygen Ion Conduction in Layered Intergrowth Structures with Intrinsic Oxygen Vacancies."

Dr. Tu N. Nguyen, Ph.D., May **1994**, "Electrosynthesis and Characterization of Main Group and Transition Metal Oxides."

Dr. Daniel M. Giaquinta, Ph.D., February **1994**, "Synthesis and Characterization of New Layered Main-Group-Transition Metal Oxides."

## B. Undergraduate Student Supervision

University of South Carolina

Grayson Gimblet, Spring **2017 - 2020**

Tessa Posey, Spring **2017 - 2020**

Nicholas Spagnuolo, Spring **2017 - 2019**

John Estock, SPRI student, Summer **2018**

Branford Wilkins, Spring **2013 - 2016**.

Alexis Meyers, SPRI student, Summer **2013**.

Kendall Hughey, ACS Chemistry major, Fall **2012**.

Ben Hardaway, SPRI student, Summer **2012**.

Lauren Grabowski, Summer **2012**.

Nathan Trenor, Spring **2011**.

Ankur Patel, Spring **2011**.

Eric Rountree, Summer **2010**.



Elisabeth Rausch, Fall **2009**.  
Kristina Wichmann, Fall **2009**.  
Jacqueline Cantwell, Fall **2009** – Spring **2012**.  
Chavis Stackhouse, Summer **2009** – Spring **2012**.  
Wolfgang Zeier, Summer, Fall **2008**.  
Thomas Jagau, Summer, Fall **2008**.  
Heidi Houghton, Summer **2007**.  
Adam Fox, Spring **2007** – Spring **2009**.  
Jilian McAlum, Spring **2007**.  
Mike Burns, Summer **2006**.  
Kathryn Seward, Summer, Fall **2006**, Spring **2007**, Summer **2007**.  
Zeeshan Khaliq, Spring, Summer, Fall **2006**.  
Meredith Tershansy, Fall **2004** – Fall **2006**, Spring **2007**, Summer **2007**.  
Rachel Hipp, Summer **2004**, Spring **2005**.  
Doug Perkins, Spring **2004** – Fall **2004**.  
Matt Remy, Summer **2004**.  
Irina Puzdrjakova, Summer **2004**, Summer **2005**.  
Danielle Sweetapple, Fall **2003**.  
Samuel J. Mugavero III, Summer **2003**.  
Katarzyna Glab, Summer **2003**, Spring **2004**.  
John Stone, Summer **2002**.  
Harvey Davis, Summer **2002**.  
Yunhui Li, Summer **2002**.  
Will Gemmill, Summer **2002**.  
Tara Hansen, Summer **2002**.  
Jennifer Napper, Summer **2002**.  
Kathrine Gerth, Summer **2001**.  
Craig Chapman, Summer **2001**.  
Judy Mwamuka, Summer **2001**.  
Tim Brooch, Summer **2001**.  
Kit Seawright, Summer **2000**.  
Gerard Rowe, Summer **2000**.  
Matthew Davis, Summer **1999**.  
Patrick Smallwood, Summer **1997**.  
Christopher McEaching, Summer **1997**.  
Ham Hanley, Summer **1997**, **1997** – **1999**.

Massachusetts Institute of Technology

Sally Daganzo, Summer **1996**.  
Katya Delak, **1995** – **1996**.

Sandhya Deo, **1995 – 1996.**  
Steve Morse, **1994.**  
Hans Olsen, **1993 – 1994.**  
Mairin Anderson, **1993 – 1994.**  
Wendy Krause, **1992 – 1993.**  
Heather Williamson, **1992 – 1993.**  
Ken Ellis, **1990 – 1991.**

C. Courses Taught

University of South Carolina

<u>Semester/Quarter</u>	<u>Course Number</u>	<u>Course Description</u>	<u>Number of Students</u>
Fall 2017	899	Dissertation Preparation	2
Fall 2017	898	Research in Chemistry	3
Fall 2017	790	Introduction to Research	3
Summer 2017	899	Dissertation Preparation	3
Summer 2017	898	Research in Chemistry	3
Spring 2017	899	Dissertation Preparation	3
Fall 2016	899	Introduction to Research	3
Fall 2016	713	Chemistry of the Elements	20
Summer 2016	899	Thesis Preparation	2
Summer 2016	898	Research in Chemistry	2
Spring 2016	899	Dissertation Preparation	3
Spring 2016	898	Research in Chemistry	2
Fall 2015	898	Research in Chemistry	3
Fall 2015	899	Introduction to Research	2
Fall 2015	499	Undergraduate Research	1
Fall 2015	713	Chemistry of the Elements	14
Summer 2015	899	Thesis Preparation	1
Summer 2015	898	Research in Chemistry	4
Spring 2015	899	Dissertation Preparation	1
Spring 2015	898	Research in Chemistry	4
Spring 2015	791	Introduction to Research	1
Fall 2014	898	Research in Chemistry	6
Fall 2014	791	Introduction to Research	2
Fall 2014	790	Introduction to Research	2
Fall 2014	713	Chemistry of the Elements	18
Summer II 2014	898	Thesis Preparation	4
Summer I 2014	898	Research in Chemistry	4
Spring 2014	899	Dissertation Preparation	1
Spring 2014	898	Research in Chemistry	4
Spring 2014	791	Introduction to Research	2
Spring 2014	496	Undergraduate Research	1
Fall 2013	898	Research in Chemistry	5
Fall 2013	791	Introduction to Research	1
Fall 2013	790	Introduction to Research	2
Fall 2013	713	Chemistry of the Elements	11
Fall 2013	497	Undergraduate Research	1

Summer II 2013	898	Thesis Preparation	5
Summer I 2013	898	Research in Chemistry	5
Summer I 2013	701	Seminar	5
Spring 2013	899	Dissertation Preparation	2
Spring 2013	898	Research in Chemistry	1
Spring 2013	791	Introduction to Research	1
Fall 2012	899	Dissertation Preparation	2
Fall 2012	898	Research in Chemistry	1
Fall 2012	790	Introduction to Research	1
Fall 2012	713	Chemistry of the Elements	9
Fall 2012	497	Undergraduate Research	1
Fall 2012	496	Undergraduate Research	1
Summer II 2012	899	Dissertation Preparation	2
Summer II 2012	898	Research in Chemistry	1
Summer I 2012	899	Dissertation Preparation	3
Summer I 2012	898	Research in Chemistry	1
Summer I 2012	701	Seminar	2
Spring 2012	899	Dissertation Preparation	3
Spring 2012	898	Research in Chemistry	1
Spring 2012	701	Introduction to Research	4
Spring 2012	499	Undergraduate Research	1
Fall 2011	899	Dissertation Preparation	3
Fall 2011	898	Thesis Preparation	2
Fall 2011	399	Independent Study	1
Summer II 2011	899	Dissertation Preparation	3
Summer II 2011	898	Thesis Preparation	3
Summer I 2011	899	Dissertation Preparation	2
Summer I 2011	898	Research in Chemistry	4
Summer I 2011	701	Seminar	1
Spring 2011	899	Dissertation Preparation	1
Spring 2011	898	Research in Chemistry	6
Spring 2011	791	Introduction to Research	4
Spring 2011	496	Undergraduate Research	3
Spring 2011	701	Seminar	10
Spring 2011	112	General Chemistry	180
Fall 2010	899	Dissertation Preparation	3
Fall 2010	898	Thesis Preparation	3
Fall 2010	713	Chemistry of the Elements	11
Spring 2010	790	Introduction to Research	1
Spring 2010	498	Undergraduate Research	1
Summer II 2010	899	Dissertation Preparation	3
Summer II 2010	898	Thesis Preparation	1
Summer II 2010	799	Thesis Preparation	3

Summer I 2010	899	Dissertation Preparation	2
Summer I 2010	799	Thesis Preparation	1
Summer I 2010	701	Seminar	3
Spring 2010	899	Dissertation Preparation	5
Spring 2010	799	Thesis Preparation	2
Spring 2010	791	Introduction to Research	2
Spring 2010	497	Undergraduate Research	1
Summer II 2010	899	Dissertation Preparation	3
Summer II 2010	898	Thesis Preparation	1
Summer II 2010	799	Thesis Preparation	3
Summer I 2010	899	Dissertation Preparation	2
Summer I 2010	799	Thesis Preparation	1
Summer I 2010	701	Seminar	3
Spring 2010	899	Dissertation Preparation	5
Spring 2010	799	Thesis Preparation	2
Spring 2010	791	Introduction to Research	2
Spring 2010	497	Undergraduate Research	1
Spring 2010	701	Seminar	8
Spring 2010	112	General Chemistry	161
Fall 2009	899	Dissertation Preparation	5
Fall 2009	799	Thesis Preparation	2
Fall 2009	713	Chemistry of the Elements	12
Spring 2009	498	Undergraduate Research	1
Spring 2009	496	Undergraduate Research	1
Summer II 2009	899	Dissertation Preparation	5
Summer II 2009	898	Thesis Preparation	2
Summer I 2009	899	Dissertation Preparation	3
Summer I 2009	799	Thesis Preparation	4
Spring 2009	112	General Chemistry	185
Spring 2009	899	Dissertation Preparation	2
Spring 2009	799	Thesis Preparation	4
Spring 2009	790	Introduction to Research	2
Spring 2009	701	Seminar	2
Fall 2008	713	Chemistry of the Elements	12
Fall 2008	799	Thesis Preparation	3
Fall 2008	899	Dissertation Preparation	2
Summer II 2008	799	Thesis Preparation	3
Summer II 2008	898	Research in Chemistry II	1
Summer II 2008	899	Dissertation Preparation	2
Summer I 2008	898	Research in Chemistry II	1
Summer I 2008	899	Dissertation Preparation	2
Spring 2008	112	General Chemistry	184
Spring 2008	497	Undergraduate Research	2

Spring 2008	701	Seminar	5
Spring 2008	898	Research in Chemistry I	1
Spring 2008	899	Dissertation Preparation	2
Fall 2007	496	Undergraduate Research	2
Fall 2007	498	Undergraduate Research	1
Fall 2007	713	Chemistry of the Elements	7
Fall 2007	790	Introduction to Research	1
Fall 2007	799	Thesis Preparation	1
Fall 2007	898	Research in Chemistry II	3
Fall 2007	899	Dissertation Preparation	3
Summer II 2007	798	Research in Chemistry I	1
Summer II 2007	898	Research in Chemistry II	4
Summer II 2007	899	Dissertation Preparation	1
Summer I 2007	898	Research in Chemistry II	3
Summer I 2007	899	Dissertation Preparation	2
Spring 2007	112	General Chemistry	153
Spring 2007	399	Independent Study	1
Spring 2007	496	Undergraduate Research	1
Spring 2007	701	Seminar	5
Spring 2007	898	Research in Chemistry I	4
Spring 2007	899	Dissertation Preparation	2
Fall 2006	496	Undergraduate Research	1
Fall 2006	497	Undergraduate Research	1
Fall 2006	499	Senior Thesis	1
Fall 2006	713	Chemistry of the Elements	4
Fall 2006	790	Introduction to Research	1
Fall 2006	898	Research in Chemistry II	3
Fall 2006	899	Dissertation Preparation	1
Summer II 2006	798	Research in Chemistry I	1
Summer II 2006	898	Research in Chemistry II	5
Summer I 2006	798	Research in Chemistry I	1
Summer I 2006	799	Thesis Preparation	1
Summer I 2006	898	Research in Chemistry II	4
Spring 2006	112	General Chemistry	156
Spring 2006	390z	Project Planning	1
Spring 2006	496	Undergraduate Research	1
Spring 2006	701	Seminar	5
Spring 2006	791	Introduction to Research	2
Spring 2006	898	Research in Chemistry	3
Spring 2006	899	Dissertation Preparation	3
Fall 2005	713	Chemistry of the Elements	3
Fall 2005	790	Introduction to Research	2
Fall 2005	799	Thesis Preparation	1

Fall 2005	898	Research in Chemistry II	4
Fall 2005	899	Dissertation Preparation	2
Summer II 2005	898	Research in Chemistry II	5
Summer II 2005	899	Dissertation Preparation	1
Summer I 2005	898	Research in Chemistry II	4
Summer I 2005	899	Dissertation Preparation	1
Spring 2005	399	Undergraduate Research	1
Spring 2005	496	Undergraduate Research	1
Spring 2005	701	Seminar	12
Spring 2005	791	Introduction to Research	1
Spring 2005	798	Thesis Preparation	1
Spring 2005	898	Research in Chemistry	5
Spring 2005	899	Dissertation Preparation	1
Fall 2004	511	Adv. Inorganic Chemistry	13
Fall 2004	713	Chemistry of the Elements	9
Fall 2004	790	Introduction to Research	1
Fall 2004	898	Introduction to Research II	5
Summer II 2004	898	Research in Chemistry II	5
Summer I 2004	898	Research in Chemistry II	5
Spring 2004	112	General Chemistry	201
Spring 2004	496	Undergraduate Research	1
Spring 2004	701	Seminar	7
Spring 2004	791	Introduction to Research	3
Spring 2004	799	Thesis Preparation	1
Spring 2004	898	Research in Chemistry	4
Spring 2004	899	Dissertation Preparation	1
Fall 2003	790	Introduction to Research	3
Fall 2003	898	Research in Chemistry II	4
Fall 2003	899	Dissertation Preparation	1
Summer II 2003	898	Research in Chemistry II	6
Summer I 2003	799	Thesis Preparation	4
Summer I 2003	898	Research in Chemistry	2
Spring 2003	112	General Chemistry	139
Spring 2003	701	Seminar	7
Spring 2003	791	Introduction to Research	1
Spring 2003	799	Thesis Preparation	4
Spring 2003	898	Research in Chemistry II	2
Spring 2003	899	Dissertation Preparation	1
Fall 2002	713	Chemistry of the Elements	9
Fall 2002	790	Introduction to Research	2
Fall 2002	898	Research in Chemistry II	3
Fall 2002	899	Dissertation Preparation	1
Summer II 2002	898	Research in Chemistry	4

Summer II 2002	899	Dissertation Preparation	2
Summer I 2002	898	Research in Chemistry	4
Summer I 2002	899	Dissertation Preparation	1
Spring 2002	112	General Chemistry	123
Spring 2002	701	Seminar	6
Spring 2002	799	Thesis Preparation	2
Spring 2002	898	Research in Chemistry	1
Spring 2002	899	Dissertation Preparation	3
Fall 2001	713	Chemistry of the Elements	5
Fall 2001	U101	University 101	19
Fall 2001	898	Research in Chemistry II	3
Fall 2001	899	Dissertation Preparation	1
Summer II 2001	898	Research in Chemistry II	3
Summer II 2001	899	Dissertation Preparation	1
Summer I 2001	898	Research in Chemistry	3
Summer I 2001	899	Dissertation Preparation	1
Spring 2001	112	General Chemistry	120
Spring 2001	701	Seminar	4
Spring 2001	791	Introduction to Research	1
Spring 2001	898	Research in Chemistry II	1
Spring 2001	899	Dissertation Preparation	4
Fall 2000	713	Chemistry of the Elements	4
Fall 2000	U101	University 101	10
Fall 2000	790	Introduction to Research	1
Fall 2000	799	Thesis Preparation	1
Fall 2000	898	Research in Chemistry II	3
Fall 2000	899	Dissertation Preparation	2
Summer II 2000	898	Research in Chemistry II	1
Summer II 2000	899	Dissertation Preparation	5
Summer I 2000	898	Research in Chemistry II	2
Summer I 2000	899	Dissertation Preparation	4
Spring 2000	112	General Chemistry	175
Spring 2000	701	Seminar	8
Spring 2000	899	Dissertation Preparation	1
Spring 2000	898	Research in Chemistry II	4
Spring 2000	799	Thesis Preparation	1
Spring 2000	791	Introduction to Research	2
Fall 1999	713	Chemistry of the Elements	5
Fall 1999	U101	University 101	20
Fall 1999	790	Introduction to Research	2
Fall 1999	791	Introduction to Research	1
Fall 1999	799	Thesis Preparation	2
Fall 1999	898	Research in Chemistry II	5



Summer II 1999	798	Research in Chemistry I	1
Summer II 1999	898	Research in Chemistry II	4
Summer I 1999	798	Research in Chemistry	1
Summer I 1999	898	Research in Chemistry	4
Summer I 1999	899	Dissertation Preparation	1
Spring 1999	112	General Chemistry	103
Spring 1999	899	Dissertation Preparation	2
Spring 1999	898	Research in Chemistry II	1
Spring 1999	799	Thesis Preparation	1
Spring 1999	798	Research in Chemistry I	1
Spring 1999	791	Introduction to Research	1
Spring 1999	790	Introduction to Research	1
Fall 1998	713	Chemistry of the Elements	12
Fall 1998	U101	University 101	17
Fall 1998	790	Introduction to Research	1
Fall 1998	799	Thesis Preparation	1
Fall 1998	898	Research in Chemistry II	1
Fall 1998	899	Dissertation Preparation	2
Fall 1998	399	Independent Research	1
Summer II 1998	798	Research in Chemistry I	2
Summer II 1998	898	Research in Chemistry II	2
Summer II 1998	497	Undergraduate Research	1
Summer I 1998	798	Research in Chemistry I	2
Summer I 1998	898	Research in Chemistry II	2
Summer I 1998	496	Undergraduate Research	1
Spring 1998	112	Freshman Chemistry	106
Spring 1998	498	Undergraduate Research	1
Spring 1998	791	Introduction to Research	2
Spring 1998	799	Thesis Preparation	1
Spring 1998	898	Research in Chemistry II	2
Spring 1998	701	Inorganic Seminar	8
Fall 1997	713	Chemistry of the Elements	9
Fall 1997	U101	University 101	20
Fall 1997	790	Introduction to Research	2
Fall 1997	898	Research in Chemistry II	2
Fall 1997	498	Undergraduate Research	1
Summer II 1997	799	Thesis Preparation	2
Summer I 1997	799	Thesis Preparation	2
Summer I 1997	496	Undergraduate Research	1
Spring 1997	799	Thesis Preparation	2
Spring 1997	898	Research in Chemistry II	1
Spring 1997	899	Dissertation Preparation	2
Fall 1996	713	Chemistry of the Elements	10

Massachusetts Institute of Technology

<u>Semester/Quarter</u>	<u>Course Number</u>	<u>Course Description</u>	<u>Number of Students</u>
Spring 1996	5.05	Solid State Chemistry	15
Fall 1995	5.311	Introductory Chemical Experimentation	56
Spring 1995	5.05	Solid State Chemistry	12
Fall 1994	5.311	Introductory Chemical Experimentation	56
Spring 1994	5.05	Solid State Chemistry	24
Fall 1993	5A04	Chemistry and the Environment	8
Fall 1993	5.04	Group Theory	45
Spring 1993	5.03	Principles of Inorganic Chemistry	57
Fall 1992	5A04	Chemistry and the Environment	8
Fall 1992	5.04	Group Theory	35
Spring 1992	5.03	Principles of Inorganic Chemistry	53
Fall 1991	5A04	Chemistry and the Environment	8
Fall 1991	5.04	Group Theory	30
Spring 1991	5.03	Principles of Inorganic Chemistry	41
Fall 1990	5A04	Chemistry and the Environment	8
Fall 1990	5.04	Group Theory	32
Spring 1990	5.03	Principles of Inorganic Chemistry	35

5A04 is a freshman advising seminar course that meets for a two hour seminar each week and includes advising 8 freshman during their entire first year at MIT.