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| **Jeffrey Donald Einkauf** | |
| Oak Ridge National Laboratory, Chemical Sciences Division | Phone: 865-574-4932 |
| Oak Ridge, TN 37831-6119 | Email: einkaufjd@ornl.gov |
| **Education** | |
| **Florida Atlantic University** (FAU), Boca Raton, FL   * Ph.D. – Chemistry – 2017 * Research Advisor: Daniel T. de Lill, Ph.D. * MS – Chemistry – 2016 * BS – Chemistry – 2012, summa cum laude * Minor: Biology |  |
| **Publications** | |

1. J. D. Einkauf, L. Ortega, S. M. McDeavit, and J. D. Burns, “Ion exchange kinetics of alpha-ziconium phosphate nanoplatelets for application in targeted alpha therapy” *Solvent Extraction and Ion Exchange.* **Submitted**.
2. J. D. Einkauf and J. D. Burns, “Recovery of oxidized actinides, Np(VI), Pu(VI), and Am(VI), from co-crystallized uranyl nitrate hexahydrate: a single technology approach to used nuclear fuel recycling” *Industrial & Engineering Chemistry Research*. **59(10)**, 4756-4761, **2020.**
3. **J. D. Einkauf** and J. D. Burns, “Interactions of the bismuthate anion with alkali, alkaline earth, lanthanide, and actinide metals in nitric acid systems” *ACS Applied Energy Materials.* **3(2),** 1593-1601, **2020**.
4. **J. D. Einkauf** and J. D. Burns, “Solid state characterization of oxidized actinides encapsulated in a co-crystallized uranyl nitrate hexahydrate” *Dalton Transactions.* **49**, 608-612, **2020**.
5. **J. D. Einkauf**, A. J. Wilcox, and J. D. Burns, “Solubility and complexation of the bismuthate ion in nitric acid systems” *Inorganic Chemistry.* **57(24)**, 15341-15349, **2019***.*
6. A. K. Adcock, B. Gibbons, **J. D. Einkauf**, J. A. Betke, F. Rubinson, D. T. de Lill, and K. E. Knope, “Bismuth(III) – thiophenedicarboxylates as host frameworks for lanthanide ion incorporation:

synthesis, structural characterization, and photoluminescence”*Dalton Transactions,* **47(38),** 13419-13433, **2018**.

1. **J. D. Einkauf,** K. L. Rue, H. A. Ten Hoeve, and D. T. de Lill, "Tuning luminescence in lanthanide coordination polymers through dilution of emissive centers" *Journal of Luminescence,* **197,** 412-417, **2018**.
2. C. E. Carraher, M. R. Roner, A. G. Campbell, A, Moric-Johnson, L. Miller, P. Slawek, F. Mosca.

**J. D. Einkauf**, J. E. Haky, and R. Crichton “Synthesis of organotin polyesters from reaction of the salt of D-Camphoric acid and organotin dihalides and initial anticancer activity” *Journal of Inorganic and Organometallic Polymers and Materials,* **28(2)**, 481-491, **2018**.

1. **J. D. Einkauf**, R. E. Ortega, L. Mathivathanan, and D. T. de Lill, “Nitroaromatic sensing with a new lanthanide coordination polymer [Er2(C10H4O5S2)3(H2O)6]n assembled by 2,2’-bithiophene5,5’-dicarboxylate” *New Journal of Chemistry*, **41**, 10929-10934, **2017**.
2. C. E. Carraher Jr., M. R. Roner, J. Frank, A. Moric-Johnson, L. C. Miller, K. Black, P. Slawek, F. Mosca, **J. D. Einkauf**, and F. Russell, “Synthesis of water-soluble group 4 metallocene and organotin polyethers and their ability to inhibit cancer” *Processes*, **5**(50), **2017.**
3. C. E. Carraher Jr., M. R. Roner, F. Mosca, A. Moric-Johnson, L. C. Miller, **J. D. Einkauf**, F.

Russell, and P. Slawek, “Synthesis and characterization, including cancer cell line inhibition, of group VA (group 15)-containing polyesters from reaction with camphoric acid” *Journal of Inorganic and Organometallic Polymers and Materials*, 1-13, **2017**.

1. **J. D. Einkauf**, J. M. Clark, A. Paulive, G. Tanner, and D. T. de Lill, “A general model of sensitized luminescence in lanthanide-based coordination polymers and metal-organic framework materials” *Inorganic Chemistry,* **56**(10), 5544-5552, **2017**.
2. **J. D. Einkauf**, B. C. Chan, and D. T. de Lill, “Reversible solvent-induced structural changes in a one-dimensional uranyl coordination polymer using 4,4’oxybis(benzoate)” *Polyhedron,* **128**, 149153, **2017**.
3. C. E. Carraher Jr., P. P. Slawek, M. R. Roner, A. Moric-Johnson, L. C. Miller, **J. D. Einkauf**, and F. Russell, “Synthesis and structural and initial cancer cell line characterization of organotin polyesters from dipicolinic acid” *Journal of Inorganic and Organometallic Polymers and Materials*, 1-13, **2016**.
4. **J. D. Einkauf**, T. T. Kelley, B. C. Chan, and D. T. de Lill, “Rethinking sensitized luminescence in lanthanide coordination polymers and MOFs: Band sensitization and water enhanced Eu luminescence in [Ln(C15H9O5)3(H2O)3]n (Ln = Eu; Tb)” *Inorganic Chemistry,* **55**(16), 7920-7927, **2016**.
5. S. Gonzalez, X. Mei-Chu, K. A. Pitton, R. Crichton, **J. D. Einkauf**, and D. T. de Lill, “Developing luminescent lanthanide coordination polymers and metal-organic frameworks for bioimaging applications” *Florida Atlantic University Undergraduate Research Journal,* **6**, 37-43,**2016**.
6. **J. D. Einkauf**, J. P. Karram, N. E. Greig, B. C. Chan, and D. T. de Lill, “Hole-size relationships in the assembly of a furandicarboxylate-based metallolinker in praseodymium coordination polymers synthesized under basic conditions” *European Journal of Inorganic Chemistry,* **2016(7)**, 10851092, **2016**.
7. **J. D. Einkauf**, L. Mathivathanan, D. T. de Lill., "Structural, spectroscopic, and computational studies of [2,2'-bithiophene]-5-carboxylic acid" *Journal of Molecular Structure*, **1104**, 33-39, **2016**.
8. N. E. Greig, **J. D. Einkauf**, J. M. Clark, E. J. Corcoran, J. P. Karram, C. A. Kent, V. E. Eugene, B.

C. Chan, D. T. de Lill, “Luminescent lanthanide coordination polymers synthesized via *in situ* hydrolysis of dimethyl-3,4-furandicarboxylate” *Journal of Solid State Chemistry*, **225**, 402409, **2015**.

20. A. L. Ramirez, T. K. Kelley, K. E. Knope, N. E. Greig, **J. D. Einkauf**, L. Soderholm, and D. T. de Lill, “Structure and Luminescence of 2-dimensional coordination polymers of lanthanide(III) ions with 2,3-pyridinedicarboxylic acid” *Inorganica Chimica Acta,* **392**, 46-51, **2012**.

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| Conference Proceedings |

## Peer Reviewed Presentations

1. Bismuthate Behavior with Used Nuclear Fuel Species in Nitric Acid. **Jeffrey D. Einkauf**, Andrew J. Wilcox, and Jonathan D. Burns. American Nuclear Society Annual Meeting, Minneapolis, MN, 2019.

## Presentations

1. Dissolution and Stability of the Bismuthate Species in the Presence of Fission Products.  **Jeffrey D. Einkauf** and Jonathan D. Burns. 257th ACS National Meeting, Orlando, 2019.
2. Comparing Molecular and Band-Based Approaches to the Antenna Effect in Lanthanide Coordination Polymers. **Jeffrey D. Einkauf** and Daniel T. de Lill. 253rd ACS National Meeting, San Francisco, 2017.
3. Understanding the Antenna Effect within Lanthanide Coordination Polymers. **Jeffrey D. Einkauf** and D. T. de Lill. Florida Inorganic and Materials Exposition (FIMS), 2015.
4. Examining the Antenna Effect within Lanthanide Coordination Polymers. **Jeffrey D. Einkauf** and D. T. de Lill. Florida Inorganic and Materials Exposition (FIMS), 2014.
5. Photophysical and Structural Characterization of Lanthanide Coordination Polymers. **Jeffrey D. Einkauf**. Florida Atlantic University, Department of Chemistry Cyril Párkányi Graduate Research Memorial Scholarship, Boca Raton, FL, 2014.

## Invited Talks

1. The Behavior of Sodium Bismuthate in Nitric Acid Systems Towards Hexavalent Actinide Separations. **Jeffrey D. Einkauf** and Jonathan D. Burns. Chemical Sciences Division, Oak Ridge National Laboratory, Oak Ridge TN, 2019.
2. Comparing Molecular and Band-Based Approaches to the Antenna Effect in Lanthanide Coordination Polymers. University of Texas at El Paso, April 2018.

## Posters

1. Optimizing Hydrothermal Reaction Conditions for Lanthanide Coordination Polymer Formation: A Study of the 1,4-Benzenedicarboxylate System. **Jeffrey D. Einkauf** and Daniel T. de Lill. 253rd ACS National Meeting, San Francisco, 2017.
2. Comparing Molecular and Band-Based Approaches to the Antenna Effect in Lanthanide Coordination Polymers. **Jeffrey D. Einkauf** and Daniel T. de Lill. Florida Inorganic and Materials Symposium (FIMS), 2016.
3. Doping Studies on Luminescent Mixed Lanthanide Metal-Organic Frameworks. Kelly L. Rue, Heather A. Ten Hoeve, **Jeffrey D. Einkauf**, and Daniel T. de Lill. Florida Inorganic and Materials Symposium (FIMS), 2016.
4. Secondary Building Unit Formation in the Hydrothermal Synthesis of Lanthanide Coordination Polymers. **Jeffrey D. Einkauf**, Ryan A. Crichton, and D. T. de Lill. Florida Inorganic and Materials Symposium (FIMS), 2014.
5. The Role of Nonradiative Decay Mechanisms in Luminescent Lanthanide Coordination Polymers. **Jeffrey D. Einkauf**, Tanya T. Kelley, and Daniel T. de Lill. Graduate Student and Professional Association (GPSA), College of Science Research Day, FAU ACS & AWIS Research Symposium, 2015.
6. Structure and Luminescence of a Lanthanide Benzophenondicarboxylate Coordination Polymer. **Jeffrey D. Einkauf**, Tanya T. Kelley, Benny C. Chan and Daniel T. de Lill. Florida Annual Meeting and Exposition (FAME), 2012.

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| Professional Experience |

**Oak Ridge National Laboratory**, Oak Ridge, TN (Dec 2019 – Present)

* **Postdoctoral Research Fellow** – Research Advisor: Bruce A. Moyer

Advanced separations using a iminoguanidinium-based photoswitch towards selectivity in extraction of anions.

* Binding constants determined via titrimetry
* Crystallization of adducts
* Radiotracing experiments
* Investigation into the photoswitching behavior of iminoguanidinium analogs as a selective extractants for oxoanions

**Texas A & M University**, College Station, TX (Fall 2018 – Nov 2019)

* **Postdoctoral Research Fellow** – Research Advisor: Jonathan D. Burns

Research on separation methods for used nuclear fuel with a focus on uranium, americium, neptunium, and plutonium extraction from fission products as an alternative to the PUREX process

* Extensive use of glovebox and handling of radioactive material
* Investigated various oxidative methods for production of hexavalent actinide species
* Quantified actinide concentrations using HPGe and NaI counting techniques
* Kinetic studies performed on the stability and degradation of short-lived species needed for oxidation of actinide ions
* Monitored metal-ion concentration in solution through UV-Vis spectroscopy and ICP-MS spectrometry
* Maintained lab SOPs for handling radioactive materials and maintained ALARA principles

**Florida Atlantic University** (FAU), Boca Raton, FL (Fall 2010 – Fall 2018)

* **Visiting Instructor** (Fall 2017 – Fall 2018)
* Lectured senior chemistry students in Inorganic Chemistry lecture and lab components
* Lectured 260 students in General Chemistry 1 lecture component
* Lectured 340 students in General Chemistry 2 lecture component
  + Lectured senior chemistry students in Bioanalytical Instrumentation course on X-ray diffraction and TGA/DSC
  + Guest lectured graduate instrumentation course on the topics of X-ray Crystallography and solid state chemistry
  + Guest lectured senior chemistry students in an instrumentation course on thermal analyzers, FTIR, and UV-Vis spectroscopy
  + Conducted research on catalysis and sensing properties of lanthanide and transition metal metal-organic frameworks
  + Synthesis and characterization of polymeric materials for anti-cancer activity o Mentored undergraduate research students on catalysis and sensing research projects while maintaining a safe laboratory environment
  + Co-chaired chemistry club functions for community outreach and American Chemical Society events
* **Graduate Research** (Spring 2013-Summer 2017)
  + Research into Lanthanide (Ln)-containing materials
* Synthesis of new Ln metal organic frameworks (MOFs)
* Ln luminescence and spectroscopy o Re-evaluation of the antenna effect model for consideration in Ln MOFs
* Synthesis and analysis of covalent-organic frameworks (COFs)
* Created and presented lectures pertaining to literature reviews and research
* Mentored undergraduate researchers in the field of materials and inorganic chemistry
* **Graduate Teaching Experience** (Spring 2013-Summer 2017) o Led organic chemistry teaching assistant (TA) meetings o Lectured organic chemistry labs on the topic of IR spectroscopy
  + TA for Inorganic Chemistry Lab
    - * Taught the fundamentals of laboratory techniques and concepts for inorganic chemistry
      * Assisted in implementing a new lab with the emphasis of synthesizing and separating cobalt complexes
  + TA for Organic Chemistry Lab
    - * Taught the fundamentals of laboratory techniques and concepts in organic chemistry
      * Assisted in the implementation of a microscale green nitration of a phenol chemistry experiment
  + Guest Lecturer
    - * Guest-lectured one lecture for Daniel T. de Lill, Ph.D. in Inorganic Chemistry for 40 undergraduate students
      * Guest-lectured one lecture for Tito S. Sempertegui, Ph.D. in Inorganic Chemistry for 45 undergraduate students
      * Guest-lectured two lectures for Daniel T. de Lill, Ph.D. in the upper division Materials Chemistry course for a class of 15 students
      * Guest-lectured three lectures for Charles Carraher, Ph.D. in the Contemporary

Chemical Issues course for a class of 150 students

* + TA for Contemporary Chemical Issues

 Graded lab reports, ran review sessions, and entered grades on blackboard system

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| **Techniques, Software & Instrumentation** |

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| * Fluorescence | * NMR | * Microsoft Office | * Rad Handling |
| * UV-Vis | * Synthesis (Schlenk) | * Minitab | * HPGe & NaI Counting |
| * ICP-MS | * WinGX | * Origin |
| * HPLC | * Gaussian | * ChemDraw | * GENIE 2k |
| * TGA/DSC | * Mercury | * Glovebox |  |

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| **Awards** |

* Division of Inorganic Chemistry Graduate Student Travel Award, $450, Spring 2017
* Graduate and Professional Student Association Travel Award, $600, Spring 2017
* Lindau Nobel Laurette Meetings, Finalist, Spring 2017
* Dissertation Year Award, $500, Fall 2016
* Dr. Cyril Parkanyi Graduate Memorial Scholarships, 1st prize, $600, Summer 2014
* Outstanding Organic Chemistry TA, Fall 2013, Spring 2014, and Summer 2014

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| Organizations |

* Oak Ridge Post-Doctoral Association, February 2020 - current
* American Nuclear Society, August 2018 - current
* Division of Inorganic Chemistry, Student Affiliate, 2012 - current
* Division of Nuclear Chemistry, Student Affiliate, 2018 - current
* Phi Theta Kappa Honor Society, 2006
* American Chemical Society, 2010 - current
* College of Science Graduate Association, FAU, 2014 - 2017
* Co-Chair, Graduate Welcoming Committee, FAU, 2014 - 2017