



Dr Jenifer BRALEY

Assistant Professor
Phone: (303) 273-3996
Fax: (303) 273-3919
Email: jbraley@mines.edu

Department of Chemistry &
Geochemistry
Colorado School of Mines
1523 Illinois Street
Golden, CO 80401

Professional Preparation

Colorado State University	Chemistry (ACS Certified)	BS 2005
Washington State University	Analytical Chemistry	PhD 2010

Appointments

Scientist II	Pacific Northwest National Lab	2010-2012
Assistant Professor	Colorado School of Mines	2012-Present

Research Interests

Fundamental actinide chemistry
Nuclear fuel reprocessing
Nuclear forensics
Medical radioisotope production

Synergistic Activities

Memberships:

American Chemical Society
Division of Nuclear Chemistry and Technology, Program Chair
Industrial and Engineering Chemistry Division, Separation Science and Technology Subdivision,
Member

Professional Services:

Reviewer for: Journal of Physical Chemistry, Inorganic Chemistry, Hydrometallurgy, US
Department of Energy – Basic Energy Sciences Program, Dalton Transactions, Separation
Purification & Technology. Defense Threat Reduction Agency, Inorganica Chimica Acta,
Radiochimica Acta, US Department of Energy – Nuclear Energy University Program, Solvent
Extraction and Ion Exchange

Training of highly-skilled personnel (Graduated / in progress):

PhD (0 / 5); Postdocs (Past:0 / Present:1)

Training of undergraduate students through yearlong senior design projects

3 students mentored since 2012

Outreach

Awards

- DOE Early Career Award – Heavy Element Chemistry, 2014
- SCUREF Junior Faculty Award, 2013
- U.S. DOE Innovations in Fuel Cycle Research – Fuel Separations and Waste Forms – 2nd Place, 2010
- WSU James C. Sullivan Graduate Scholarship, 2009
- WSU Frank E. Fowler Graduate Fellowship, 2008
- WSU Donald S. Matteson Graduate Fellowship, 2007
- WSU Graduate Student Scholar Award, 2006, 2007
- CSU Department of Chemistry's Undergraduate Researcher of the Year, 2005

Publications

1 - "Measured Neutron Flux Parameters in the USGS TRIGA MARK I Reactor"

J. Rad. Nucl. Chem. 2014, Submitted

Koehl, M.A.; Rundberg, R.S.; Braley, J.C.

- 2 - "Actinide N-Donor Solution Thermodynamics: Expanding the f-element Covalency Dialogue"
Coord. Chem. Rev. 2014, Submitted
 Drader, J.A.; **Braley, J.C.**
- 3 - "Heat Transfer During the Formation of Yttria-Stabilized Zirconia Sol-Gel Kernels"
Int. Jnl. Heat Mass Transfer 2014, Submitted
 Baker, M.P.; **Braley, J.C.**; King, J.C.
- 4 - "Testing Of Straight-Chain Halocarbon Forming Fluids For TRISO Fuel Kernel Production"
J. Nucl. Mat. 2014, Submitted
 Baker, M.P.; Gorman, B.P.; **Braley, J.C.**; King, J.C.
- 5 - "Combining CMPO and HEH[EHP] for Separating Trivalent Lanthanides from the Transuranic Elements."
Solv. Extr. Ion. Exch. 31(6), 567-577 (2013)
Braley, J.C.; Lumetta, G.L.; Carter, J.C
- 6 - "Explorations of TALSPEAK chemistry in extraction chromatography: Comparisons of TTHA with DTPA and HDEHP with [HEH]EHP"
Solv. Extr. Ion. Exch. 31(2), 107-121 (2013)
Braley, J.C.; McAlister, D.A.; Horwitz, E.P.; Nash, K.L.
- 7 - "The TRUSPEAK Concept: Combining CMPO and HDEHP for Separating Trivalent Lanthanides from the Transuranic Elements"
Solv. Extr. Ion. Exch. 31(3), 223-236 (2013)
 Lumetta, G.J.; Gelis, A.V.; **Braley, J.C.**; Carter, J.C.; Pittman, J.W.; Warner, M.G.; Vandegrift, G.F.
- 8 - "Insights Into f-element Coordination Chemistry in TALSPEAK Systems"
Procedia Chemistry, 7, 45-50 (2012)
 Nash, K.L.; Johnson, G.; Brigham, D.; Marie, C.; Grimes, T.S.; **Braley, J.C.**
- 9 - "The Role of Carboxylic Acids in TALSQuEAK Separations"
J. Coord. Chem., 65(16), 2862-2876 (2012)
Braley, J.C.; Carter, J.C.; Sinkov, S.I.; Nash, K.L.; Lumetta, G.J.
- 10 - "Separating and Stabilizing Phosphate from High-Level Radioactive Waste: Process Development and Spectroscopic Monitoring"
Environ. Sci. Tech., 46(11), 6190-6197 (2012)
 Lumetta, G.J.; **Braley, J.C.**; Peterson, J.M.; Bryan, S.A.; Levitskaia, T.G.
- 11 - "Lipophilic Ternary Complexes in Liquid-Liquid Extraction of Trivalent Lanthanides"
J. Coord. Chem., 65(5), 741-753 (2012)
 Lumetta, G.J.; Levitskaia, T.G.; Latesky, S.L.; Henderson, R.V.; Edwards, E.A.; **Braley, J.C.**; Sinkov, S.I.
- 12 - "Alternatives to HDEHP and DTPA for Simplified TALSPEAK Separations" – Invited Paper
Ind. Eng. Chem. Res., 51(2), 629-638 (2012)
Braley, J.C.; Grimes, T.S.; Nash, K.L.
- 13 - "Separating the Minor Actinides through Advances in Selective Coordination Chemistry"
PNNL-21642, August 2012
 Lumetta, G.J.; **Braley, J.C.**; Sinkov, S.I.; Carter, J.C.
- 14 - "Combining Neutral and Acidic Extractants for Recovering Transuranic Elements from Nuclear Fuel"
Proceedings of the 19th Solvent Extraction Conference, Paper No. 68 (2011)
 Lumetta, G.J.; Neiner, D.; Sinkov, S.I.; Carter, J.C.; **Braley, J.C.**; Latesky, S.L.; Gelis, A.V.; Vandegrift, G.F.
- 15 - "Challenges for Actinide Separations in Advanced Nuclear Fuel Cycles"
in Nuclear Energy and the Environment, ACS Symposium Series, volume 1046, C. M. Wai, B, J. Mincher Eds, 19-38 (2010)
 Nash, K.L.; **Braley, J.C.**
- 16 - "Chemistry of Radioactive Materials in the Nuclear Fuel Cycle"
in Advanced Separation Techniques for Nuclear Fuel Reprocessing and Radioactive Waste Treatment, Woodhead Publishing Series in Energy: Number 2, K.L. Nash, G.L Lumetta Eds., 1-22 (2010)

- Nash, K.L.; **Braley, J.C.**
- 17 - "Warm Water Oxidation Verification – Scoping and Stirred Reactor Tests"
PNNL-53451-RPT16, Rev 0, June 2011
Braley, J.C.; Delegard, C.H.; Sinkov, S.I.; Schmidt, A.J.
- 18 - "Complex interactions in solvent extraction—biphasic speciation in the TALSPEAK process."
Proceedings of the 19th Solvent Extraction Conference, Paper No. 85 (2011)
Nash, K.L.; Nilsson, M.; Grimes, T.; **Braley, J.**; Uruga, K.; Marie, C.
- 19 - "Sigma Team for Minor Actinide Separation: PNNL FY 2010 Status Report"
FCRD-SEPA-2010-000121, August 2010
Braley, J.C.; Delegard, C.H.; Sinkov, S.I.; Schmidt, A.J.
- 20 - "Removing Phosphate from Hanford High-Phosphate Tank Wastes: FY 2010 Results"
PNNL-19778, September 2010
Lumetta, G.J.; Felmy, A.R.; **Braley, J.C.**; Carter, J.C.; Edwards, M.K.; MacFarlan, P.J.; Qafoku, O.
- 21 - "Partitioning of U, Np, Th, and Eu between acidic aqueous Al(NO₃)₃ solutions and various TOPO extraction chromatographic materials"
IOP Conference Series: Materials Science and Engineering, 9(1), (2010)
Shafer, J.C.; Sulakova, J.; Ogden, M.D.; Nash, K. L.
- 22 - "Partitioning of U(VI) and Eu(III) between Acidic Aqueous Al(NO₃)₃ and Trioctyl Phosphine Oxide in n-Dodecane"
Proceedings of the 18th Solvent Extraction Conference, Vol. I, 593-598 (2008)
Shafer, J.C.; Harrington, R.C.; Nash, K. L.

Presentations

Invited:

- 1 - "Actinide Separations in the Nuclear Fuel Cycle" (oral presentation)
Radiochemistry Fuel Cycle Summer School
University of Nevada Las Vegas, July 2014
Braley, J.C
- 2 - Actinide Separations in the Nuclear Fuel Cycle – Relevance to Nuclear Forensics" (oral presentation)
Nuclear Forensics Summer School
University of Missouri, June 2014
Braley, J.C
- 3 - "Separations and Management of Used Nuclear Fuel in the United States: An overview of past practices, current management, and future directions" (oral presentation)
Department of Civil & Environmental Engineering & Earth Sciences
Seminar Series, University of Notre Dame, April 2014
Braley, J.C.
- 4 - "Actinide Separation Advances: Improving the Security and Efficiency of Next Generation Nuclear Fuel Cycles" (oral presentation)
Department of Chemistry: Combined Analytical/Inorganic
Seminar, Colorado State University, March 2014
Braley, J.C
- 5 - "Actinide Separations in the Nuclear Fuel Cycle" (oral presentation)
Radiochemistry Fuel Cycle Summer School
University of Nevada Las Vegas, July 2013
Braley, J.C.
- 6 - "Nuclear Science and Engineering at the Colorado School of Mines" (oral presentation)
INEST Workshop, Austin, TX. April 2013
Braley, J.C
-

Provided:

- 1 - "Nuclear Forensics Development at Mines"
Academic Lab Collaboration Meeting, Chicago, IL, August 2014
Braley, J.C.
- 2 - "Actinide Interactions with (Poly)Aminopolycarboxylates: A Review Concerning Actinide Covalency"
(oral presentation)
38th Annual Actinide Separation Conference, Albuquerque, NM, May 2014
Braley, J.C.
- 3 - "Radiochemistry at the Colorado School of Mines: Preliminary Results" (oral presentation)
37th Annual Actinide Separations Conference, Spokane, WA, June 2013
Drader, J.; Servis, M.; Heroux, D.; Richards, R.; Wu, D.; **Braley, J.C.**
- 4 - "Nuclear and Radiochemistry at the Colorado School of Mines" (oral presentation)
RMRM, American Chemical Society, Westminster, CO, October 2012
Braley, J.C.
- 5 - "Review of Online spectroscopic (Onspec) monitoring of aggregation chemistry in solvent extraction systems" (oral presentation)
36th Annual Actinide Separations Conference, Chattanooga, TN, May 2012
Braley, J.C.; Lines, A.M.; Bryan, S.A.; Levitskaia, T.G.; Lumetta, G.J.
- 6 - "Spectroscopic Characterization of TBP-Bound Pu(IV) in Dodecane for Online Monitoring of Third Phase" (oral presentation)
244th Meeting of the American Chemical Society, Philadelphia, PA, August 2012
Braley, J.C.; Lines, A.M.; Bryan, S.A.; Levitskaia, T.G.; Lumetta, G.J.
- 7 - "The OnSpec Monitoring System for Aggregation Chemistry in Solvent Extraction Systems" (oral presentation)
243rd Meeting of the American Chemical Society, San Diego, CA, March 2012
Braley, J.C.; Lines, A.M.; Bryan, S.A.; Levitskaia, T.G.; Lumetta, G.J.
- 8 - "From TALSqueak to TRUSqueak: Application of Aqueous Ternary Species" (oral presentation)
17th Separation Science & Technology Conference, Gatlinburg, TN, October 2011
Braley, J.C.; Lumetta, G.J.; Sinkov, S.I.; Carter, J.C.; Nash, K.L.
- 9 - "Extraction Chromatographic Cleanup of Potentially Acidic Hanford Wastes Containing Al(NO₃)₃ using Tri-n-octyl Phosphine Oxide" (poster presentation)
17th Separation Science & Technology Conference, Gatlinburg, TN, October 2011
Braley, J.C.; Sulakova, J.; Ogden, M.D.; Nash, K. L.
- 10 - "Removing Phosphate from Hanford High-Phosphate Tank Wastes: The Lime-Aid Process" (oral presentation)
242nd American Chemical Society National Meeting, Denver, CO, August 2011
Braley, J.C.; Lumetta, G.J.; Carter, J.C.; Chenault, J.W.; Felmy, A.R.; Qafoku, O.
- 11 - "Optimization of HEH[EHP]/HEDTA Chemistry for Trivalent Actinide/Lanthanide Separations" (oral presentation)
35th Annual Actinide Separations Conference, Charlotte, NC, May 2011
Braley, J.C.; Lumetta, G.J.; Sinkov, S.I.; Carter, J.C.; Nash, K.L.
- 12 - "Uranium Metal Corrosion in KW Basin Sludge via Warm Water Oxidation" (poster presentation)
35th Annual Actinide Separations Conference, Charlotte, NC, May 2011
Braley, J.C.; Delegard, C.H.; Sinkov, S.I.; Schmidt, A.J.; Sloughter, J.P.; Baker, R.B.
- 13 - "The Replacement of HDEHP for improved TALSPEAK separations" (oral presentation)
Annual Actinide Separations Conference, Chicago, IL, May 2010
Braley, J. C.; Grimes, T.S.; Nash, K.L.
- 14 - "The Replacement of HDEHP for improved TALSPEAK separations" (oral presentation)
239th Meeting of the American Chemical Society, San Francisco, CA, March 2010
Braley, J. C.; Grimes, T.S.; Nash, K.L.

- 15 - "Biphasic Microcalorimetry of the U/TBP/NO₃⁻ System Inspired by an Extraction Chromatographic Remediation of the Hanford Site" (oral presentation)
Actinides Conference 2009, San Francisco, CA, July 2009
Shafer, J. C.; Zalupski, P. R.; Nash, K.L.
- 16 - "Acidic Remediation of the Hanford Site using TOPO-XAD7 impregnated resins" (poster presentation)
International Solvent Extraction Conference 2008, Tucson, AZ, USA, September 2008
Shafer, J. C.; Nash, K. L.
- 17 - "Separation of Eu and Np from Potential Al(NO₃)₃ Tank Waste Leachates with Tri-n-octyl Phosphine Oxide" (oral presentation)
15th Separation Science & Technology Conference, Gatlinburg, TN, October 2008
Shafer, J.C.; Harrington, R.C.; Nash, K.L.
- 18 - "Partitioning of Eu(III) between Acidic Aqueous Al(NO₃)₃ and Tributyl Phosphate: A Comparison of Liquid-Liquid and Extraction Chromatographic Methods" (oral presentation)
Northwest Regional Meeting of the American Chemical Society, Boise, ID, June 2007
Shafer, J. C.; Harrington, R.C.; Nash, K.L.

Advised Post-Doctoral Presentations:

- 1 - "Extraction chromatographic materials for selective recovery of uranium in a thorium nuclear fuel cycle" (oral presentation)
247th Meeting of the American Chemical Society, Dallas, TX, March 2014
Drader, J.A.; **Braley, J.C.**
- 2 - "An initial assessment of americium oxidation limitations using NaBiO₃ for advanced nuclear fuel cycle separations" (poster presentation)
37th Actinide Separations Conference, Spokane, WA, June 2013
Drader, J.A.; Mincher, B.; Heroux, D.; Richards, R. **Braley, J.C.**

Advised Graduate Student Presentations:

- 1 - "PUREX Process Trace Metal Signatures for Source Facility Determination" (poster presentation)
Academic Lab Collaboration Meeting, Chicago, IL, August 2014
Baldwin, A.G.; **Braley, J.C.**
- 2 - "Understanding Extractant Interactions in Solvent Extraction through Molecular Dynamics" (poster presentation)
American Nuclear Society – Annual Student Conference. University Park, PA, April 2014
Servis, M.; Wu, D.T.; **Braley, J.C.**
- 3 - "A Radioanalytical Approach for Determination of PUREX Process Trace Metal Signatures" (poster presentation)
2014 Conference on Earth and Energy Research. Golden, CO, February 2014
Baldwin, A.G.; **Braley, J.C.**
- 4 - "Nuclear Forensic Investigation of Fission Product Yields" (poster presentation)
2014 Conference on Earth and Energy Research. Golden, CO, February 2014
Koehl, M.A.; Rundberg, R.S.; **Braley, J.C.**
- 5 - "Oxidant and Extractant Development for the Selective Recovery of Higher Americium Oxidation States" (poster presentation)
2014 Conference on Earth and Energy Research. Golden, CO, February 2014
McCann, K.; Zhu, L.; Drader, J.A.; Boyes, S.G.; Lumetta, G.J.; Sinkov, S.I.; **Braley, J.C.**
- 6 - "Oxidant and Extractant Development for the Selective Recovery of Higher Americium Oxidation States" (poster presentation)
2014 Conference on Earth and Energy Research. Golden, CO, February 2014
McCann, K.; Zhu, L.; Drader, J.A.; Boyes, S.G.; Lumetta, G.J.; Sinkov, S.I.; **Braley, J.C.**
- 7 - "Understanding Extractant Interactions in Solvent Extraction through Molecular Dynamics" (poster presentation)
2014 Conference on Earth and Energy Research. Golden, CO, February 2014
Servis, M.; Wu, D.T., **Braley, J.C.**

*Winner Best Graduate Student Poster

- 8 - "Understanding Extractant Interactions in Solvent Extraction through Molecular Dynamics" (oral presentation)
38th Annual Actinide Separation Conference, Albuquerque, NM, May 2014
Servis, M; Wu, D.T.; Yang, P.; Braley, J.C.
- 9 - "Selective Recovery of Higher Americium Oxidation by DAAP" (poster presentation)
38th Annual Actinide Separation Conference, Albuquerque, NM, May 2014
McCann, K.; Lumetta, G.J.; Mincher, B.J.; Sinkov, S.I.; Braley, J.C.

CITIZENSHIP: United States