

## **RICHARD A. O'BRIEN, Ph.D.**

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University of South Alabama  
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### **ACADEMIC EXPERIENCE**

#### **UNIVERSITY OF SOUTH ALABAMA** Mobile, Alabama

2018- Present	Associate Professor of Chemistry (Non-tenure track)
2012-2018	Assistant Professor of Chemistry (Non-tenure track)
2011-2012	Instructor- Chemistry Department
2008-2011	Adjunct Faculty- Chemistry Department
2008-2011	Postdoctoral Research Associate- Chemistry Department

- Research Focus:

- 1- Synthesis, Characterization, and Application of Tetra (4-Thiaalkyl) ammonium Salts (Thiaquat Salts).
- 2- Synthesis, Characterization, and Application of Lipid-Inspired Ionic Liquids.
- 3- Synthesis of New Classes of Bio-Inspired and Lipid-Inspired Ionic Liquids Utilizing Thiol-ene and Thiol-yne Photochemical Reactions.
- 4- Mechanistic Studies of Thiol-ene Reactions for Markovnikov Addition.

- Mentors: Prof. James H. Davis, Jr. and Prof. Kevin N. West

- Teaching Focus:

- 1- CH101 Laboratory: Survey of Inorganic & Organic Chemistry
- 2- CH131 and CH132 Laboratories: General Chemistry I / II
- 3- CH132 Lecture: General Chemistry II

- Academic Activities

- Substitute lecturer for General Chemistry I/II (CH131/132) and Organic Chemistry I/II (CH201/CH202) from 2010 - 2016.
- Presented research at USA Research, ACS, AIChE, and COIL conferences.
- Taught graduate and undergraduate students safety, analytical, and synthetic chemistry techniques during 2008-present. Mentored students in research activities.
- Instrumentation Coordinator for Chemistry Department, including 500 MHz NMR.
- Mentored Honors student during Senior Research Thesis project from 2010-2011.
- Student awarded 2010 Goldwater Scholarship and 2011 NSF GRF.
- Recognized as a 2011 "Top Prof" by the Azalea Chapter of Mortar Board Senior Honor Society at the University of South Alabama.
- Member of Master's Thesis committees & Gen Ed. Sub-committee during 2011-2018.
- Member of USA and Chemistry Curriculum Committees during 2011-2018.
- Nominated for 2018 Arts & Sciences Excellence in Teaching Award.
- Nominated for 2014 Andy & Carol Denny National Alumni Excellence in Teaching.

**ITAWAMBA COMMUNITY COLLEGE**    Tupelo, Mississippi  
2008-2011                      Adjunct Faculty- Chemistry Department

- Taught on-line General Chemistry I lecture and laboratory courses.

### INDUSTRIAL EXPERIENCE

**ARIZONA CHEMICAL COMPANY**    Savannah, Georgia  
2001-2007                      Senior Research Scientist- Oleochemicals Group

- Provided technical support for bench top to commercialization for SYLVACLEAR<sup>®</sup> and SYLVAGEL<sup>®</sup> gellants for Personal Care, Air Care, and Industrial applications.
- Provided technical and manufacturing support for the UNICLEAR<sup>™</sup>, SYLVACLEAR<sup>®</sup>, SYLVAGEL<sup>®</sup> gellants and UNIREZ<sup>®</sup> phase change ink resins. Presented technical information to target customers. Technical lead for team that reduced cycle time by 20% and corrective actions with no out-of-specification products to customers. Implemented “Best Practices” into manufacturing. Product lines worth multi-millions in revenue during 2001- 2007. Utilized DoE, SPC, and Process Mapping during manufacturing improvements.
- Project leader for team that improved product quality in CENTURY<sup>®</sup> monomer fatty acid, and SYLVACLEAR<sup>®</sup> polyamide gellants. Implemented “Best Practices” into manufacturing. Product lines worth multi-millions in revenue during 2001-2007.

**HEXCEL CORPORATION**            Decatur, Alabama  
1997-2001                      Research Scientist- Research and Technology Division

- Synthesized polyacrylonitrile (PAN) polymers for new product development to improve fiber properties during spinning and carbonization. Identified two candidates for scale-up to production utilizing a bench top continuous polymerization reactor.
- Produced continuous tow carbon fibers from commercially available LLDPE fibers for automotive applications during DOE-sponsored LCCF program. Carbon fibers met LCCF targets of 400 Ksi tensile strength and 25 Msi modulus on research scale.
- Project leader for PAN fiber capacity improvements. Initial trials provided carbon fibers that doubled capacity and met target mechanical properties of 750 Ksi tensile strength & 35 Msi modulus with prototype extrusion equipment on a single tow line.
- Provided manufacturing support for polymerization, fiber extrusion and polymer characterization. Solved problems related to raw materials, PAN molecular weight, process filtration and polymer/solvent impurities.

**TPL, INC.**                      Albuquerque, New Mexico  
1993-1997                      Advanced Scientist- Advanced Materials Division

- Group Leader for Polymer Development Team. Division won multiple Government contracts worth > \$1MM in revenue. Led to the development of dielectric polymers for high voltage film capacitors with energy densities of > 2.5 J/cc.
- Synthesized target molecules containing silyl ester, alkene, ester, halide and carbonyl functional groups. Improved yield of two-step multi kg process to > 85%.
- Purified target organic compounds for dielectric polymers at > 99.99% purity using a spinning band distillation system. Led to improved polymer properties.
- Performed successful N-denitration of nitramines and HMX for Stage I DoE contract.

## **RIEKE METALS, INC.**

Lincoln, Nebraska

1992-1993                      Research Scientist- Highly Reactive Metals<sup>®</sup>

- Product development and scaled-up synthesis of Regioregular and Regiorandom Alkyl-based polythiophenes for electronic applications.
- Developed new product lines involving the utilization of Rieke<sup>®</sup> Highly Reactive Mg, Zn, and Cu for use in organic synthesis.

## **ACADEMIC AND INDUSTRIAL SKILLS**

- Synthesis, photochemistry, application, and characterization of ionic liquids and thiaquat salts for GC, heat transfer, electrochemical, and PTC applications.
- Bench top to commercialization activities for polyamides and bio-based esters.
- Pilot scale operations and written procedures for polyamides and lubricant esters.
- Problem solving and technical support in polyamide and lubricant ester manufacturing. Formulation work with polyamides and lubricant esters.
- Polyacrylonitriles, polythiophenes, polystyrenes, polyamides, and polysiloxanes.
- Dimer acid, isostearic acid, ester, and fatty acid technologies and manufacturing practices. Problem solving activities involving the manufacture of these product lines.
- GC, GPC, LC, DSC, TGA, FT-IR, FT-NMR, and UV-Vis spectroscopy.
- General organic, organometallic, and polymer synthetic methods.
- Technical presentations, technical reports and disclosures, publications, and patents.

## **EDUCATION**

- 1- University of Nebraska-Lincoln Degree: Ph.D. (1992)  
Dissertation Advisor: Professor Reuben D. Rieke  
Dissertation: Chemical Modification of Halogenated Polystyrene Resins Utilizing Highly Reactive Copper and Calcium and the Chemistry of Highly Reactive Copper Contained In a Polymer.  
Award: DuPont Fellowship (1987-1988)
- 2- University of North Dakota Degree: M.S. (1987)  
Master's Advisor: Professor James J. Worman  
Master's Thesis: Synthesis, Mechanism of Formation, and Spectral Studies of N-(3)-Substituted Hydantoins.  
Award: Dennison Award from N.D. Academy of Sciences (1987)
- 3- South Dakota State University Degree: B.S. (1985) Professional Chemistry  
Undergraduate Advisor: Professor Harry Hecht ACS Degree  
Award: Dobberstein Undergraduate Research Award (1984)

## **EDITORIAL RESPONSIBILITIES**

### Active Referee

Current Green Chemistry (Bentham Science Publishers)

## MEMBERSHIPS

- American Chemical Society
- National Society of Collegiate Scholars at the University of South Alabama

## STUDENTS MENTORED

- 1- Kaila Mattson- University of South Alabama, **Project:** *Lipid-Inspired Ionic Liquids*
- 2- Jessica Lacy- University of South Alabama, **Project:** *Protic Ionic Liquids*
- 3- Fatima Hamade- University of South Alabama, **Project:** *Thiol-ene Chemistry of Vinylphosphonic Acids and Synthesis of their Derivatives*
- 4- Paul Hixon- University of South Alabama, **Project:** *Boron-based Viologens*
- 5- Adam Lewis- University of South Alabama, **Project:** *Boron-based Viologens*
- 6- Kyle Gaines- University of South Alabama, **Project:** *Task-Specific Ionic Liquids*
- 7- Adela Benchea- University of South Alabama, **Project:** *High Temperature Phosphonium and Sulfonium Salts and Ionic Liquids*
- 8- Forrest Edhegard- University of South Alabama, **Project:** *C2 Lipidic Ionic Liquids*

## COLLABORATIONS

- |    |                           |                               |                      |
|----|---------------------------|-------------------------------|----------------------|
| 1- | Prof. James H. Davis, Jr. | University of South Alabama   | Ionic Liquids        |
| 2- | Dr. W. Matthew Reichert   | University of South Alabama   | Ionic Liquids        |
| 3- | Dr. Kevin N. West         | University of South Alabama   | Ionic Liquids/DSC    |
| 4- | Dr. Christy Wheeler West  | University of South Alabama   | PTC/DSC              |
| 5- | Dr. Arsalan Mirjafari     | Florida Gulf Coast University | Ionic Liquids        |
| 6- | Dr. T. Grant Glover       | University of South Alabama   | Mesoporous Materials |

## BOOK CHAPTERS

- 1- Mirjafari, A., O'Brien, R.A., Murray, S. M., Mattson, K. M., Mobarrez, N., West, K. N., Davis, Jr., J. H. "Lipid-Inspired Ionic Liquids Containing Long-Chain Appendages: Novel Class of Biomaterials with Attractive Properties and Applications." *American Chemical Society Ionic Liquids: Science and Applications* **2012**, 199-216.
- 2- Mirjafari, A., O'Brien, R.A., Davis Jr., J.H., **2016**. Synthesis and Properties of Lipid-Inspired Ionic Liquids. In: Xu, X., Guo, Z., Cheong, L-Z. (Eds.), *Ionic Liquids in Lipid Processing and Analysis: Opportunities and Challenges*, pp. 205–223.

## BOOKS

Richard A. O'Brien and Milorad Stojanovic, **2018**. *Chemistry 101 Laboratory Manual*, FountainHead Press, 186 pp., ISBN: 978-1-68036-646-4, 4<sup>th</sup> edition.

## PUBLICATIONS

- 1- Nan, H., Zhang, C., O'Brien, R.A., Benchea, A., Davis, J.H., Jr. "Lipidic Ionic Liquid Phases for the Separation of Nonpolar Analytes by Comprehensive Two-dimensional Gas Chromatography", *J. of Chrom. A.*, **2017**, *1481*, 127-136.
- 2- Siu, B., Cassity, C.G., Wierzbicki, A., Sykora, R.E., Salter, E.A., O'Brien, R.A., West, K.N., Davis, Jr., J.H. "Thermally robust: Triarylsulfonium ionic liquids stable in air for 90 days at 300 °C", *RCS Advances*, **2017**, *7*, 7623-7630.
- 3- Thigpen, A.S., Nestor, S.T., O'Brien, R.A., Minkowicz, S., Sheng, Y., Davis, Jr., J.H., West, K.N., Mirjafari, A. "Thioether-functionalized picolinium ionic liquids: click synthesis and thermophysical characterization for use as lubricants", *New J. Chem.*, **2017**, *41*, 1625-1630.
- 4- Langham, J.V., O'Brien, R.A., Davis, Jr., J.H., West, K.N. "Solubility of CO<sub>2</sub> and NO<sub>2</sub> in an Imidazolium-Based Lipidic Ionic Liquid", *J. Phys. Chem. B.* **2016**, *120*, 10524-10530.
- 5- Huynh, T.L.Y., Poiroux, K., O'Brien, R.A., West, K.N., Davis, Jr., J.H., Wheeler West, C. "Fusion and Thermal Degradation Behavior of Symmetric Sulfur-Containing Quaternary Ammonium Bromides", *J. Phys. Chem. B.*, **2016**, *120(7)*, 1330-1335.
- 6- O'Brien, R.A., Zayas, M.S., Gaitor, J.C., Edhegard, F.A., Paul, L.M., Minkowicz, S., Sykora, R.E., Sheng, Y., Michael, S.F., Isern, S, Mirjafari, A. "Biomimetic Design of Lipidic Ionic Liquids with Enhanced Fluidity", *New. J. Chem.* **2016**, *40*, 7795-7803.
- 7- Green, B.D., Badini, A.J., O'Brien, R.A., Davis, Jr. J.H., West, K.N. "Liquid-Liquid Equilibria of Binary Mixtures of a Lipidic Ionic Liquid with Hydrocarbons", *Ind. Eng. Chem. Res.*, **2015**, *54*, 5165-5171.
- 8- Gaitor, J.C., Zayas, M.S., Myrthil, D.J., White, F., Sykora, R.E., O'Brien, R.A., Reilly, J.T., Mirjafari, M. "Crystal Structure of a Methimazole-Based Ionic Liquid", *Acta Crystallographica E*, **2015**, *71(12)*, o1008-o1009.
- 9- Ruckart, K.N., O'Brien, R.A., Woodard, S.M., West, K.N., Glover, T.G. "Porous Solids Impregnated with Task-Specific Ionic Liquids as Composite Sorbents for CO<sub>2</sub> Capture", *J. Phys. Chem. C*, **2015**, *119(35)*, 20681-20697.
- 10- Green, B.D., O'Brien, R.A., Davis, Jr., J.H., West, K.N. "Ethane and Ethylene Solubility in an Imidazolium-based Lipidic Ionic Liquid", *Ind. Eng. Chem. Res.*, **2015**, *54 (18)*, 5165-5171.

## PUBLICATIONS

- 11- Braun, R.A., Bradfield, J.L., Lacy, J.N., Henderson, C.B., Mobarrez, N., Sheng, Y., O'Brien, R.A., Davis, Jr., J.H., Mirjafari, A. "Click chemistry mediated synthesis of biologically-inspired phosphonyl-functionalized ionic liquids", *Green Chem.*, **2015**, *17*, 1259-1268.
- 12- Wheeler West, C.W., O'Brien, R.A., Hollingsworth, B.E., Huynh, T., Sweat, R.E., Griffin, N.J., Salter, E.A., Weirzbicki, A., Davis, Jr., J.H. "Impact of Sulfur Heteroatoms on the Activity of Quaternary Ammonium Salts as Phase Transfer Catalysts for Nucleophilic Displacement Reactions", *J. Mol. Cat. A: Chemical*, **2015**, *398*, 282-288.
- 13- O'Brien, R.A., Mirjafari, A., Mattson, K.M., Murray, S.M., Mobarrez, N., Salter, E.A., Wierzbicki, A., Davis, Jr., J.H., West, K.N. "The Effect of Sulfur Position on the Melting Points of Lipidic 1-Methyl-3-Thiaalkylimidazolium Ionic Liquids", *J. Phys. Chem. B.* **2014**, *118*, 10232-10239.
- 14- Chen, L., Mullen, G.E., Le Roch, M., Cassity, C.G., Gouault, N., Fadamiro, H.Y., Barletta, R.E., O'Brien, R.A., Sykora, R.E., Stenson, A.C., West, K.N., Horne, H., Davis, Jr, J.H. "On the Formation in Nature of a Protic Ionic Liquid", *Angew. Chem.* **2014**, *126*, 30 and *Angew. Chem. Int. Ed.* **2014**, *53*, 30. (Featured in *Chemical & Engineering News*, July 28, 2014, Volume 92, Number 30, page 32, "Ant Battle Yields Ionic Liquid" and *Nature*, Research Highlights, July 31, 2014, Volume 511, "Fighting ants make rare fluid".)
- 15- Mirjafari, A., O'Brien, R.A., West, K.N., Davis, Jr., J.H. "Synthesis of Novel Lipid- Inspired Ionic Liquids via Thiol-ene Chemistry: Profound Solvent Effect on Reaction Pathway", *Chem. Eur. J.* **2014**, *20*(25), 7576-7580. (Featured in *Wiley-VCH Hot Topics for Click Chemistry*, 2014)
- 16- O'Brien, R.A., Wheeler West, C., Hollingsworth, B.E., Stenson, A.C., Henderson, B., Mirjafari, A., Mobarrez, N., West, K.N. Mattson, K.M., Salter, E.A., Wierzbicki, A., Davis, Jr., J.H. "A Simple and Rapid Route to Novel Tetra(4-thiaalkyl)ammonium Bromides", *RSC Adv.* **2013**, *3*, 24612-24617.
- 17- Cassity, C.G., Mirjafari, A., Mobarrez, N., Strickland, K.J., O'Brien, R.A., Davis, Jr., J.H. "Ionic Liquids of Superior Thermal Stability" *Chem. Commun.* **2013**, *49*, 7590-7592. (Featured in *Chemical & Engineering News*, August 12, 2013, Volume 91, Number 32, page 27, "Ionic Liquids at High Temps".)
- 18- Murray, S., Zimlich, T., Mirjafari, A., O'Brien, R.A., Davis, Jr., J. H., West, K.N. "Thermophysical Properties of Imidazolium-Based Lipidic Ionic Liquids." *Journal of Chemistry and Engineering Data* **2013**, *58*(6), 1516-1522.

## PUBLICATIONS

- 19- Kwan, M-L, Mirjafari, A., McCabe, J.R., O'Brien, R.A., Essi IV, D.F., Baum, L., West, K.N., Davis, Jr., J.H. "Synthesis and thermophysical properties of ionic liquids: Cyclopropyl moieties versus olefins as  $T_m$ -reducing elements in lipid-inspired ionic liquids" *Tetrahedron Lett.* **2013**, 54, 12-14.
- 20- Mirjafari, A., Murray, S.M., O'Brien, R.A., Stenson, A.C., West, K.N., Davis, Jr., J.H., "Structure-based tuning of  $T_m$  in lipidic ionic liquids: Insights from  $Tf_2N^-$  salts of gene transfection agents" *Chem. Commun.* **2012**, 48, 7522-7524.
- 21- O'Brien, R.A., Mirjafari, A., Jajam, V., Capley, E.N., Stenson, S.C., West, K.N., Davis, Jr., J.H. "Functionalized ionic liquids with highly polar polyhydroxylated appendages and their rapid synthesis via thiol-ene click chemistry" *Tetrahedron Lett.* **2011**, 52, 5173-5175.
- 22- Mirjafari, A., Mobarrez, N., Davis, Jr., J.H., O'Brien, R.A., Noei, J. "Microwave-promoted one-pot conversion of alcohols to oximes using 1-methylimidazolium nitrate, [Hmim][NO<sub>3</sub>], as a green promoter and medium" *C. R. Chimie* **2011**, 14(12), 1065-1070.
- 23- Dorman, S.C., O'Brien, R.A., Lewis, A., Salter, E.A., Wierzbicki, A., Hixon, P.W., Sykora, R.E., Mirjafari, A., Davis, Jr., J.H. "A new building block for electroactive organic materials? Synthesis, cyclic voltammetry, single crystal X-ray structure, and DFT treatment of a unique boron-based viologen", *Chem. Commun.* **2011**, 47, 9072-9074.
- 24- Murray, S.M., O'Brien, R.A., Mattson, K.M., Ceccarelli, C., Sykora, R.E., West, K.N., Davis, Jr., J.H. "The Fluid-Mosaic Model, Homeoviscous Adaptation, and Ionic Liquids: Dramatic Lowering of the Melting Point by Side-Chain Unsaturation", *Angew. Chem. Intl. Ed.*, **2010**, 49, 2755-2758. (Featured in *Chemical & Engineering News*, March 15, 2010, Volume 88, Number 11, page 11, "New Chains for Ionic Liquids".)
- 25- Soutullo, M.D., O'Brien, R. A., Gaines, K.E., Davis, Jr., J.H. "Constitutional Dynamic Systems of Ionic and Molecular Liquids", *Chem. Commun.* **2009**, 2529-2531.
- 26- Chapman, R.D., O'Brien, R.A., Kondracki, P.A. "N-Denitration of Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX) by Hydrazine Catalyzed by Palladium", *J. Energ. Mater.* **1998**, 16, 147-171.
- 27- Chapman, R.D., O'Brien, R.A., Kondracki, P.A. "N-Denitration of Nitramines by Dihyronicotinamides", *Tetrahedron* **1996**, 52, 9655-9664.
- 28- Chen, T., O'Brien, R.A., Rieke, R.D. "Use of Highly Reactive Zinc Leads to a New, Facile Synthesis for Polyarylenes", *Macromolecules* **1993**, 26, 3462-3463. (Examples found in U.S. Patents 5,358,546 (1994) and 5,756,653 (1998))

## PUBLICATIONS

- 29- O'Brien, R.A., Chen, T., Rieke, R.D. "Chemical Modification of Halogenated Polystyrene Resins Utilizing Highly Reactive Calcium and the Formation of Calcium Cuprates in the Preparation of Highly Functionalized Polymers", *J. Org. Chem.* **1992**, *57*, 2667-2677. (Examples found in U.S. Patents 5,211,886 (1993); 5,211,889 (1993); 5,330,687 (1994); and 5,384,078 (1995))
- 30- O'Brien, R.A., Gupta, A., Rieke, R.D., Shoemaker, R.K. "Phosphorus-31 NMR Studies of Polymer-Supported, Highly Reactive Copper Reagents", *Mag. Reson. Chem.* **1992**, *30*, 398-402.
- 31- O'Brien, R.A., Chen, T., Rieke, R.D. "Functionalization of Halogenated Polystyrene Resins Utilizing Highly Reactive Calcium", *Inorg. and Organomet. Polym.* **1992**, *2(3)*, 345-356.
- 32- O'Brien, R.A., Worman, J.J., Olson, E.S. "Carbon Dioxide in Organic Synthesis: Preparation and Mechanism of Formation of N-(3)-Substituted Hydantoins", *Synth. Commun.* **1992**, *22(6)*, 823-828.
- 33- O'Brien, R.A., Rieke, R.D. "Direct Metalation of *p*-Bromopolystyrene Using Highly Reactive Copper and the Preparation of Highly Reactive Copper Bound to an Insoluble Polymer", *J. Org. Chem.* **1990**, *55*, 788-790.

## PATENTS

- 1- "Aqueous Suspensions Containing Polymerized Fatty Acid-Based Polyamides", Pavlin, M.S., O'Brien, R.A. U.S. Patent 6,864,349 B2 (2005).
- 2- "Aqueous Suspensions Containing Polymerized Fatty Acid-Based Polyamides", Pavlin, M.S., O'Brien, R.A. EP1453885 B1 (2009).
- 3- "Aqueous Suspensions Containing Polymerized Fatty Acid-Based Polyamides", Pavlin, M.S., O'Brien, R.A. WO/2003/050164 (2003).

## TECHNICAL DISCLOSURES

- 1- Gelled Compositions for Polymerizable Monomers (IPCOM000013107D)
- 2- Gelled Compositions for Solvent-based Coatings (IPCOM000013108D)
- 3- Gelled Compositions for Epoxy-based Systems (IPCOM000012463D)
- 4- Gelled Compositions as Waxes and Polishes (IPCOM000009045D)



## TECHNICAL DISCLOSURES

- 5- Gelled Fiber Reinforced Plastics and Gel Coats  
(IPCOM000007401D)

## FINAL REPORTS

- "Novel Reagents for N-NO<sub>2</sub> Scission", Chapman, R.D., O'Brien, R.A., Kondracki, P.A.  
WL-TR-1997-7010 for Contract FO8630-94-C-0011, U.S. Air Force.

## GRANTS

### **Not Funded**

- 1- West, K. N. (Principal), Davis, J. H. (Co-Principal), O'Brien, R. A. (Co-Principal), Shah, J. (Co-Principal), "SusChEM: Collaborative Research: A Collaborative Research: A Unified Experimental and Molecular Simulation Bottoms-Up Approach to the Rational Design of Lipidic Ionic Liquids for Sulfur Removal", Sponsored by NSF - CBET - IPT, Federal, \$304,980.00. (October, 2015 – March, 2016).
- 2- West, K. N. (Principal), Davis, J. H. (Co-Principal), O'Brien, R. A. (Co-Principal), "SusChEM: Collaborative Research: A Unified Experimental and Molecular Simulation Approach for Understanding Structure-Property Relationships and Solvation in Lipidic Ionic Liquids", Sponsored by NSF - CBET - IPT, Federal, \$305,804.00. (August, 2015 – March, 2015).

## PRESENTATIONS (Presenter or Co-author)

- 1- Garich, Holly, Hall, Tim, Inman, Maria, Taylor, E. Jennings, Peng, Thomas, Davis, James, Tench, Morgan, O'Brien, Richard, Reversible Electrochemical Mirror Devices using Room Temperature Ionic Liquid Electrolyte, presented at the 233rd ECS National Meeting (2018).
- 2- Davis, Jr., James H., West, Kevin N., Rabideau, Brooks, Sui, Benjamin, Soltani, Mohammad, Cassity, Cody, Vo, Matt, McCants, JaMichael, Salter, Edward A., O'Brien, Richard A., Wierzbicki, Andrzej, Stenson, Alexandra C., McGheehee, Jimmie, On the creation and chemistry of ionic liquids in air for months at 300 °C, presented at the 255th ACS National Meeting & Exposition (2018).
- 3- Siu, Benjamin, Cassity, Cody G., Badini, Alexander, Davis, Jr., James H., West, Kevin N., O'Brien, Richard A., Soltani, Mohammad, Thermally Stable Peraryl Phosphonium Ionic Liquids and Molten Salts: Thermodynamic and Thermophysical Properties, presented at the 18th Annual AIChE Meeting (2018).

## PRESENTATIONS (Presenter or Co-author)

- 4- He Nan, Cheng Zhang, Richard A. O'Brien, Adela Benchea, James H. Davis, Jr., Amrit Venkatesh, Aaron J. Rossini, Jared L. Anderson, Ionic liquid-based stationary phases for gas chromatographic separations, presented at the Minnesota Chromatography Forum (2018).
- 5- Kevin N. West, Benjamin Sui, James H. Davis Jr., Richard A. O'Brien, Cody G. Cassity, Alexander Badini, Mohammad Soltani. Thermally Robust Molten Salts & Ionic Liquids: Thermodynamics, Properties, and Phase Behavior, presented at the 17th Annual AIChE Meeting (2017).
- 6- West, K.N. Davis Jr., J.H., O'Brien, R.A., Sui, Cassity, Cody G. Thermal and Thermodynamic Properties of Ionic Liquids and Molten Salts with High Thermal Stability, presented at the 16th Annual AIChE Meeting (2016).
- 7- Mirjafari, A., O'Brien, R. A., Sykora, R., Sanchez Zayas, M., Sheng, Y. Drug-based lipidic ionic liquids: A new class of biomaterials presented at the 251st ACS National Meeting & Exposition (2016).
- 8- West, K.N., Green, B.D., O'Brien, R.A., Davis, Jr., J.H. Solubility and Volumetric Behavior of Binary Mixtures of Lipidic Ionic Liquids and Molecular Solutes, presented at the 15th Annual AIChE Meeting (2015).
- 9- West, C.W., O'Brien, R.A., Hollingsworth, B.E., Huynh, T., Sweat, R.E., Griffin, N.J. Impact of Sulfur Heteroatoms on the Activity of Quaternary Ammonium Salts As Phase Transfer Catalysts, presented at the 15th Annual AIChE Meeting (2015).
- 10- West, K.N., Green, B.D., O'Brien, R.A., Davis, Jr., J.H. Binary Phase Behavior of Lipidic Ionic Liquids, presented at the 14th Annual AIChE Meeting (2014).
- 11- Green, B.D., West, K.N., O'Brien, R.A., Davis, Jr., J.H. Solvent Properties of Lipidic Ionic Liquids, presented at the 14th Annual AIChE Meeting (2014).
- 12- Mirjafari, A., Braun, R.A., Lacy, J.N., O'Brien, R.A., Davis, Jr., J.H. Synthesis of bio- inspired organophosphorous functionalized ionic liquids via "click" radical addition, 247th ACS National Meeting & Exposition, Division of Industrial and Engineering Chemistry, Dallas, TX (2014).

## PRESENTATIONS (Presenter or Co-author)

- 13- Davis, J. H., Chen, L., Mullen, G. E., Le Roch, M., Cassity, C. G., Gouault, N., Fadamiro, H. Y., Barletta, R. E., O'Brien, R. A., Sykora, R. E., Stenson, A. C., West, K. N., Horne, H. H., Hendrich, J. M., Rui, K., Ionic Liquids, On the formation of a protic ionic liquid, Gordon Research Conference, (2014).
- 14- West, K.N., Davis, J.H., O'Brien, R.A., Langham, J. VLE of Lipidic Ionic Liquid Systems, presented at the 13th Annual AIChE Meeting (2013).
- 15- Griffin, N., O'Brien, R.A., Wheeler West, C., Extraction of Platinum Employing Novel Thiaalkylammonium Salts, presented at the University of South Alabama UCUR Symposium (2013).
- 16- O'Brien, R.A., Wheeler West, C., Hollingsworth, B.E., Mirjafari, A., Mobarrez, N., West, K.N., Davis, J.H., Synthesis of Novel Tetraalkylammonium Bromides and their Derivatives as a new class of Phase Transfer Catalysts, presented at the USA Faculty Development Forum (2013).
- 17- West, K.N., Davis, J.H., O'Brien, R.A., Zimlich, T.K., AL-Hashem, A., Langham, J.V., Understanding the Thermophysical & Solvent Properties of Lipidic Ionic Liquids, presented at the USA Graduate Research Symposium (2013).
- 18- West, K.N., Davis, J.H., McCabe, J.R., AL-Hashem, A., Zimlich, T.K., Mirjafari, A., O'Brien, R.A. Pure and Mixture Thermophysical Properties and Phase Behavior of Lipidic Ionic Liquids, presented at the 12th Annual AIChE Meeting (2012).
- 19- West, K.N., Murray, S.M., Mattson, K.M., O'Brien, R.A., Mirjafari, A., Davis, Jr., J.H. The Influence of Structural Variation on the Thermophysical Properties of Lipid-Inspired Ionic Liquids, presented at the 12th Annual AIChE Meeting (2012).
- 20- West, C.W., O'Brien, R.A., Davis, Jr., J.H., Mirjafari, A. Kinetic Evaluation of Novel Sulfur-Containing Quaternary Ammonium Salts as Phase Transfer Catalysts, presented at the 12th Annual AIChE Meeting (2012).
- 21- West, K. N., Murray, S. M., Thigpen, A. S., Zimlich, T. K., Mirjafari, A., O'Brien, R. A., Davis, J. H., Tuning the thermophysical properties of lipidic ionic liquids through structural variation, presented at the 243rd ACS National Meeting & Exposition (2012).

## POSTERS (Presenter or Co-author)

- 22- Mirjafari, A., Mobarrez, N., O'Brien, R.A., West, K.N. & Davis Jr., J.H. A strategy for the synthesis of 2-fatty acid- substituted imidazolium-based ionic liquids, presented at the 243rd ACS National Meeting & Exposition (2012).
- 23- West, K.N., Murray, S.M., Mattson, K.M., O'Brien, R.A., Mirjafari, A. & Davis Jr., J.H. The Influence of Structural Variation on the Thermophysical Properties of Lipid-Inspired Ionic Liquids, presented at the 11th Annual AIChE Meeting (2011).
- 24- Davis, Jr., J.H., O'Brien, R.A., Mirjafari, A., Murray, S.M., Mattson, K.M., Salter, E.A., West, K.N. & Wierzbicki, A. Lipid Inspired Ionic Liquids: Significant Progress in the Systematic Control of Structure Property Relationships in ILs with Long Alkyl Appendages, presented at the 4th Congress on Ionic Liquids (2011).
- 25- Davis, J.H., West, K.N., Mattson, K.M., MacDonald, J.L., O'Brien, R. Lipid inspired ionic liquids: Highly lipophilic ILs with low melting points, presented at the Pacificchem Conference (2010).
- 26- O'Brien, R. Understanding Clear Technologies for Candles: What are They? What's New? and What You Need to Know to Create Safe and Innovative Products, presented at the National Candle Association Meeting (2003).
- 27- Leon y Leon, C.A., O'Brien, R.A., McHugh, J.J., Dasarathy, H., Schimpf, W. Polyethylene and Polypropylene as Low Cost Carbon Fiber (LCCF) Precursors, presented at the 33rd International SAMPE Technical Conference (2001).
- 28- Leon y Leon, C., O'Brien, R., Dasarathy, H., McHugh, J., Schimpf, W. Development of Low Cost Carbon Fiber (LCCF) for Automotive and Non-Aerospace Applications, presented at the SAMPE-ACC-DOE-SPE Midwest Advanced Materials and Process Conference (2000).
- 29- O'Brien, R.A., Chen, T., Rieke, R.D. Chemical Modification of Halogenated Polystyrene Resins Utilizing Highly Reactive Calcium, presented at the 26th ACS Midwest Regional Meeting (1991).
- 30- Kevin N. West, Richard A. O'Brien, Katie J. Strickland, Cody A. Cassity, Adela Benchea, Matthew Vo, and James H. Davis, Jr. *Thermal Extremophiles: ILs that Have Superior High-Temperature Thermal Stability*, presented at the Gordon Research Conference (2016).

## POSTERS (Presenter or Co-author)

- 31- A. Mirjafari, R.A. O'Brien, M. Sanchez Zayas, S.T. Nestor, J.C. Gaitor, M.M. Reardon, and R.E. Sykora, *Biomimetic Strategy to Develop Ionic Liquids as Amphiphilic Self-Assembly Materials*, presented at the Gordon Research Conference (2016).
- 32- Braun, R.A., Bradfield, J.L, O'Brien, R.A., Davis, Jr., J.H., Mirjafari, A. *Synthesis of Bio-Inspired Organophosphorus Functionalized Ionic Liquids via "Click" Radical Addition*, presented at the Gordon Research Conference (2014).
- 33- Hollingsworth, B.E., West Christy W., O'Brien, R.A., Davis, J.H. *Novel quaternary ammonium salts as phase-transfer catalysts*, presented at the 245<sup>th</sup> ACS National Meeting & Exposition, Division of Industrial and Engineering Chemistry (2013).
- 34- O'Brien, R.A., Hamade, F.A., Mirjafari, A., West, K.N., & Davis, Jr., J.H. *Thiol-ene Chemistry with Vinylphosphonic Acids: A new strategy for the Synthesis of Substituted Phosphonic Acids and their Derivatives*, presented at the 20<sup>th</sup> Annual University of South Alabama Research Forum (2013).
- 35- O'Brien, R.A., Wheeler-West, C., Hollingsworth, B.E., Mirjafari, A., Mobarrez, N., West, K.N., & Davis, Jr. J.H. *Synthesis of Novel Tetraalkylammonium Bromides and their Derivatives as a new class of Phase Transfer Catalysts*, presented at the 20<sup>th</sup> Annual University of South Alabama Research Forum (2013).
- 36- Griffin, N., Wheeler-West, C., O'Brien, R.A. *Extraction of Platinum Employing Novel Thiaalkylammonium Salts*, presented at the University of South Alabama UCUR Symposium (2013).
- 37- Sweat, R., Wheeler-West, C., O'Brien, R.A. *Sulfur-Containing Quaternary Ammonium Salts as Phase Transfer Catalysts.*, presented at the University of South Alabama UCUR Symposium (2013).
- 38- O'Brien, R.A., Mirjafari, A., Mobarrez, N., Murray, S.M., Salter, E.A., Weirzbicki, A., West, K.N., Davis, Jr., J.H. *Sulfur as an unsaturation 'effect isotere' in lipidic materials: Tm lowering in lipid-inspired ionic liquids and fatty acids*, presented at the 19<sup>th</sup> Annual University of South Alabama Research Forum (2012).
- 39- Mirjafari, A., O'Brien, R.A., Mobarrez, M., Murray, S.M., Thigpen, A.S., West, K.N., Davis, Jr., J.H. *Thiol-ene "click" reactions as an efficient approach to synthesize structurally diverse pyridinium-based ionic liquids*, presented at the 19<sup>th</sup> Annual University of South Alabama Research Forum (2012).

## POSTERS (Presenter or Co-author)

- 40- Mobarrez, N., Mirjafari, A., O'Brien, R.A., West, K.N., Davis, Jr., J.H. *Thiol-ene coupling reactions as a green protocol to synthesize structurally diverse ionic liquids*, presented at the 19<sup>th</sup> Annual University of South Alabama Research Forum (2012).
- 41- West, K.N., Murray, S.M., Thigpen, A.S., Zimlich, T.K., Mirjafari, A., O'Brien, R. A., Davis Jr., J.H. *Tuning the thermophysical properties of lipidic ionic liquids through structural variation*, presented at the 243<sup>rd</sup> ACS National Meeting & Exposition, Division of Industrial and Engineering Chemistry (2012).
- 42- Mirjafari, A., Murray, S.M., O'Brien, R.A., West, K.N., Davis, Jr., J.H. *Cationic lipids (transfection) as design tutors: insights into structure-property relationships in lipidic ionic liquids*, presented at the 243<sup>rd</sup> ACS National Meeting & Exposition, Division of Industrial and Engineering Chemistry (2012).
- 43- Mirjafari, A., Reynold, R., Mobarrez, N., O'Brien, R.A., West, K.N., Davis, Jr., J.H. *Functionalized sucrose esters of fatty acids: Synthesis of novel bio-based compounds using SEFOSE® by oxymercuration-demercuration reactions*, presented at the 243<sup>rd</sup> ACS National Meeting & Exposition, Division of Cellulose and Renewable Materials (CELL) and Sci-Mix (2012).
- 44- Mirjafari, A., O'Brien, R.A., Murray, S.M., Thigpen, A.S., West, K.N., Davis, Jr., J.H. *Thiol-ene click reactions as an efficient approach to synthesize structurally diverse pyridinium-based ionic liquids*, presented at the 243<sup>rd</sup> ACS National Meeting & Exposition, Division of Industrial and Engineering Chemistry (2012).
- 45- O'Brien, R.A., Mirjafari, A., Mattson, K.M., Murray, S.M., West, K.N., Davis, Jr., J.H. *Sulfur as an unsaturation 'effect isostere' in lipidic materials: T<sub>m</sub> lowering in lipid-inspired ionic liquids and fatty acids*, presented at the 243<sup>rd</sup> ACS National Meeting & Exposition , Division of Industrial and Engineering Chemistry (2012).
- 46- O'Brien, R.A., Mattson, K.M., Mirjafari, A., Murray, S.M., West, K.N., Davis, Jr., J.H., *Preparation of Lipid-Inspired Ionic Liquids via Thiol-ene Reaction and the Study of the Sulfur Position in a C<sub>18</sub> Alkyl Appendage on the Melting Points*, presented at the 4<sup>th</sup> Congress of Ionic Liquids (2011).
- 47- Murray, S.M., Mirajafari, A., O'Brien, R.A., West, K.N., Davis, Jr., J.H. *Thermophysical Characterization of Novel Lipid-Inspired Ionic Liquids*, presented at the 4<sup>th</sup> Congress of Ionic Liquids (2011).

## POSTERS (Presenter or Co-author)

- 48- Mirjafari, A., O'Brien, R.A., Murray, S.M., West, K.N., Davis, Jr., J.H. *Thiol-ene Coupling Reaction of an Oleyl-based Precursor: Synthesis of Novel Lipid-inspired Ionic Liquids*, presented at the 4<sup>th</sup> Congress of Ionic Liquids (2011).
- 49- O'Brien, R.A., West, K.N., Davis, Jr., J.H. *Functionalized Ionic Liquids with Highly Polar Polyhydroxylated Appendages and their Rapid Synthesis via Thiol-ene Click Chemistry*, presented at the 4<sup>th</sup> Congress of Ionic Liquids (2011).
- 50- O'Brien, R.A., Mattson, K.M., Mirjafari, A., Murray, S.M., West, K.N., Davis, Jr., J.H. *Synthesis of Lipidlike Ionic Liquids with Diverse Appendages via the Thiol-ene Reaction*, presented at the 4<sup>th</sup> Congress of Ionic Liquids (2011).
- 51- O'Brien, R.A., Mattson, K.M., McDonald, L., Mirjafari, A., Murray, S.M., West, K.N., Davis, Jr., J.H. *Thiol-ene Coupling Reactions as a Method to Prepare Functionalized Ionic Liquids*, presented at the 4<sup>th</sup> Congress of Ionic Liquids (2011).
- 52- Mirjafari, A., O'Brien, R.A., Murray, S.M., West, K.N., Davis, Jr., J.H. *Thiol-ene Coupling Reactions as a Tool to Prepare Structurally Diverse Ionic Liquids*, presented at the 4<sup>th</sup> Congress of Ionic Liquids (2011).
- 53- Davis, Jr., J.H., O'Brien, R.A., Mirjafari, A., Mattson, K.M., Murray, S.M., Salter, A., West, K.N., Wierzbicki, A. *Lipid-inspired ionic liquids: significant progress in systematic control of structure-property relationships in ILs with long alkyl appendages*, presented at the 4<sup>th</sup> Congress of Ionic Liquids (2011).
- 54- Mirjafari, A., O'Brien, R.A., Murray, S.M., West, K.N., Davis, Jr., J.H. *Transformation of DOTMA and DOTAP Liposomes into Lipid-based Ionic Liquids*, presented at the 4<sup>th</sup> Congress of Ionic Liquids (2011).
- 55- O'Brien, R.A., West, K.N., Davis, Jr., J.H. *Functionalized Ionic Liquids with Highly Polar Polyhydroxylated Appendages and their Rapid Synthesis via Thiol-ene Click Chemistry*, presented at the 18<sup>th</sup> Annual University of South Alabama Research Forum (2011).
- 56- Murray, S.M., Mattson, K.M., O'Brien, R.A., West, K.N., Davis, Jr., J.H. *Synthesis and Characterization of Lipid-Inspired Ionic Liquids*, presented at the 18<sup>th</sup> Annual University of South Alabama Research Forum (2011).
- 57- Davis, Jr., J.H., O'Brien, R.A., Mattson, K.M., Gaines, K., Plash, B.B., Wierzbicki, A., Salter, E.A. *New Bronsted Acidic TSILs. From Computation-guided Design to Synthesis and Properties*, presented at the 236<sup>th</sup> ACS National Meeting & Exposition (2008).

## POSTERS (Presenter or Co-author)

- 58- Davis, Jr., J.H., O'Brien, R.A., Gaines, K., Mattson, K.M. *New Amine Functionalized Ionic Liquids for Multimode Gas Capture*, presented at the 236<sup>th</sup> ACS National Meeting & Exposition (2008).
- 59- Gaines, K., Davis, Jr., J.H., O'Brien, R.A., Mattson, K.M. *Designed to Decompose: Task-specific Ionic Liquids Incorporating N-Acylium and N-Sulfonylium Cations*, presented at the 236<sup>th</sup> ACS National Meeting & Exposition (2008).
- 60- Mattson, K.M., Davis, Jr., J.H., O'Brien, R.A., Gaines, K. *Task-specific Ionic Liquids (TSILs) Based on Heterocyclic Cations with Directly Ring-attached Aldehyde and Benzoyl Groups: Hydrate and Acetal Formation*, presented at the 236<sup>th</sup> ACS National Meeting & Exposition (2008).

## SERVICE

### 1- Department of Chemistry Service

Committee Chair, General Ed Sub Committee. (August, 2013 - Present).  
Committee Member, Search Committee for one-year, non-tenure track Instructor/Assistant Professor position. (May-June, 2017, 2018)  
Coordinator: Instrumentation. (August, 2012 - Present).

### 2- College of Arts & Sciences and the University of South Alabama Service

Committee Member, Undergraduate Scholarship Committee. (August, 2015 – present).  
Committee Member, Scientific Reasoning Subcommittee of the General Education Committee. (March, 2018 – present).