

ANDREW JOHN GUENTHNER

Undergraduate Education:

Case Western Reserve University

Department of Chemical Engineering (1990-1995, except Co-op dates)

Degree Received: B. S. Chemical Engineering, May 1995

Grade Point Average: 3.97 / 4.0

Specialization: Polymer Chemical Engineering

Graduate Education:

The University of Akron

Department of Polymer Engineering 1996 - 2000

Degree Received: Ph. D., Polymer Engineering, August 2000

Research Advisor, Dr. Thein Kyu

Dissertation Topic: "Evaporation-Induced Solidification and Morphology
Development in Polymer Fibers and Films"

Grade Point Average: 3.99 / 4.0

Specializations: Rheology of polymers, polymer colloids, liquid crystalline
polymers, polymer surfaces and interphases, adhesives and adhesive joint
design, filled polymer coatings

Other Research Experience:

Owens-Corning Science and Technology Center

Position: Co-operative education student, 1992-95

Supervisors: Dr. Anthony Maurer, Dr. David Dwight

Topics Investigated: paste transport in sheet molding compound fiber mats, glass
fiber / thermoplastic matrix adhesion indicator tests, glass fiber surface
chemistry, role of solvent evaporation in glass fiber production

Naval Air Warfare Center, Weapons Division

Position: Materials Engineer, 2000 – 2005

Supervisor: Dr. Geoffrey Lindsay

Topics Investigated: film formation in polymers for optical and electrical
applications, integrated optical waveguides, membranes for batteries and
fuel cells, RF-to-optical devices, corrosion prevention, and fouling release.

Position: Head, Polymer Science and Engineering Branch, 2005 – 2009

Supervisors: Dr. Lawrence Merwin, Dr. Stephen Fallis

Duties and research: Team leader / supervisor for up to 9 full-time and 3-10
student / trainee chemists and chemical/materials engineers; research in
high-temperature polymer composite resins, thermal analysis of energetic
materials, electro-optical polymer materials; rapid prototyping / flexible
manufacturing, and self-assembled multifunctional materials

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Position: Lead, NAWCWD Power Sources Science and Technology Initiative, 2008 -- 2009: management of a seed grant program for development of new DoD-relevant concepts in portable power generation and storage

Air Force Research Laboratory, Aerospace Systems Directorate (Polymer Working Group)

Position: Senior Chemical Engineer, 2009-2015

Principal Chemical Engineer & Lead, Applied Materials Group, 2016 - 17

Supervisors: Maj. Alton Dugas (2009-10), Maj. Veasna Pel (2010-12), Maj. Dr. Hope Klukovich (2012-2015), Mr. Timothy McKelvey, 2015-2018

Group Lead: Dr. Joseph M. Mabry, 2009-2015

Research Topics: Nanoscale reinforcement via self-assembly, high performance composite resins, multi-functional nanocomposites, superhydrophobic/oleophobic fabrics and coatings, surface and interface science, solubility and wetting parameters, fuel treatment and re-refining, propellant binders and inert ingredients, modeling and simulation of polymeric networks

Position: Propellants Branch Technical Advisor, 2017 – 2018

Supervisor: Mr. Timothy McKelvey, 2017 – 2018

Job Duties and Research: Oversee \$2M+/yr “Propellants Technical Base” applied research program + technical oversight of ~25 civilian/military and 35 on-site contractor workforce. Train and develop cadre of Principal Investigators and Group Leaders within the 60-member Propellants Branch. Create, implement, and monitor a 10-yr research strategy for the Propellants Branch. Develop accountability, productivity, and alignment metrics and project assessment framework, work with Rocket Propulsion Division to steer projects and resources in accordance with strategy and assessments. Establish pioneering research projects and collaboration to mitigate capability gaps.

Research topics: Machine learning / artificial intelligence / quantitative structure-property models of solid and liquid energetic materials; rapid and flexible manufacturing and production technologies for chemical ingredients

Nanohydrophobics, Inc.

Position: Chief Technology Officer, 2018 - present

Supervisor: Mr. Peter Boyd, Chief Executive Officer, 2018 - present

Job Duties and Research: Responsible for all aspects of technology development, business strategy development, commercialization, and marketing. Responsible for creation and execution of company technology and product development strategy. Fund-raising and business development for pre-commercial start-up company via venture capital pitches, corporate joint development agreement proposals, proposals to government agencies, and national laboratory facility user proposals. Oversight of company day-to-day operations, testing and sampling, research and development,

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manufacturing, and engineering. Creation of marketing and technology documentation. Creation and submission of regulatory documents. Oversee 1-2 technical personnel.

Research topics: Low surface energy coatings; self-assembled and self-repairing materials; capital efficient production processes; heat and mass transport in nanostructured materials

Examples of Research Projects Successfully Initiated

Toughening High-Temperature Thermosets: (\$300k, funded by ONR ILIR, 2003-2006) Program Goal: Investigate new materials and processes for producing thermoplastic toughened cyanate ester resins with reduced moisture uptake. Individual Effort: Led program, identified one new cyanate ester resin and one new toughener that result in 20-50% less water uptake with no loss in mechanical or thermal properties. Resulted in two peer-reviewed publications, two conference papers, and one patent.

Affordable High-Temperature Composite Resins (\$575k, funded by ONR IAR, 2006-2009): Program Goal: Develop polyphenylene resin formulations with mechanical and thermal properties similar to polyimides at 70-90% lower cost, 85% less moisture absorption, and compatibility with simplified processing operations. Individual Effort: Led program, 2007-2009, worked with industrial collaborators to develop specific processing protocols for production of composite flat panels and filament wound tubes; USAF investigated the new formulations for use in solid rocket motors. One book chapter, two conference papers, and four (restricted) invention disclosures filed.

Bio-based High-Temperature Composite Resins (\$150k, SEED funded by SERDP, 2009-11, ~\$1.3M, 2012-16, \$450k ESTCP funded 2017). Program Goal: Demonstrate feasibility of cyanate ester resins derived from non-petroleum sources as replacements for cyanate esters derived from petroleum. Individual Effort: Proposed and initiated program at NAWCWD. Program leadership at NAWCWD passed to Dr. Benjamin Harvey upon transfer to AFRL. At AFRL, led characterization efforts that identified multiple candidate materials and proved feasibility, established that bio-based materials have an intrinsically greater performance envelope compared to petroleum-derived substances. Jointly proposed full program with NAWCWD. Full program was funded by SERDP with Dr. Harvey as PI. Proposed ESTCP follow-on in 2016, funded for FY17. Received SERDP Project of the Year Award in 2016. Co-authored 12 peer-reviewed journal articles, 1 book chapter, 2 conference papers, and 1 patent.

Affordable Fuel Supplies through Innovative Processing (PI: Dr. Joseph Mabry; \$720k, funded by AFRL Research Council, 2012-2013, follow-on \$2.4M 2014-16). Supplemented by \$265k DLA funding in 2018. Program Goal: Demonstrate ability to upgrade lower cost fuel supplies to meet performance requirements of higher cost fuels through simple membrane-based re-refining. Individual Effort: Proposed and initiated program with Dr. Joseph Mabry, developed systematic approach for prediction of re-

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refining performance, designed and oversaw construction of prototype re-refining devices, successfully removed undesirable components from lower cost fuels, and supplied re-refined fuels for performance testing. Program transitioned to AFRL Field Support program, 2016, and Air Force Life Cycle Management Center, 2018. Received the AFRL Aerospace Systems Directorate S&T Management of the Year Award in 2017 for this project, which was described as a “game changer” for a Global Combat Command customer. Work resulted in two patents (1 issued, 1 application). 2 patents licensed for commercialization.

Natural Alternatives to Isocyanate Cure for Propellant Binders (\$150k, SEED funded by SERDP, 2013-14, funded as full \$1.5M program for FY18-20). Program Goal: Investigate naturally-occurring chemical solidification processes in modified polybutadiene-based propellant binders as alternatives to isocyanate cure. Individual effort: Proposed and initiated program, principal investigator overseeing technical and administrative activities. Resulted in two patent disclosures (1 application filed, 1 in process).

Molten-Salt Infused Surfaces for High-Temperature Applications (\$630k, funded by AFOSR, 2016-18). Program Goal: Develop liquid-infused surfaces that survive elevated temperature and provide unique momentum, mass, and heat transport characteristics for rocket propulsion. Individual effort: Proposed and initiated program, principal investigator overseeing technical and administrative activities, joint PI with Dr. Marcus Young (AFRL Spacecraft Branch) in FY17-18, mentored Dr. Kamran Ghiassi as replacement technical PI. Created new technology for controlling fluid displacement by fuels, oils, and greases. 1 journal article published + 1 invention disclosure.

Functionalized Boron Nitride Nanotube Composites (\$450k, funded by AFOSR, 2017-19). Program Goal: Develop methods to functionalize boron nitride surfaces in order to form boron nitride nanotubes into strong, heat-resistant structures. Individual effort: Proposed and initiated program, principal investigator overseeing technical and administrative activities. New purification method for boron nitride nanotubes developed, and new functionalization method identified.

Fouling-release Surfaces for Heat Exchangers (\$1.3M invested to date through California Energy Commission and National Science Foundation grants, individual contributions, and corporate research contributions). Program Goal: Create an ultra-thin, durable, fouling-resistant surface for heat exchangers. Individual effort: Served as the Air Force key point of contact from 2012-2018, executed Air Force portion of two cooperative research efforts, initial concept development and creation of two commercial product concepts. Transitioned to Nano Hydrophobics in 2018. Successfully initiated two new proposals at Lawrence Berkeley National Laboratory Molecular Foundry. Work

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resulted in 2 patent families (1 issued in US; 2 applications in US; 1 international application)

In total, about \$12M has been awarded since 2000 to programs successfully proposed and initiated principally by me.

Other Specialized Skills and Abilities

- Unique combination of subject matter expertise unmatched in the world:
 - Surface science and coatings (polymers, metals, and ceramics)
 - Self-assembly and crystal growth
 - Physics and chemistry of nanostructured chemicals
 - High-temperature polymers
 - High-performance bio-based polymers
 - Self-repairing materials
 - Modeling and simulation of complex materials
- Consulting: consultant for numerous weapons, spacecraft and UAS programs on adhesive performance, elastomer performance, insulation performance, thermal modeling, and coatings performance, and have participated in failure analysis and incident response involving plastics, rubbers, and propellants.

Peer-Reviewed Journal Articles

1. Wang, X. Y.; Guenther, A. J. "Scaling Parameter And Periodic Phase In Liquid Crystals" *Physical Review Letters*, 82, 4252-4255 (1999).
2. Kyu, T.; Chiu, H.-W.; Guenther, A. J.; Okabe, Y.; Saito, H.; Inoue, T. "Rhythmic Growth Of Target And Spiral Spherulites Of Crystalline Polymer Blends" *Physical Review Letters*, 83, 2749-2752 (1999).
3. Guenther, A. J.; Kyu, T. "Formation of Banded Textures in Liquid Crystalline Polymers with Extended Curvature Elasticity" *Macromolecules*, 33, 4463-4471 (2000).
4. Guenther, A. J.; Kyu, T. "Excluded Volume Theory of Rigid Plates in Solution Using Continuous Orientation Distributions" *Journal of Polymer Science, Part B: Polymer Physics*, 38, 2366-2377 (2000).
5. P. Zarras, N. Anderson, C. Webber, D. J. Irvin, J. A. Irvin, A. Guenther and J. D. Stenger-Smith, "Progress in Using Conductive Polymers as Corrosion Inhibiting Coatings", *Radiation Physics and Chemistry*, 68, 387-394 (2003).

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6. Mehta, R.; Keawwattana, W.; Guenther, A. J.; Kyu, T. "Role of curvature elasticity in sectorization and ripple formation during g melt crystallization of polymer single crystals", *Physical Review E*, 69, 061802 (2004).
7. Watson, M. D.; Ashley, P. R.; Guenther, A. J.; Abushagur, M. A. G. "Modeling of Electro Optic Polymer Electrical Characteristics in a 3 layer Optical Modulator", *IEEE Journal of Quantum Electronics*, 41, 588-595 (2005).
8. Wright, M. E.; Fallis, S.; Guenther, A. J.; Baldwin, L. C. "Synthesis of hydroxymethyl-functionalized polyimides and the facile attachment of an organic dye utilizing bis(isocyanates) and bis(acid chloride) linkers", *Macromolecules*, 38, 1001410021 (2005).
9. Guenther, A. J.; Khombhongse, S.; Liu, W.; Dayal, P.; Reneker, D. H.; Kyu, T. "Dynamics of Hollow Nanofiber Formation during Solidification Subjected to Solvent Evaporation", *Macromolecular Theory and Simulations*, 15, 87-93 (2006).
10. Lindsay, G. A.; Ashley, P. R.; Sanghadasa, M.; Davis, M. C.; Guenther, A. J.; Wright, M. E. "New Photonic and Electronic Polymers", *Materials Science and Engineering. B*, 132, 8-11 (2006).
11. Wright, M. E.; Petteys, B. J.; Guenther, A. J.; Fallis, S.; Yandek, G. R.; Tomczak, S. J.; Minton, T. K.; Brunsvold, A. "Chemical Modification of Fluorinated Polyimides: New Thermally Curing Hybrid-Polymers with POSS", *Macromolecules*, 39, 47104718 (2006).
12. Sanghadasa, M.; Ashley, P. R.; Webster, E.; Cocke, C. R.; Lindsay, G. A.; Guenther, A. J. "A Simplified Technique for Efficient Fiber-Polymer Waveguide Power Coupling Using Customized Cladding with Tunable Index of Refraction" *IEEE Journal of Lightwave Technology*., 24, 3816-3823 (2006).
13. Guenther, A. J.; Yandek, G. R.; Wright, M. E.; Petteys, B. J.; Quintana, R.; Connor, D.; Gilardi, R. D.; Marchant, D. "A New Silicon-Containing Bis(Cyanate Ester) Resin with Improved Thermal Oxidation and Moisture Resistance", *Macromolecules* 39, 6046-6053 (2006).
14. Dayal, P.; Guenther, A. J.; Kyu, T. "Morphology development of main-chain liquid crystalline polymer fibers during solvent evaporation," *Journal of Polymer Science Part B: Polymer Physics*, 45, 429-435, (2007).
15. Turri, G.; Chen, Y.; Bass, M.; Orchard, D.; Butler, J. E.; Magana, S.; Feygelson, T.;

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- Thiel, D.; Fourspring, K.; Dewees, R. V.; Bennett, J. M.; Pentony, J.; Hawkins, S.; Baronowski, M.; Guenther, A.; Seltzer, M. D.; Harris, D. C. "Optical Absorption, Depolarization, and Scatter of Epitaxial Single-Crystal Chemical-Vapor-Deposited Diamond at 1.064 microns", *Optical Engineering*, 46, Article 064002 (2007).
16. Wright, M. E.; Petteys, B. J.; Guenther, A. J.; Yandek, G. R.; Baldwin, L. C.; Jones, C.; Roberts, M. J. "Synthesis and Chemistry of a Monotethered-POSS Bis(Cyanate Ester): Thermal Curing of Micellar Aggregates Leads to Discrete Nanoparticles", *Macromolecules*, 40, 3891-3894 (2007).
17. Lindsay, G. A.; Guenther, A. J.; Wright, M. E.; Sanghadasa, M.; Ashley, P. R. "Long-Term Alignment Stability of CLD and FTC Chromophores in Polycarbonate and Polyimide Poled Glassy Films at Elevated Temperatures", *Polymer*, 48, 66066616 (2007).
18. Roberts, M. J.; Guenther, A.; Feng, S. "Evidence for Non-diffractive Propagation of Light through Multilayer Metallodielectric Materials", *Optics Express*, 15, 1199912004 (2007).
19. Guenther, A. J.; Hess, D. M.; Cash, J. J. "Morphology Development in Photopolymerization-Induced Phase Separated Mixtures of UV-Curable Thiol-ene Adhesive and Low Molecular Weight Solvents", *Polymer* 49, 5533-5540 (2008).
20. Sanghadasa, M.; Ashley, P. R.; Guenther, A. J.; Lindsay, G. A.; Bramson, M. D. "Design and Demonstration of Polarizing Polymer Waveguides using Birefringent Polymers", *IEEE Journal of Lightwave Technology*, 27, 4667-4677 (2009).
21. Guenther, A. J.; Hess, D. M.; Cash, J. J. "Dimensional Stability of Sparse Network Microstructures Formed via Photopolymerization-Induced Phase Separation", *Journal of Polymer Science, Part B: Polymer Physics*, 48, 396-410 (2010).
22. Stenger-Smith, J. D.; Guenther, A. J.; Cash, J. J.; Irvin, J. A.; Irvin, D. J. "Poly(Propylenedioxy)Thiophene Based Supercapacitors Operating at Low Temperatures" *Journal of the Electrochemical Society*, 157, A298-A304 (2010).
23. Cambrea, L. R.; Davis, M. C.; Groshens, T. J.; Guenther, A. J.; Lamison, K. R.; Mabry J. M. "A new room-temperature liquid, high-performance tricyanate ester", *Journal of Polymer Science, Part A: Polymer Chemistry*, 48, 4547-4554 (2010).
24. Campos, R.; Guenther, A. J.; Haddad, T. S.; Mabry, J. M. "Fluoroalkyl-functionalized Silica Particles: Synthesis, Characterization, and Wetting Characteristics", *Langmuir*, 27, 10206-10215 (2011).

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25. Guenther, A. J.; Davis, M. C.; Lamison, K. R.; Yandek, G. R.; Cambrea, L. R.; Groshens, T. J.; Baldwin, L. C.; Mabry, J. M. "Synthesis, Cure Kinetics, and Physical Properties of a New Tricyanate Ester with Enhanced Molecular Flexibility", *Polymer*, 52, 3933-3942 (2011).
26. Guenther, A. J.; Lamison, K. R.; Vij, V.; Reams, J. T.; Yandek, G. R.; Mabry, J. M. "New Insights into Structure-Property Relationships in Thermosetting Polymers from Studies of Co-Cured Polycyanurate Networks", *Macromolecules*, 45, 211-220 (2012).
27. Marquez, S. A.; Shen, L.; Brunsvold, A. L.; Cooper, R.; Zhang, J.; Minton, T. K.; Tomczak, S. J.; Vij, V.; Wright, M. E.; Guenther, A. J.; Petteys, B. J. "Atomic Oxygen Effects on POSS Polyimides in Low Earth Orbit", *ACS Applied Materials & Interfaces*, 4, 492-502 (2012).
28. Reams, J. T.; Guenther, A. J.; Lamison, K. R.; Vij, V.; Lubin, L. M.; Mabry, J. M. "Effect of Chemical Structure and Network Formation on Physical Properties of Di(Cyanate Ester) Thermosets", *ACS Applied Materials & Interfaces*, 4, 527-535 (2012).
29. Campos, R.; Guenther, A. J.; Meuler, A. J.; Tuteja, A.; Cohen, R. E.; McKinley, G. H.; Haddad, T. S.; Mabry, J. M. "Superoleophobic surfaces through control of stochastic sprayed-on topography", *Langmuir*, 28, 9834-9841 (2012).
30. Guenther, A. J.; Lamison, K. R.; Lubin, L. M.; Haddad, T. S.; Mabry, J. M. "Hansen Solubility Parameters for Octahedral Oligomeric Silsesquioxanes" *Industrial & Engineering Chemistry Research*, 51, 12282-12293 (2012).
31. Davis, M. C.; Groshens, T. J.; Guenther, A. J.; Reams, J. T.; Mabry, J. M. "Polycyanurate Networks from Anethole Dimers: Synthesis and Characterization" *Journal of Polymer Science Part A: Polymer Chemistry*, 50, 4127-4136 (2012).
32. Lamison, K. R.; Guenther, A. J.; Mabry, J. M. "Water Breakthrough Pressure of Cotton Fabrics Treated with Fluorinated Silsesquioxane / Fluoroelastomer Coatings" *Applied Surface Science*, 258, 10205-10208 (2012).
33. Guenther, A. J.; Davis, M. C.; Ford, M. D.; Reams, J. T.; Groshens, T. J.; Baldwin, L. C.; Lubin, L. M.; Mabry, J. M. "Polycyanurate Networks with Enhanced Segmental Flexibility and Outstanding Thermochemical Stability", *Macromolecules*, 45, 9707-9718 (2012).
34. Meylemans, H.; Harvey, B. G.; Reams, J. T.; Guenther, A. J.; Cambrea, L. R.;

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- Groshens, T. J.; Baldwin, L. C.; Garrison, M.; Mabry, J. M. "Synthesis, Characterization, and Cure Chemistry of Renewable Bis(Cyanate) Esters Derived from 2-Methoxy-4-Methylphenol" *Biomacromolecules*, 14, 771-780 (2013).
35. Cash, J. J.; Davis, M. C.; Ford, M. D.; Groshens, T. J.; Guenther, A. J.; Harvey, B. G.; Lamison, K. R.; Mabry, J. M.; Meylemans, H. A.; Reams, J. T.; Sahagun, C. M. "High Tg thermosetting resin from resveratrol" *Polymer Chemistry*, 4, 3859-3865 (2013).
36. Guenther, A. J.; Reams, J. T.; Lamison, K. R.; Ramirez, S. M.; Swanson, D. D.; Yandek, G. R.; Sahagun, C. M.; Davis, M. C.; Mabry, J. M. "Synergistic Physical Properties of Co-Cured Networks Formed from Di- and Tri-cyanate Esters" *ACS Applied Materials & Interfaces*, 5, 8772-8783 (2013).
37. Hubbard, J. W.; Orange, F.; Guinel, M. J.-F.; Guenther, A. J.; Mabry, J. M.; Sahagun, C. M.; Rinaldi, C. "Curing of a Bisphenol-E Based Cyanate Ester using Magnetic Nanoparticles as an Internal Heat Source through Induction Heating" *ACS Applied Materials & Interfaces*, 5, 11329-11335 (2013).
38. Davis, M. C.; Guenther, A. J.; Sahagun, C. M.; Lamison, K. R.; Reams, J. T.; Mabry, J. M. "Polycyanurate Networks from Dehydroanethole Cyclotrimers: Synthesis and Characterization" *Polymer*, 54, 6902-6909 (2013).
39. Corley, C. A.; Guenther, A. J.; Sahagun, C. M.; Lamison, K. R.; Reams, J. T.; Hassan, M. K.; Morgan, S. E.; Iacono, S. T.; Mabry, J. M. "Di(cyanate Ester) Networks Based on Alternative Fluorinated Bisphenols with Extremely Low Water Uptake" *ACS Macro Letters*, 3, 105-109 (2014).
40. Guenther, A. J.; Vij, V.; Haddad, T. S.; Reams, J. T.; Lamison, K. R.; Sahagun, C. M.; Ramirez, S. M.; Yandek, G. R.; Suri, S. C.; Mabry, J. M. "Silicon-Containing Tri- and Tetra-Functional Cyanate Esters: Synthesis, Cure Kinetics, and Network Properties" *Journal of Polymer Science, Part A: Polymer Chemistry*, 52, 767-779 (2014).
41. Harvey, B. G.; Sahagun, C. M.; Guenther, A. J.; Groshens, T. J.; Cambrea, L. R.; Reams, J. T.; Mabry, J. M. "A High-Performance Renewable Thermosetting Resin Derived from Eugenol" *ChemSusChem*, 7, 1964-1969 (2014).
42. Reams, J. T.; Guenther, A. J.; Lamison, K. R.; Yandek, G. R.; Swanson, D. D.; Mabry, J. M. "Formulation and Physical Properties of Cyanate Ester Nanocomposites Based on Graphene" *Journal of Polymer Science, Part B: Polymer Physics*, 52, 1061-1070 (2014).

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43. Harvey, B. G.; Guenther, A. J.; Yandek, G. R.; Cambrea, L. R.; Meylemans, H. A.; Baldwin, L. C.; Reams, J. T. "Synthesis and Characterization of a Renewable Cyanate Ester/Polycarbonate Network Derived from Eugenol" *Polymer*, 55, 5073-5079 (2014).
44. Guenther, A. J.; Wright, M. E.; Chafin, A. P.; Reams, J. T.; Lamison, K. R.; Ford, M. D.; Kirby, S. P. J.; Zavala, J. J.; Mabry, J. M. "Mechanisms of Decreased Moisture Uptake in ortho-Methylated Di(Cyanate Ester) Networks" *Macromolecules*, 47, 7691-7700 (2014).
45. Harvey, B. G.; Guenther, A. J.; Meylemans, H. A.; Haines, S. R. L.; Lamison, K. R.; Groshens, T. J.; Cambrea, L. R.; Davis, M. C.; Lai, W. W. "High Temperature Resins and Polymers from Vanillin" *Green Chemistry*, 17, 1249-1258 (2015).
46. Harvey, B. G.; Guenther, A. J.; Lai, W. W.; Meylemans, H. A.; Davis, M. C.; Cambrea, L. R.; Reams, J. T.; Lamison, K. R. "Synthesis and Characterization of High Performance Thermosetting Resins Derived from Renewable Phenols: The Effects of o-Methoxy Groups on the Properties and Thermal Stability of Cyanate Ester Resins" *Macromolecules*, 48, 3173-3179 (2015).
47. Harvey, B. G.; Guenther, A. J.; Koontz, T. A.; Storch, P. J.; Reams, J. T.; Groshens, T. J. "Sustainable Hydrophobic Thermosetting Resins and Polycarbonates from Turpentine" *Green Chemistry*, 18, 2416-2423 (2016).
48. Guenther, A. J.; Ramirez S. M.; Ford, M. D.; Soto, D.; Boatz, J. A.; Ghiassi, K. B.; Mabry, J. M. "Organic Crystal Engineering of Thermosetting Cyanate Ester Monomers: Influence of Structure on Melting Point", *Crystal Growth & Design*, 16, 4082-4093 (2016).
49. Guenther, A. J.; Sahagun, C. M.; Lamison, K. R.; Reams, J. T.; Haddad, T. S.; Mabry, J. M. "Effect of Nanoparticle Functionalization on the Performance of Polycyanurate / Silica Nanocomposites" *Industrial Engineering & Chemistry Research*, 55, 7096-7107 (2016).
50. Jennings, A.; Morey, A.; Guenther, A.; Iacono, S. "Synthesis and Characterization of Siloxane-based Cyanate Ester Elastomers from Readily Available Materials" *Polymer International*, 66, 540-547 (2017).
51. Guenther, A. J.; Harvey, B. G.; Chafin, A. P.; Davis, M. C.; Zavala, J. J.; Lamison, K. R.; Reams, J. T.; Ghiassi, K. B.; Mabry, J. M. "Effect of Segmental Configuration

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- on Properties of n-Propyl-Bridged Polycyanurate Networks” *Macromolecules*, 50, 4887-4896 (2017).
52. Ghiassi, K. B.; Guenther, A. J.; Redeker, N. D.; Boatz, J. A.; Harvey, B. G.; Davis, M. C.; Chafin, A. P.; Groshens, T. J. “Insights into melting behavior of propyl-bridged di(cyanate ester) monomers through crystal packing, thermal characterization, and computational analysis” *Crystal Growth & Design*, 18, 10301040 (2018).
53. Throckmorton, J. A.; Feldman, G.; Palmese, G.; Guenther, A. J.; Lamison, K. R.; Redeker, N. D.; Ruth, P. N. “Hydrolytic Degradation Kinetics of Bisphenol E Cyanate Ester Resin and Composite” *Polymer Degradation and Stability*, 151, 1-11 (2018).
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55. Moore, L. M. J.; Zavala, J. J.; Lamb, J. T.; Reams, J. T.; Yandek, G. R.; Guenther, A. J.; Haddad, T. S.; Ghiassi, K. B. “Bis-phenylethynyl Polyhedral Oligomeric Silsesquioxanes: New High-Temperature, Processible Thermosetting Materials” *RSC Advances*, 8, 27400-27405 (2018).
56. Haddad, T. S.; Moore, L. M. J.; Reams, J. T.; Ford, M. D.; Marcischak, J. C.; Ghiassi, K. B. “NMR Analysis of Hydroxyl-Terminated Polybutadiene End-Groups and Reactivity Differences with Monoisocyanates”, *Journal of Polymer Science, Part A: Polymer Chemistry*, 56, 2665-2671 (2018).
57. Smith, K. K.; Redeker, N. D.; Marcischak, J. C.; Rios, J. C.; Mecklenburg, M.; Guenther, A. J.; Ghiassi, K. B. “Surface Modification and Functionalization of Boron Nitride Nanotubes via Condensation with Saturated and Unsaturated Alcohols”, *ACS Applied Nano Materials*, accepted with revision, 2018.
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60. Alston, J. R.; Harris, H. B.; Lamb, J. T.; Snowlin, K.; Guenther, A. J.; Ghiassi, K. B.; Kelkar, A. "Quantification of BNNT Enrichment: Extracting Hexagonal Boron Nitride from Boron Nitride Nanotubes" *Nanoscale Advances*, submitted, 2018.

Book Chapters (reviewed)

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2. “Anti-Reflective Coatings On Patterned Metals Or Metallic Surfaces” (D. Irvin, A. Guenther, N. Prokopuk) – US Patent 7,351,448, issued 2008.

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3. "Polycyanurate Compositions" (A. Guenther, G. Yandek, D. Irvin) – US Patent 7,462,681, issued 2008.
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18. "Apparatuses and methods for energy efficient separations including refining of fuel products" (J. Reams, A. Guenther, J. Mabry, K. Lamison, A. Tuteja, A. Kota, G. Kwon) – Canadian Patent Application 2927003, filed 2015.
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20. "Elastomeric Binder Compositions and Methods of Preparing Same" (A. Guenther, J. Marcischak, T. Haddad, J. Mabry, J. Reams) -- AFD 1457, filed 2016.
21. "Apparatuses and methods for energy efficient separations including refining of fuel products" (J. Reams, A. Guenther, J. Mabry, K. Lamison, A. Tuteja, A. Kota, G. Kwon) – Indian Patent Application 201617015413, filed 2016.
22. "Natural Polymer Nanoparticles from Ionic Liquid Emulsions" (J. Alston, A. Guenther, J. Mabry) – US Patent Application 15/672,365, filed 2017.
23. "Apparatus and Process for Manufacturing Microconduit Networks Formed by Electrospinning Techniques" (A. Guenther, D. Hess) – Navy case #107192, filed 2017.
24. "Surface Coatings, Treatments, and Methods for Removal of Mineral Scale by Self-Release" (A. Guenther, J. Alston, J. Mabry, P. Boyd, T. Rost) -- US Patent Application 15/675,070, filed 2017.
25. "Surface Coatings, Treatments, and Methods for Removal of Mineral Scale by Self-Release" (A. Guenther, J. Alston, J. Mabry, P. Boyd, T. Rost) -- European Patent Application EP-3152273, filed 2017.

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26. “Apparatuses and methods for energy efficient separations including refining of fuel products” (J. Reams, A. Guenther, J. Mabry, K. Lamison, A. Tuteja, A. Kota, G. Kwon) – European Patent Application EP-3055387, filed 2017.
27. “Fluorinated Copolymer Formulations” (A. Guenther, T. Haddad, V. Dioumaev) – US provisional application (not yet published), filed 2018.
28. “Apparatuses and methods for energy efficient separations including refining of fuel products” (J. Reams, A. Guenther, J. Mabry, K. Lamison, A. Tuteja, A. Kota, G. Kwon) – US Patent Application 15/870,524, filed 2018.
29. “Curative Compositions for Macromolecular Networks Derived from Thiol-Containing Monomers” (J. Reams, A. Guenther, T. Haddad, J. Marcischak) –filed 2018.
30. “Nucleophilic Aromatic Substitution of Nitro-Containing Compounds in Microfluidic Flow” (J. Reams, A. Guenther, K. Ghiassi) – disclosure filed 2018.

Abandoned Patent Applications

1. “Thermally-Activated Heat Resistant Insulating Apparatus“ US Patent Application 2010/0139931 (A. Guenther, M. Wright, S. Fallis), filed 2005, abandoned 2010.
2. “Thermally-Activated Heat Resistant Insulating Apparatus“ US Patent Application 2010/0139932 (A. Guenther, M. Wright, S. Fallis), filed 2008, abandoned 2010.
3. “Thermally-Activated Heat Resistant Insulating Apparatus“ US Patent Application 2010/0139933 (A. Guenther, M. Wright, S. Fallis), filed 2008, abandoned 2010.
4. “Thermally-Activated Heat Resistant Insulating Apparatus“ US Patent Application 2010/0144226 (A. Guenther, M. Wright, S. Fallis), filed 2008, abandoned 2010.
5. “Synthesis of POSS-Containing Monomers for High Performance Polymers” (M. Wright, A. Guenther, B. Petteys, S. Tomczak) – Navy Case #103558, divisional of #99715, filed 2015, abandoned 2017.

Secondary Reports / Media Focusing Exclusively on Research Achievements

1. “Scientists Invent Material for Testing on Space Station” (by Renee Hatcher) *The Rocketeer II*, 1 (No. 9), p. 1 (May 8, 2008).

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2. “Novel Adhesive via Cyclotrimerization” (Contributors Timothy M. Swager, Stefanie A. Sydlik) *SYNFACTS* 12, 1249 (2010).
3. “Meet the Scientist: Andrew Guenthner”, DoD Armed with Science Blog, June 24, 2016.

Professional Associations:

American Physical Society (member 1998-2002), including:

Division of Polymer Physics
Forum on Physics and Society

American Chemical Society (member 1999-2003, 2006-2018), including:

Division of Polymer Chemistry
Division of Polymer Materials Science and Engineering
Mojave Desert Local Section

SPIE – The International Society for Optical Engineering (2002-2008)

SAMPE – Society for the Advancement of Materials and Process Engineering, High Desert Local Section Member, 2008 - 2017

Honors, Awards, and Special Activities:

- William H. Schuette Award for outstanding scholarship, leadership, and character in chemical engineering at Case Western Reserve University - 1995
- Ticon Award (for outstanding students in Polymer Engineering) – 1998
- GenCorp University Signature Award for outstanding academic performance and research in polymer science and engineering - 1998
- ICI Student Award in Applied Polymer Science (National Finalist) - 1999
- “On the Spot” Award for accomplishments in support of the Precision Strike Navigator Program – 2004
- Excellence in Research Award in recognition of expertise in polymer processing and characterization and clear ability to apply that expertise to difficult problems – 2005.
- Milton-Union Hall of Honor, Inaugural Inductee – 2006.
- Michelson Laboratory Award for outstanding technical achievements in service to the Naval Air Warfare Center, Weapons Division – 2007.
- U.S. / U.K. Exchange of Early Career Scientists participant -- 2007
- The University of Akron, Distinguished Alumni Award -- 2008.

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- Invited participant, National Academy of Engineering Frontiers of Engineering Conference (1 of 100 selected nationwide) – 2009.
- Chair-Elect of ACS Mojave Desert Section – 2010, 2015.
- Chair – ACS Mojave Desert Section – 2011, 2012, 2016.
- E. C. Simpson Award for Air Force Civilian Achievement (team award, Fuels Separation Team, w/ Joseph Mabry, Josiah Reams, Kevin Lamison, and Matthew Billingsley) – 2013
- Department of Defense Laboratory Scientist of the Quarter – 2nd Quarter 2016
- Strategic Environmental Research and Development Program, Project of the Year – 2016
- AFRL Aerospace Systems Directorate Science and Technology Manager of the Year Award – 2016