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Curriculum Vitae May 2024

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Education

- Postdoctoral Fellowship University of Southern Mississippi, Department of Polymer Science, Advisor: Shelby F. Thames, Industrial agricultural materials, coating and corrosion science.
- Doctorate of Philosophy University of Alabama in Huntsville, Huntsville, AL, Materials Science, December 1992. Advisor: J. Milton Harris, Dissertation title: "Hydrophilic Polymers for Surface Modification."
- Bachelor, Master of Science University of Alabama in Huntsville, Huntsville, AL, B.S., Chemistry, December 1986; M.S., Chemistry, May 1989

Experience

- September 2015 – present Professor of Chemistry, Missouri University of Science and Technology, Rolla, Missouri
- January 2005 – August 2015 Associate Professor of Chemistry, Missouri University of Science and Technology (formerly University of Missouri-Rolla)
- August 1999 – August 2005 Assistant Professor of Chemistry, University of Missouri Rolla, Rolla, MO. Research: Coating science, corrosion inhibition, adhesion, ceramic-polymer dielectric composites, syntheses of active metal nanoparticles, nanocomposite interfaces.
- August 1993 – August 1999 Postdoctoral fellow, Department of Polymer Science, University of Southern Mississippi, Hattiesburg, MS.
- December 1992 – August 1993 Good manufacturing procedure (cGMP) author, auditor, and synthetic chemist for Shearwater Polymers, Church Street, Huntsville, Alabama.

Professional Associations and Offices

- American Chemical Society (ACS) member since 1990
South Central Missouri local ACS section Chair elect, 2001; Chairperson 2002
ACS Chemistry Week, local section activities chair 2003 – 2014
Board Member, Midwest Regional Meeting Board; Rep. ACS So. Central Missouri Local Section, 2005 to present. Board Secretary 2015-16. Chair Elect 2016 – 17. Chair 2017 – 18.
International and American Association for Dental Research (IADR) 2009 – 13
The Federation of Societies of Coatings Technology (FSCT, ACA) 1996 – 13
Conference Technical Agenda Planning Committee, November 2005 – 13
Missouri S&T Teacher Education Program Advisory Board, 2005 – present
TMS 2013 – present
Society of Petroleum Engineering (SPE) 2018 – present
Sigma Xi 2024 – present

Other Organizations

- Vestry member, Christ Church Episcopal, Rolla, MO, 2005-08; 2012-15; 2018-21.
Junior Warden, 2012-15; 2018-21
Senior Warden 2007, during Rector vacancy, Christ Church Episcopal, Rolla, MO, Jan 2007-08.
Construction oversight group, Christ Church Episcopal, Rolla, MO, 2003-2004.
Rector Search Committee, Christ Church Episcopal, Rolla, MO, 2002.
Mission Committee, Episcopal Church of the Ascension, Hattiesburg, MS. Responsibilities included financial, building/maintenance, and organizational decisions and planning. Reorganized the church from Family toward Program structure. Dec 1994 - Dec 1997.
Craft Program Advisory Committee, Hattiesburg High School, Hattiesburg, MS. Aug 1996 - May 1998.

Service

Ad hoc Journal review

Journal of Colloid and Interface Science	Journal of Materials Research
Metallurgical and Materials Transactions B	Materials Science and Engineering B
Materials Chemistry and Physics	Progress in Organic Coatings
Chemistry of Materials	ACS Applied Materials & Interfaces
Journal of Coatings Technology	Industrial Crops and Products
Iranian Polymer Journal	Journal of Applied Polymer Science

Symposium Organization

International Coatings Expo, Technical Program Committee, FSCT/ACA 2006-2013
Co-organizer: 2nd Symp. Recycling of Electronic Wastes, TMS, San Diego, 27-28 February 2011

Ad hoc Proposal review

USDA IFAFS proposal review panel 2001
NSF SBIR/STTR Phase I Panel F-1 Review, 2002
USDA SBIR/STTR Phase I review 2002
NSF SBIR/STTR Phase I Panel Review, Materials Processing, 2003
USDA NRI proposal review 2000-2004
USDA SBIR/STTR Phase I review 2004
USDA SBIR/STTR Phase II review 2011
NSF SBIR Phase I Panel Review, Recycling, 2006, 2007, 2009, 2010
NSF SBIR Phase I Panel Review, Polymers and Polymeric Materials, 2010
SERDP 2010, 2012
NSF Materials Processing and Manufacturing 2013
ACS Petroleum Research Fund 2014

College/Campus Committees

Campus Environmental, Health, and Safety; and “Green Campus” committees 2010-2017
Sustainability Minor advisory committee 2010 – 2012, 2018 – 22
Campus Curriculum Committee 2000-2003; 2012 to 2017, Chairperson for 2014-2015
College of Arts and Science Curriculum Committee 2003-2005; 2017 to present
Library Learning and Resource Committee (LLRC, faculty senate representative), 2012-2017
LLRC chair 2013
Campus budget oversight committee 2012-2013
Rules, Procedures, and Agenda standing committee of Faculty Senate 2013-18, chair 2017-18
Faculty Senate President Elect 2015, President ProTem 2015-16, President 2016-17, Past
President 2017-18
Title IX panelist, 2015 to 2022; hearing panel chair March 2019
Chancellor’s Committee on Diversity and Inclusion, AY 2019-2023
University of Missouri-System
Intercampus Faculty Council, Missouri S&T representative: 2015-2018, Chairman, 2017-18
College and campus Promotion and Tenure committees: 2021-present, chair CASE P&T 2023

Chemistry Department Liaison/Committees

Freshman chemistry student and ad hoc transfer student advisor 2008 to present
Certified Teaching academic program committee board member and student advisor 2003-present
Academic Council/Faculty Senate representative 2000-2005/2010-2016
Library Liaison 1999 – present
Personnel committee 1999 – present (chair 2021-22)
Undergraduate affairs committee (chair) 1999 – present

Student Group Advisor

Schrenk Society, ACS student affiliate group (Co-advisor) 2003- 2022
Navigators 2010 – 2012
Fraternity of Intercollegiate Knights 2000-2010

Professional Nominations/Awards

Outstanding Analytical Chemistry Student Award, Univ. of Al Huntsville, 1985

New Faculty Teaching Scholar, University of Missouri, 2000-2001
 Who's Who Among America's Teachers, 2002
 Outstanding Paper Award in Coatings Technologies, Waterborne, Higher Solids, and Powder Coatings Symposium, February 2002
 Best Technical Poster Presentation, International Coatings Expo, October 2002
 Who's Who in the Sciences, 2004
 Outstanding 300 level instructor, Department of Chemistry, 2006, 2009; 2012-2013.
 Outstanding 400 level instructor, Department of Chemistry, 2011-2012
 Invited speaker, "Role of solvent in producing adhesion to polymer surfaces," 7th International Coatings for Plastics Symposium, Troy, Michigan, 7-9 June 2004.
 Invited speaker, "An In-Mold Application Of Adhesion Promoters To Polyolefin Substrates," Fifth International Symposium On Polymer Surface Modification, Toronto, Canada, June 20-22, 2005.
 Invited speaker, "Non-chromate corrosion inhibition technologies," Gordon Research Conference, Coatings and Films, July 10-15, 2005.
 Invited speaker, "Dye Adsorption Thermodynamics and Relevance to Surface Migration," Midwest Regional ACS Symposium, Joplin, Missouri, 27-28 October 2005.
 ICE 2006 Technical Focus Plenary Lecturer "Smart Corrosion Inhibition Strategies: Substrate, Coating and Inhibitors," International Coatings Expo, New Orleans, LA, November 1-3, 2006.
 Invited speaker, "High energy density capacitors," ONAMI/EPRI, Charlotte, NC, June 22-23, 2011.
 TRFA 2011 Excellence in Thermoset Polymer Research Award "Epoxidized Glycidyl Ester of Soybean Oil as Reactive Diluent for Epoxy Resin." with graduate student Rongpeng Wang.
 AOCs 2012 Industrial Oil Products Div. Student Award "Synthesis and Properties of Glycidyl Esters of Epoxidized Fatty Acids." with graduate student Rongpeng Wang.
 Invited speaker, "Influence of the Composite Filler-to-Matrix Interface on Bulk Properties," Missouri State University, Springfield, MO, 1 February 2012.
 Invited speaker, "Enhanced Dielectric Breakdown Strength and Permittivity Composites," Missouri S&T Physics dept. 14 February 2013
 Invited speaker, "Polymer Materials," Penford Products, Cedar Rapids, IA, 27 June 2013.
 Invited speaker, "Toward Biocompatible Bone Cements," Univ of So. Mississippi, MS 3 Oct 2013.
 Invited speaker, "Designing Materials Interfaces," Univ of Cincinnati, OH, 1 Nov 2013.
 Invited speaker, "High Performance Biobased Monomers," NIMTE, Ningbo, China, Aug 2014.
 Invited series speaker, "Polyaniline Dopant Effects On Corrosion Inhibition Of Steel," "Designing Polymer-Aggregate Interfaces in Cement Composite," "The Practical Use of SRET in Surface Corrosion Assessments," "Biocompatible Bone Cement," "The Art of Formulation."
 Visiting Fellowship, Chinese Academy of Science President's International Fellowship Initiative, Ningbo Institute of Industrial Technology, Ningbo, China, 2016.
 Leadership Development Program, University of Missouri 2016-2017.
 Invited speaker, "Development and Evaluation of Ultra-High Temperature Resistant Preformed Particle Gels for Conformance Control in North Sea Reservoirs," Proceedings of the SPE Annual Technical Conference and Exhibition (2021, Dubai, UAE), Society of Petroleum Engineers (SPE), Sep 2021.
 Tappmeyer Teaching Excellence award AY2023 – 24

Teaching

Lecture Courses and Labs

General Chemistry 1310	Fall'99 – present
Organic Chemistry I 2210	Ugrad lecture
Organic Chemistry II 2220	Ugrad lecture
Organic Chemistry I Lab 2219	Ugrad wet lab
Polymer Chemistry 4810/5810	Graduate/Ugrad lecture
Polymer Chemistry and Coatings Lab 4819/5819	Graduate/Ugrad lecture/Advanced wet lab
Polymer Coatings and Technology 4850/5850	Grad/Undergrad lecture
Physical Polymer Chemistry 6840	Graduate lecture
Corrosion Chemistry and Engineering 401	Graduate lecture
Organic Synthesis and Spectroscopy 4297	Graduate/Ugrad Lecture/Advanced capstone wet lab

University Extension

Short course lecturer for Missouri S&T Paint and Coatings Institute; Distance Education

Polymer Chemistry and Organic Coatings: Emulsion polymerization, Thermal characterization, Characterization of colloidal particles, Dispersion, LASD/sealer (coatings), PT/ED, ELPO

Research Group

Postdoctoral	0, current; 4 in last 10 years
Graduate students, current	3; also co-advise 2 graduate students
Undergraduate students	5
Master students; graduated	1; 5 (3 chemical engineering; 2 chemistry)
Doctoral students graduated	10 (2 co-advised w/ James O. Stoffer, 2 co-advised w/ K. Chandrashekhara; 1 co-advised Fatih Dogan; 1 co-advised with Baojun Bai)

Publications, Peer reviewed

Baird, James K. and Schuman, Thomas P., "The relationship between gas-phase and liquid-phase electron-photodetachment cross sections in the threshold region: application to anthracene and perfluorobenzene anions," *Radiat. Phys. Chem.*, **32**(3), 493-6 (1988).

Oesterberg, Eva; Bergstroem, Karin; Holmberg, Krister; Riggs, Jennifer A.; Van Alstine, J. M.; Schuman, Thomas P.; Burns, Norman L.; Milton Harris, J., "Comparison of Polysaccharide and Poly(ethylene glycol) Coatings for Reduction of Protein Adsorption on Polystyrene Surfaces," *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, **77**(2), 159-169 (1993).

Bergstroem, Karin; Oesterberg, Eva; Holmberg, Krister; Hoffman, Allan S.; Schuman, Thomas P.; Kozlowski, Antoni; Harris, J. Milton, "Effects of Branching and Molecular Weight of Surface-Bound Poly(ethylene oxide) on Protein Rejection," *Journal of Biomaterials Science, Polymer Edition*, **6**(2), 123-132 (1994).

Oesterberg, E.; Bergstroem, K.; Holmberg, K.; Schuman, T. P.; Riggs, J. A.; Burns, N. L.; Van Alstine, J. M.; Harris, J. M., "Protein Rejecting Ability of Surface-Bound Dextran in End-On and Side-On Configurations: Comparison to PEG," *Journal of Biomedical Materials Research*, **29**(6), 741-747 (1995).

Thames, Shelby F.; Yu, Haibin; Wang, Min D.; Schuman, Thomas P., "Dehydration of Lesquerella Oil," *Journal of Applied Polymer Science*, **58**, 943 (1995).

Thames, Shelby F.; Yu, Haibin; Schuman, Thomas P.; Wang, Min D., "Acrylated Lesquerella Oil in Ultraviolet Cured Coatings," *Progress in Organic Coatings*, **28**, 299 (1996).

A. Niroomand, S.F. Thames, and T.P. Schuman, "Hydroxylated Guayule Rubber in Powder Coatings," *Journal of Coatings Technology*, **68**(863), 15 (1996).

J. Shi, J.O. Stoffer, T.P. Schuman, "Ink Jet Printing Paper With Improved Waterfastness," *Journal of Coatings Technology Research*, **3**, 225 (2004).

Thomas P. Schuman, Shelby F. Thames, "The Effect of Solvent on Adhesion of Coatings to Plastics," *International Journal of Coatings Science*, **1** (2004).

Thomas P. Schuman, "Protective Coatings for Aluminum Alloys," In: Handbook of Environmental Degradation of Materials," Myer Kutz, (Ed.), Chapter 17, William Andrew Publishing, New York, 2005.

Ahmed Shahin, Fernande Grandjean, Gary J. Long, Thomas P. Schuman, "Cerium L_{III}-edge EXAFS Investigation of the Structure of Crystalline and Amorphous Cerium Oxides," *Chemistry of Materials*, **17**(2), 315 (2005).

Y. Liu, M. J. O'Keefe, A. Beyaz, T. Schuman, "Synthesis and Characterization of Aluminum-Polyaniline Thin Films and Membranes," *Surface and Interface Analysis*, **37**, 782 (2005).

Thomas Schuman, Shelby F. Thames "Solvent Effects Producing Adhesion to Molded Polymer Surfaces," *Journal of Adhesion Science and Technology*, **19**, 1207-1235 (2005).

Lynell Gilbert, Thomas P. Schuman, Fatih Dogan, Mike Krogh, "Dielectric Powder/Polymer Composites for High Energy Density Capacitors," In: *Ceramic Transactions*, Vol. **179**, Advances in Electronic and Electrochemical Ceramics, edited by F. Dogan and P. Kumta, The American Ceramic Society, Westerville, OH, pp. 17-26 (2005).

Thomas P. Schuman, "Smart Corrosion Inhibition Strategies," *JCT Coatings Tech*, **4**(2), 60-70 (2007).

Thomas P. Schuman, Maninder Singh, James O. Stoffer, "An In-Mold Application Of Adhesion Promoters To Polyolefin Substrates," In: *Polymer Surface Modification: Relevance to Adhesion*, **4**, K.L. Mittal (Ed.), VSP, Leiden, Netherlands, 2007, pp. 263-284.

A. Shabeer, S. Sundararaman, K. Chandrashekhara, T.P. Schuman, "Synthesis and characterization of soy-based epoxy-montmorillonite clay nanocomposites," *Journal of Composite Materials*, **41**(15), 1825 (2007).

S. Sundararaman, A. Shabeer, K. Chandrashekhara and T. Schuman, "Impact Behavior of Fiber Reinforced Pultruded Soy-Epoxy Composites," *Journal of Biobased Materials and Bioenergy*, **2**(1): 71-77 (2008).

Schuman, T.P., Siddabattuni, S., Cox, O., and Dogan, F., "Improved Dielectric Breakdown Strength of Covalently-Bonded Polymer-Particle Nanocomposites." *Composite Interfaces*, **17**, 719-731 (2010).

Zuo, Xiangjun; Damoah, Lucas N. W.; Zhang, Lifeng; Schuman, Thomas; Kers, Jaan, "Green pyrolysis of used printed wiring board powders." In: *Recycling of Electronic Waste II*. Zhang, Lifeng; Krumdick, Gregory K., Eds., TMS, 2011.

Velez, M.; He, Y.; Day, D. E.; Schuman, T. P.; Kilway, K. V.; Melander, J. R.; Weiler, R. A.; Miller, B. D.; Nalvarte, E. L.; Eick, J. D., "Processing of yttrium aluminosilicate (YAS) glasses for dental composites," *Ceramica (Sao Paulo, Brazil)*, **57**(341), 393-401 (2011).

Siddabattuni, S., Schuman, T.P., and Dogan, F., "Dielectric Properties of Interface Controlled Polymer Nanocomposites." *Materials Science and Engineering B*, **176**, 1422 (2011).

Jennifer R. Melander, Rachael A. Weiler, Bradley D. Miller, Thomas P. Schuman, Kathleen Kilway, Delbert E. Day, Mariano Velez, J. David Eick, "Model of photoinitiated silorane composite for biomedical applications." *Journal of Biomedical Materials Research, Part B: Applied Biomaterials*, **100**(1): 163-169 (2012).

Sherea M. Stricklin, B.A.; William V. Stoecker M.S., M.D.; Ryan K. Rader, B.S., Antoinette F. Hood, M.D., Jerome Z. Litt, M.D., Thomas P. Schuman, Ph.D. "Edematous-Plaque Photosensitivity Observed with Sitagliptin Phosphate (Januvia)," *Dermatology Online Journal*, **18**(2), 9 (2012).

Thomas P. Schuman, "Protective Coatings for Aluminum Alloys," In: *Handbook of Environmental Degradation of Materials*, 2nd edition, Myer Kutz, (Ed.), Chapter 17 (pp. 345-366), William Andrew Publishing, 2013.

Ryan K. Rader, William V. Stoecker, ,Kristen A. Hinton, Janine C. Malone, and Thomas P. Schuman, "CD30+ reversible lymphoid dyscrasia (pseudolymphoma) following HIDA

scintigraphy and the [Ring1]-[Ring2]-[C=O] generalized structure hypothesis,” *Journal of the American Academy of Dermatology*, **68**(3), e99-e101 (2013).

Rongpeng Wang and Thomas Schuman, “Epoxidized Glycidyl Ester of Soybean Oil as Reactive Diluent for Epoxy Resin,” *eXpress Polymer Letters*, **7** (3), 272-292 (2013).

Sasidhar Siddabattuni, Vladimir Petrovsky, Thomas P. Schuman, Fatih Dogan, “Impedance Spectroscopy of Dielectric Nanoparticle Slurries,” *Journal of American Ceramic Society*, **96**(5), 1490–1496 (2013).

Siddabattuni, S., Schuman, T.P., and Dogan, F., “Influence of Electronic Nature of Filler Surfaces on Dielectric Properties of Polymer-Particle Nanocomposites.” *ACS Applied Materials and Interfaces*, **5**, 1917-1927 (2013).

V. G. K. Menta, R. R. Vuppapapati, K. Chandrashekhara, T. Schuman, and J. Sha, “Elevated-temperature vacuum-assisted resin transfer molding process for high performance aerospace composites,” *Polymer International*, **62**(10), 1465–1476 (2013).

M. Velez, T. P. Schuman, and D. E. Day, “Optical Properties of Optically Transparent Glass-Ribbon Composites (OTRCs),” *Journal of Composite Materials*, **48**(30) 3747-3754 (2014).

Mohamed, M. M., Vuppapapati, R. R., Bheem Reddy, V., Chandrashekhara, K., and Schuman, T., “Characterization Of Polyurethane Composites Manufactured Using Vacuum Assisted Resin Transfer Molding,” *Advanced Composite Materials*, April 2014.

R. R. Vuppapapati, V. G. K. Menta, K. Chandrashekhara, T. Schuman, "Manufacturing and Impact Characterization of Soy-Based Polyurethane Pultruded Composites," *Polymer Composites*, **35**(6), 1070-1077 (2014).

V.G.K. Menta, R.R. Vuppapapati, K. Chandrashekhara and T. Schuman, “ Manufacturing of Transparent Composites Using Vacuum Infusion Process,” *Polymer & Polymer Composites*, **22**(9), 843-850 (2014).

Rongpeng Wang and Thomas P. Schuman, “Fabrication of Bio-based Epoxy-Clay Nanocomposites,” *Green Chemistry*, **16**(4), 1871 – 1882 (2014).

Siddabattuni, Sasidhar; Schuman, Thomas, “Polymer-Ceramic Nanocomposite Dielectrics for Advanced Energy Storage,” In: Polymer Composites for Energy Harvesting, Conversion, and Storage, L. Li, W. Wong-Ng, J. Sharp (Eds.), ACS Symposium Series, **1161**, 165-190 (2014).

Rongpeng Wang and Thomas P. Schuman, “Towards Green: A Review of Recent Developments in Biorenewable Epoxy Resins from Vegetable Oils.” In: *Green Materials from Plant Oils*, Z. Liu and G. Kraus (Eds.), chapter 9, Royal Society of Chemistry Green Chemistry Series, **29** (2015), pp. 202-241.

R. A. A. Upul Ranaweera, Thomas P. Schuman, Rongpeng Wang, Bradley D. Miller, and Kathleen V. Kilway, “Effect of Moisture on Cationic Polymerization of Silicone Epoxy Monomers,” *Journal of Applied Polymer Science*, **132**(15), 41831 (2015).

Liu, Chengguo; Liu, Zengshe; Tisserat, Brent H.; Wang, Rongpeng; Schuman, Thomas P.; Zhou, Yonghong; Hu, Lihong, “Microwave-assisted maleation of tung oil for bio-based products with versatile applications,” *Industrial Crops and Products*, **71**, 185-196 (2015).

Liu, Zengshe; Sharma, Brajendra K.; Erhan, Sevim Z.; Biswas, Atanu; Wang, Rongpeng; Schuman, Thomas P., “Oxidation and low temperature stability of polymerized soybean oil-based lubricants,” *Thermochimica Acta*, **601**, 9-16 (2015).

Sasidhar Siddabattuni, Thomas P. Schuman, “Dielectric spectroscopy and stimulated current analyses of polymer-ceramic nanocomposites,” in: *Spectroscopy of Polymer Nanocomposites*, S. Thomas, D. Rouxel, D. Ponnamma (Eds.), chapter 10, Elsevier, 2016.

Zun Chen, Jiaming Geng, Thomas P. Schuman, and Baojun Bai, “Water-free synthesis of temperature-sensitive polyacrylamide microgels and pore modeled oil recovery performance,” *Journal of Applied Polymer Science*, **134**, 44581 (2017).

Pu, Jingyang; Bai, Baojuri Jun; Alhuraishawy, Ali K; Schuman, Thomas P; Chen, Yashu; Sun, Xindi, “A novel re-crosslinkable preformed particle gel for conformance control in extreme heterogeneous reservoirs,” *Society of Petroleum Engineers (SPE) Journal*, SPE-191697-MS (2018).

Wang, Ze; Bai, Baojun; Zhou, Enze; Pu, Jingyang; Schuman, Thomas P., “Experimental Evaluation of Oxidizing Breakers for a Polyacrylamide-Based Re-Crosslinkable Preformed Particle Gel,” *Energy & Fuels*, **33**(6), 5001-5010 (2019).

Pu, Jingyang, Bai, Baojun, Alhuraishawy, Ali, Schuman, Thomas, Chen, Yashu, Sun, Xindi, “A Recrosslinkable Preformed Particle Gel for Conformance Control in Heterogeneous Reservoirs Containing Linear-Flow Features,” *SPE Journal*, SPE-191697-PA (2019).

Anirudh Krishnamurthy, Buddhhabhushan Salunkhe, Ashish Zore, Ali Rownaghi, Thomas Schuman, and Fateme Rezaei, “Amine-Based Latex Coatings for Indoor Air CO₂ Control in Commercial Buildings,” *ACS Appl. Mater. Interfaces*, **11**(18), 16594-604 (2019).

Funk G A; Cole K A; McIff T E; Menuey E M; Kilway K V; Schuman T P., “Radical scavenging of poly(methyl methacrylate) bone cement by rifampin and clinically relevant properties of the rifampin-loaded cement,” *Bone & Joint Research*, **8**(2), 81-89 (2019).

Jiaming Geng Jingyang Pu, Yang Zhao, Baihua, Lin, Baojun, Bai, Schuman, Thomas P., “pH-Responsive crude oil-in-water Pickering emulsion stabilized by polyacrylamide nanogels,” *Fuel*, **258**, 116159 (2019).

Wang, Ze ; Bai, Baojun ; Zhou, Enze; Pu, Jingyang ; Schuman, Thomas , “Experimental Evaluation of Oxidizing Breakers for a Polyacrylamide-Based Re-Crosslinkable Preformed Particle Gel,” *Energy & Fuels*, **33**(6), 5001-5010 (2019).

Buddhabhushan Salunkhe, Thomas Schuman, Ali Al Brahim, Baojun Bai, “Ultra-High Temperature Resistant Preformed Particle Gels for Enhanced Oil Recovery,” *Chemical Engineering Journal*, **426**, 130712 (2021).

Salunkhe Buddhhabhushan; Schuman Thomas; Al Brahim Ali; Bai Baojun, “Experimental data on water soluble polymers thermal and hydrolytic stability, reactivity ratios of monomers and Frr calculation for thermally stable preformed particle gels therefrom.” *Data in Brief*, 38107357 (2021).

Meinders, Robert; Murphy, David; Taylor, Gregory; Chandrashekhara, K.; Schuman, Thomas, “Development of fiber-reinforced transparent composites,” *Polymers and Polymer Composites*, **29**(9_suppl), S826-S834 (2021).

Pu, Jingyang; Bai, Baojun; Schuman, Thomas P., “Systematic Evaluation of a Novel Self-Healing Poly(acrylamide-co-vinyl acetate)/Alginate Polymer Gel for Fluid Flow Control in High Temperature and High Salinity Reservoirs,” *Polymers*, **13**(21), 3616 (2021).

Salunkhe, Buddhhabhushan; Schuman, Thomas P., “Super-Adsorbent Hydrogels for Removal of Methylene Blue from Aqueous Solution: Dye Adsorption Isotherms, Kinetics, and

Thermodynamic Properties,” *Macromol*, **1**(4), 256-275 (2021). DOI: <https://doi.org/10.3390/macromol1040018>

Song, Tao; Zhai, Zhanmiao; Liu, Junchen; Eriyagama, Yugandhara; Ahdaya, Mohamed; Alotibi, Adel; Wang, Ze; Schuman, Thomas; Bai, Baojun, “Laboratory evaluation of a novel self-healable polymer gel for CO₂ leakage remediation during CO₂ storage and CO₂ flooding,” *Chemical Engineering Journal*, **444**, 136635 (2022).

Yu, Bowen; Zhao, Shuda; Long, Yifu; Bai, Baojun; Schuman, Thomas, “Comprehensive evaluation of a high-temperature resistant re-crosslinkable preformed particle gel for water management,” *Fuel*, **309**, 122086 (2022).

Song, Tao; Feng, Qi; Schuman, Thomas; Cao, Jie; Bai, Baojun, “A novel branched polymer gel system with delayed gelation property for conformance control,” *Society of Petroleum Engineers (SPE) Journal*, **27**(1), 105-115 (2022).

Thomas Schuman, Buddhabhushan Salunkhe, Ali Al Brahim, and Baojun Bai, “Evaluation of Ultrahigh-Temperature-Resistant Preformed Particle Gels for Conformance Control in North Sea Reservoirs,” *Society of Petroleum Engineers (SPE) Journal*, 1-14 (2022).

Ali Al Brahim, Baojun Bai, Thomas Schuman, “Comprehensive Review of Polymer and Polymer Gel Treatments for Natural Gas Related Conformance Control,” *Gels*, **8**, 353 (2022). <https://doi.org/10.3390/gels8060353>.

M Ahdaya, A Al Brahim, B Bai, T Schuman , “Low-temperature recrosslinkable preformed particle gel as a material for lost circulation control,” *SPE Journal*, **27** (05): 2541–2551 (2022).

T Song, M Ahdaya, S Zhao, Y Zhao, T Schuman, B Bai, “Evaluation of a Novel Recrosslinkable Hyperbranched Preformed Particle Gel for the Conformance Control of High-Temperature Reservoirs with Fractures,” *SPE Journal*, **27** (06): 3598–3610 (2022).

S. Zhao, A. Al Brahim, J. Liu, B. Bai, T. Schuman, “Coreflooding Evaluation of Fiber-Assisted Recrosslinkable Preformed Particle Gel Using an Open Fracture Model,” *SPE Journal*, (2022).

T. Song, B. Bai, Y. Eriyagama, T. Schuman, “Lysine Crosslinked Polyacrylamide— A Novel Green Polymer Gel for Preferential Flow Control,” *ACS Applied Materials & Interfaces*, **15**, 3, 4419–4429 (2023).

T. Song, M. Ahdaya, Z. Zhai, T. Schuman, B. Bai, “Comprehensive evaluation of a novel re-crosslinkable preformed particle gel for the water management of reservoir with concentrated divalent ions,” *Fuel*, **331** (2), 125974 (2023).

Patent Disclosures/Applications

Hoenig, Stephen M.; Schuman, Thomas P.; Finlayson, Malcolm F.; Dechent, William L.; Thames, Shelby F.; Smith, Oliver W.; Bieser, John O. "Coatings compositions containing polymers of olefins and vinyl or vinylidene aromatic and/or aliphatic or cycloaliphatic vinyl monomers." PCT Int. Appl. WO99-US25826 (2000).

E. Burch, J.O. Stoffer, T.P. Schuman, "Synthesis Of Poly(Ethylene Imine) On An Oxide Support," U.S. Patent 7,947,345, May 24, 2011.

Eric L Burch, James O. Stoffer, Thomas Schuman, "Medium for chromatographic separations," U.S. Patent 7,250,388, July 31, 2007.

T.P. Schuman, J.O. Stoffer, "Method for application of adhesion promoter to molded polymer surfaces," Provisional U.S. Patent application, filed 16 February 2004.

T.P. Schuman, F. Dogan, Provisional U.S. Patent application, "Interfacial modification of filler surfaces for high energy density capacitors," filed 16 October 2008.

Lynda F. Bonewald, Kathleen V. Kilway, Thomas P. Schuman, "Biomaterial compositions," U.S. Patent 9,186,302, November 17, 2015.

Lynda F. Bonewald, Kathleen V. Kilway, Thomas P. Schuman, "Biomaterial compositions," U.S. Patent 9,770,528, September 26, 2017.

Thomas P. Schuman; "Epoxy phosphonate ester as a coupling agent for transition metal and metal oxide surfaces," U.S. Patent Application, 20170121354, May 4, 2017.

Pu, J., Bai, B., and Schuman, T. "Re-assembling polymer particle package for conformance control and fluid loss control." U.S. Patent 11,162,016, 2 November 2021.

Rezaei, Fateme; Schuman, Thomas P.; Morrison, Glenn C., "Coating compositions and using the compositions with adsorbent for passively controlling carbon dioxide in enclosed environment," U.S. Pat. Appl. Publ. (2021), US 20210017419 A1 20210121.

Long, Yifu; Bai, Baojun; Schuman, Thomas P., "Re-crosslinking particle gel for CO₂ conformance control and CO₂ leakage blocking," U.S. Patent 11,214,729, January 4, 2022.

Bai, Baojun; Wang, Ze; Sun, Zhe; Pu, Jingyang; Schuman, Thomas, "Fiber assisted re-crosslinkable polymer gel and preformed particle gels for fluid loss and conformance control," U.S. Patent 11,268,009, 8 March 2022.

Song, Tao, Bai, Baojun, Schuman, Thomas P., "Re-crosslinkable hyper-branched polymer gels based on a transamidation reaction," World Patent WO2022098411, May 12, 2022.

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J. Shi, J.O. Stoffer, and T.P. Schuman, "Quantitative Spectrophotometric Methods For Waterfastness Measurement," National ACS Meeting, Boston, MA, August 19-22, 2002.

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Ahmed Shahin, Thomas P. Schuman, Fernande Grandjean, Gary J. Long, "Cerium L_{III}-edge EXAFS Investigation of the Structure of Crystalline and Amorphous Cerium Oxides," *Prepr. Div. Fuel Chem.*, **49**(2), 759-761 (2004).

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Thomas P. Schuman, Meryss Kafka Duda, Ahamed Shabeer, K. Chandrashekhara "Soy Epoxy Nanoclay Composite Coatings," *34th International Waterborne, High-Solids, and Powder Coating Symposium*, New Orleans, LA., February 14-16, 2007.

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“Chlorinated Maleinized Guayule Rubber Powder Coatings,” presented to International AAIC meeting, Catamarca, Argentina, October 1995.

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“Aryl Silicon Powder Coatings,” presented at the Proceedings of the Silicones in Coatings conference, Paint Research Association, Brussels, Belgium, January 1996.

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“XPS Characterization of Ce(III/IV) Complexes,” presented at the National ACS Meeting, Boston, MA, August 19-22, 2002.

“Ink Jet Printing Paper With Improved Waterfastness,” presented at the *30th International Waterborne, High-Solids, and Powder Coating Symposium*, New Orleans, LA., February 26-28, 2003.

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Thomas P. Schuman, "Nanoparticle Filled Polymer-Particle Composites," IADR 2010, Washington, D.C., March 1-5, 2010.

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Kilway, Kathleen V.; Weiler, Rachel A.; Melander, Jennifer R.; Miller, Bradley D.; Bi, Lian X.; Schuman, Thomas P.; Day, Delbert E.; Bonewald, Lynda F.; Eick, J. D., "Development of a novel biomaterial for orthopaedic applications," 45th Midwest Regional Meeting of the American Chemical Society, Wichita, KS, United States, October 27-30 (2010), MWRM-366.

Zuo, Xiangjun; Damoah, Lucas N. W.; Zhang, Lifeng; Schuman, Thomas; Kers, Jaan, "Green pyrolysis of used printed wiring board powders." In: Recycling of Electronic Waste II. Zhang, Lifeng; Krumdick, Gregory K., Eds. TMS 2011. Proceedings of the Symposium held during the TMS Annual Meeting & Exhibition, 2nd, San Diego, CA, United States, Feb. 27-Mar. 3, 2011 (2011), 17-24

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Thomas P. Schuman, S. Siddabattuni, "Interface controlled high energy density epoxy-barium titanate nanocomposite dielectrics," Polymer Preprints (American Chemical Society, Division of Polymer Chemistry) (2011), 52(2), 47-48. Abstracts of Papers, 242nd ACS National Meeting & Exposition, Denver, CO, United States, August 28-September 1, 2011 (2011), POLY-669

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Thomas P. Schuman, Rongpeng Wang, "Epoxidized glycidyl esters of soy/linseed oil: synthesis and thermal properties," Polymer Preprints (American Chemical Society, Division of Polymer Chemistry) (2011), 52(2), 1048-1049. Abstracts of Papers, 242nd ACS National Meeting & Exposition, Denver, CO, United States, August 28-September 1, 2011 (2011), POLY-345.

Wang, Rongpeng; Schuman, Thomas P., "Structure-property relationships of vegetable oil derived epoxy monomers and thermosetting polymers," Abstracts of Papers, 245th ACS National Meeting & Exposition, New Orleans, LA, United States, April 7-11, 2013, (2013), POLY-563.

Siddabattuni, Sasidhar; Schuman, Thomas P.; Dogan, Fatih , "Hammett correlation for design of polymer-particle dielectric interfaces," Abstracts of Papers, 245th ACS National Meeting & Exposition, New Orleans, LA, United States, April 7-11, 2013, (2013), POLY-499.

Siddabattuni, Sasidhar; Schuman, Thomas P.; Petrovsky, Vladimir; Dogan, Fatih , "Study of nanoceramic-polymer, interfacially coupled nanodielectric composites," Abstracts of Papers, 245th ACS National Meeting & Exposition, New Orleans, LA, United States, April 7-11, 2013, (2013), PMSE-423.

Chen, Zun; Schuman, Thomas P.; Bai, Baojun , "Preparation of microparticle gels and their application in enhanced oil recovery," Abstracts of Papers, 245th ACS National Meeting & Exposition, New Orleans, LA, United States, April 7-11, 2013, (2013), PMSE-315.

Wang, Rongpeng; Schuman, Thomas P., "Fabrication and properties of biorenewable epoxy-montmorillonite clay nanocomposites," Abstracts of Papers, 245th ACS National Meeting & Exposition, New Orleans, LA, United States, April 7-11, 2013, (2013), PMSE-289.

Wang, Rongpeng; Schuman, Thomas P., "Soybean oil derived epoxy/glass fiber composites for structural applications," Abstracts of Papers, 245th ACS National Meeting & Exposition, New Orleans, LA, United States, April 7-11, 2013, (2013), CELL-272.

Thomas P. Schuman, Rongpeng Wang, "High Performance Biobased Epoxy Resin," ACS MWRM, Springfield, MO, 17 October 2013.

Ranaweera, R. A. A. Upul; Subramani, S.; Jentsch, Nicholas; Schuman, Thomas P., "Asymmetric synthesis of the 3-TOSU monomer," Abstracts of Papers, 246th ACS National Meeting & Exposition, Indianapolis, IN, United States, September 8-12, 2013 (2013), ORGN-497.

Ranaweera, R. A. A. Upul; Jentsch, Nicholas; Schuman, Thomas P., "Synthesis and use of epoxy phosphonate ester as a coupling agent for metal oxide interfaces," Abstracts of Papers, 246th ACS National Meeting & Exposition, Indianapolis, IN, United States, September 8-12, 2013 (2013), COLL-215.

Grants

<i>Funding Agency, Shared credit</i>	<i>History</i>
Hewlett Packard Corporation, Academic Partnership grant, paper coatings (ink jet) (50%); co-PI: James O. Stoffer (50%)	Aug 1999-02 \$329,300/3yr
Defense Advanced Research Projects Agency, Conductive polymer composites (40%); co-PI: Matthew O'Keefe (60%)	July 2000-03 \$365,000/3 yr
Universal Technology Corporation Non-chromated Aerospace Coatings for Military Aircraft (12%); co-PIs: James O. Stoffer (27%), Thomas O'Keefe (27%), Matthew O'Keefe (12%), William Fahrenholtz (12%), Paul Yu (10%)	Sept 2001 – 02 \$1,120,800
Caterpillar, Conductive polymers for corrosion inhibition of steel (50%); co-PI: James O. Stoffer (50%)	July 2000-2002 \$110,000/2 yr
Missouri Soybean Council, Heterogenous catalysts for partial oxidation of plant oils (100%)	July 2001 \$20,000
Hewlett Packard Corporation, Ink Jet Media division, Paper coatings for ink-jet (50%); co-PI: James O. Stoffer (50%)	Nov 2002-03 \$107,700
Stanford Synchrotron Research Lab (SSRL), XANES and EXAFS Study of the Cerium Valence State in Several Cerium Based Corrosion Inhibitors (80%), co-PI: Gary Long	April 2002 Beamtime
United States Air Force, Research Laboratory Materials and Manufacturing Directorate Environmentally benign anticorrosion chemistries for the protection of aluminum alloys (5%); co-PIs: James O. Stoffer (41%), Thomas O'Keefe (41%), Matthew O'Keefe (5%), William Fahrenholtz (5%), Paul Yu (3%)	Sept 2002-05 \$1,775,094
Center for Dielectric Studies, Organic-ceramic dielectric composites (50%); co-PIs: Fatih Dogan (25%), Mike Krogh (25%)	May 2003 \$20,875/yr
Hewlett Packard Corporation, Ink Jet Media division, Paper coatings for ink-jet (50%); co-PI: James O. Stoffer (50%)	Nov 2003-04 \$119,600
Center for Dielectric Studies, Organic-ceramic dielectric composites	May 2003

(50%); co-PIs: Fatih Dogan (25%), Mike Krogh (25%)	\$20,875/yr
U.S. Department of Education, GAANN Fellowship Program for Graduate Education in Interdisciplinary in Materials Engineering	Aug 2004-07
(5%); co-PIs: Robert Schwartz (30%), Richard Brow (10%), James Drewniak (10%), Fatih Dogan (10%), Gregory Hilmas (10%), Mary Reidmeyer (10%), William Fahrenholtz (5%), Matthew O'Keefe (5%), Harlan Anderson (5%)	\$703,008
Hewlett Packard Corporation, Ink Jet Media division, Paper coatings for ink-jet (100%)	Nov 2004-05 \$18,500
Center for Dielectric Studies, Organic-ceramic dielectric composites (50%); co-PIs: Fatih Dogan (25%), Mike Krogh (25%)	May 2004 \$13,875/yr
Metal Container Corporation, div. of Anheuser-Busch, Corrosion assessment of aluminum can surface pretreatment (100%)	May 2005 \$6,000
Center for Dielectric Studies, Organic-ceramic dielectric composites (50%); co-PIs: Fatih Dogan (25%), Mike Krogh (25%)	May 2005 \$7,875/yr
United Soybean Board, Pultruded Soybean Composites (50%); PI K. Chandrashekhara	October 2007 \$50,000/year
National University Transportation Center, Pultruded Composites Using Soy-based Polyurethane (50%); PI K. Chandrashekhara	November 2007 \$25,000/yr
Gen Dynamics Ordinance& Tactical Systems/NUTC, Development of Glass Fiber Reinforced Transparent Composites	10/1/2008 - 9/30/2009 \$ 50,000
Chandrashekhara (PI), Schuman (co-PI) (50%)	
MSC Corporation, Development of Fatty Prill Processes (100%)	June 2007-June 2009 \$10,000
Missouri Life Science Research Board 13234, Bone Cement for Fracture Repair in Animals Eick, Bonewald (PI's); role co-PI (5%)	1 Jan 2008-31 Dec 2010
NSF I/UCR Center, Synthesis and Development Of High Energy Density Dielectric Composites Schuman (PI, 55%), Dogan (co-PI, 45%)	8/14/2001 - 7/31/2010 \$ 150,000
MSC Company, Development of Novel Animal Feed Mormile (PI), Lamb, Schuman, Sitton (co-PI's) (40:0:30:30)	12/1/2006 - 6/30/2009 \$ 472,575
United Soybean Board, Pultruded Soybean Composites (50%); PI K. Chandrashekhara	October 2009-2011 \$50,000/year
National Institutes of Health, Nanostructured Dental Composite J. David Eick (PI), K. Kilway, T. Schuman, M. Velez (co-PIs)	4/1/2007 - 3/31/2011 \$ 1,012,500
Polyhalon T. Schuman, PI	Oct 2009 – Oct 2010 \$2500
U.S. Office of Naval Research, Enhanced Dielectric Breakdown Strength and Permittivity Composites	Feb 2011 – Jul 2013 \$200,000
T. Schuman (PI), F. Dogan (25%)	
Telemedicine and Advanced Technology Research Center (TATRC) J. D. Eick (PI), L. Bonewald, K. Kilway, T. Schuman (co-PIs)	Aug 2011 – Jul 2015 \$1,049,000
SBIR Lightweight Fiber Reinforced Transparent Composites For Armored Ground/Sea Vehicles (HABsonic)	\$25,000
K. Chandrashekhara (PI), T. Schuman (50%)	May 13 to Nov 13

Enhanced Oil Recovery JIP (Industrial Consortium) Baojun Bai (PI), T. Schuman (40%)	\$85,000 Oct 2014 – Oct 2016
Scale Up of Dielectric Films for High Energy Storage Density Capacitors (General Atomics subcontract funded by Office of Naval Research) T. Schuman (PI), F. Dogan (25%)	\$472,900 May 2016 to Aug 2017
Oil-Derived, Epoxy Monomer for Structural Composite Applications (Missouri Soybean Board) T. Schuman (PI)	\$39,483 June 2016 to May 2017
Enhanced Oil Recovery JIP (Industrial Consortium) Baojun Bai (PI), T. Schuman (co-PI, 100%)	\$85,000 Oct 2016 – Oct 2017
Enhanced Oil Recovery JIP - High Temp PPGs (Industrial Consortium) Baojun Bai (co-PI), T. Schuman (PI, 100%)	\$85,000 Oct 2017 – Oct 2018
Enhanced Oil Recovery JIP - High Temp PPGs (Industrial Consortium) Baojun Bai (co-PI), T. Schuman (PI, 100%)	\$85,000 Oct 2018 – Oct 2019
Enhanced Oil Recovery JIP - High Temp PPGs (Industrial Consortium) Baojun Bai (co-PI), T. Schuman (PI, 100%)	\$85,000 Oct 2019 – Oct 2020
SBIR: Soy-Based _Structural Insulated Panels for Energy Efficient Housing K. Chandrashekhara (PI), P. Nam (co-PI), T. Schuman (co-PI) Aug 2019 – April 2020	\$25,000
Enhanced Oil Recovery JIP - High Temp PPGs (Industrial Consortium) Baojun Bai (co-PI), T. Schuman (PI, 100%)	\$85,000 Oct 2020 – Oct 2021
SERDP, Application of Schiff Base Chemistry to Surface Passivation and Sealing of Plated Steels, Anodized Aluminum and IVD Coatings (as subcontract under Boeing, \$1,704,830) W. Schuette (Boeing, PI), W. Fahrenholtz (PI), T. Schuman (co-PI), M. O’Keefe (co-PI) May 2021 – Apr 2024	\$600,000
PGCCIC: Research Project: Development of High Temperature Resistant Gels for Conformance Control (Industrial Consortium) Project 00065259 Baojun Bai (co-PI 20%), T. Schuman (PI, 80%)	\$137,326 Oct 2021 – Oct 2022
PGCCIC: Research Project: Further Improvement of CO2 Resistant Re-crosslinked Particle Gels for Conformance Control (Industrial Consortium) Project 00065262 Baojun Bai (PI 80%), T. Schuman (co-PI, 20%)	\$ 308,575 Oct 2021 – Oct 2023
Cost-effective swellable particle gel-sealants for geothermal energy reservoirs (U.S. Department of Energy) B. Bai (PI, 40%), T. Schuman (co-PI, 30%), Minzhen Wu (co-PI, 30%) May 2021-May 2024	2,291,240.00 direct+ \$300,000 match
Polymer Composites (Honeywell) K. Chandeshakhara (PI) 40%, R. Billo (20%), M. Liu (20%) and T. Schuman (20%) 1 October 2022-30 Sept 2023	\$145,000
PGCCIC: Research Project: Further Improvement of CO2 Resistant Re-crosslinked Particle Gels for Conformance Control (Industrial Consortium) Project 00065262 Baojun Bai (PI 80%), T. Schuman (co-PI, 20%)	\$ 308,575 Oct 2023 – Oct 2024
Aerospace Thermoset Polymer Composites (Honeywell) K. Chandeshakhara (PI) 40%, R. Billo (20%), M. Liu (20%) and T. Schuman (20%) 1 November 2023-31 October 2024	\$145,000

General Mills, Dough characterization	\$45,000
T. Schuman (100%)	1 October 2023 – 15 May 2024
Additive Manufacturing of High-Performance Polymer Composites (Honeywell)	\$145,000
K. Chandeshakhara (PI) 40%, R. Billo (20%), M. Liu (20%) and T. Schuman (20%)	22 December 23 - 31 August 2024