

Tomonori Saito

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Job

Oak Ridge National Laboratory	Oak Ridge, TN, U.S.A.
Senior R&D Staff	Jan 2021 – current
R&D Staff	Jan 2017 – December 2020
R&D Associate	December 2012 – December 2016
Soft Matter Group Chemical Sciences Division	
Postdoctoral Research Associate	August 2010 – November 2012
Polymer Matrix Composites Group Materials Science and Technology Division	

Service

The University of Tennessee, Knoxville	Knoxville, TN, U.S.A.
Joint Faculty Associate Professor (Faculty Advisor)	2019-current
The Bredesen Center for Interdisciplinary Research and Graduate Education	

Education

The Pennsylvania State University	University Park PA, U.S.A.
Postdoctoral Research Associate	May 2008 – August 2010
Department of Materials Science and Engineering Department of Civil and Environmental Engineering Research Advisors: Prof. Bruce E. Logan (CEE), Prof. Michael A. Hickner (MATSE)	
Virginia Polytechnic Institute and State University	Blacksburg, VA, U.S.A.
Ph.D. Organic Polymer Chemistry	May 2008
Department of Chemistry Research Advisor: Prof. Timothy E. Long Dissertation: “Synthesis and Characterization of Multiphase Block Copolymers: Influence of Functional Groups in Macromolecular Architecture”	
Waseda University	Tokyo, Japan
M. S. Chemical Engineering	March 2003
B. S. Applied Chemistry	March 2001
The University of British Columbia (Exchange program in M.S.)	2001-2002, Vancouver, Canada

Research Expertise

Dr. Tomonori Saito is a synthetic polymer chemist, who has extensive experience in the synthesis of well-defined polymers via living/controlled polymerization as well as post-modification of various polymers. His expertise has been applied to various projects at ORNL including polymer upcycling, vitrimers, flow battery, fuel cell membranes, ion-conducting polymers for batteries and battery binders, ionic liquid polymers, CO₂ separation membranes, polymer nanocomposites, additive manufacturing, polymer nanoparticles, elastomers, self-healing materials, thermal insulation materials, uranium extraction from seawater, carbon fiber composites, polyolefin-based carbon fibers, lignin based-carbon fibers, and lignin-based renewable thermoplastics. He has published more than 100 peer-reviewed articles (*h*-index 40), 8 patents issued (two was licensed.), won R&D 100 in 2012, 2016, 2019, 2021.

His strength in research relies on the use of his skills in synthetic polymer chemistry to impact material sciences, energy, and chemical & environmental engineering applications. His polymer synthesis experience includes synthesis of block, graft, random copolymers with functional groups using living anionic polymerization, ATRP, RAFT, ROMP, conventional free radical polymerization, step-growth polymerization, and post-functionalization chemistry. His engineering expertise includes design, process and characterization of polymeric materials using various techniques for applications such as 3D printing, thermal insulation materials, renewable/upcycled plastics, carbon fibers, composites, CO₂ separation membranes, fuel cell, flow battery, self-healing materials, elastomers, metal adsorbents, ion-conducting polymers for energy storage, etc..

Current Research Focus

- Polymer Upcycling
- Gas Separation Membrane
- Energy Storage (Li-ion Battery, Flow Battery, Fuel Cell)
- Polymer Composites
- Block Copolymers and Soft Nanoparticles
- SMART Gas Pipe Rehabilitation
- Self-healing and Dynamic Polymers (Vitrimers)
- Additive Manufacturing (Binger Jet 3D Printing, FDM, DIW)
- Polymer Electrolytes
- Building Materials (Thermal Insulation)

He current leads projects as a lead PI on 1. Polymer Upcycling (BES), 2. New Frontier in Polymer Matrix Composites via Tailored Vitrimer Chemistry (EERE VTO), 3. Structural Materials-aided Advanced Renewal Technology for REPAIR (SMART REPAIR) (ARPA-E), 4. Self-healing films for vacuum insulation panel (EERE BTO, and TCF). He is a task lead on 1. Multicomponent polymeric materials including nanocomposites, elastomers, self-healing materials, soft nanoparticles and their composites (BES), 2. Development of novel binders for binder jet 3D printing (EERE AMO), 3. High-Energy-Density, Organic Radical-Mediated Redox Flow Batteries (OE), 4. Fuel Cell Membranes (PEMFC and AEMFC, EERE HFTO). He also has multiple projects as a co-PI 1. Development of facer and facer bonding for thermal

insulation foams (EERE BTO), 2. Self-healing sealants (EERE BTO, and TCF), 3. Preinstall sealants for Prefab Components (EERE BTO), and a few other involvement.

Research Accomplishments

Peer-reviewed Publications (total 105)

2021

1. Ye Zhang, Guang Yang, Michelle L. Lehmann, Chaoshan Wu, Lihong Zhao, **Tomonori Saito**, Yanliang Liang, Jagjit Nanda, Yan Yao, Separator Effect on Zinc Electrodeposition Behavior and Its Implication for Zinc Battery Lifetime, *Nano Lett.* 2021, 21, 24, 10446–10452
2. Md Anisur Rahman, Christopher Bowland, Sirui Ge, Shree Ram Acharya, Sungjin Kim, Valentino R. Cooper, Xi Chen, Stephan Irlle, Alexei Sokolov, Aditya Savara, **Tomonori Saito***, “Design of Tough Adhesive from Commodity Thermoplastics through Dynamic Crosslinking”, *Sci. Adv.* 2021; **7** : eabk2451, **featured in multiple media including ORNL, eurekaalert, phys.org, newswire, ritzherald, newsbreak, and many others.**
3. Dustin B. Gilmer, Lu Han, Michelle L. Lehmann, Derek H. Siddel, Guang Yang, Azhad U. Chowdhury, Benjamin Doughty, Amy M. Elliott*, **Tomonori Saito***, “Additive Manufacturing of Strong Silica Sand Structures enabled by Polyethyleneimine Binder”, *Nat Comm*, 2021, 12, 5144, **featured in Nat Comm Editor’s highlights, Nat Comm’s additive manufacturing articles’ highlight, featured in multiple media including Mashable, ORNL, Phys.org, Defense Digest, STEM Magazine**
4. Corson L. Cramer, Jackson K. Wilt, Quinn A. Campbell, Lu Han, **Tomonori Saito**, Andrew T. Nelson, “Accuracy of stereolithography printed alumina with digital light processing”, *Open Ceramics* 8 (2021) 100194
5. Mohammadreza Mahmoudi, Sungjin Kim, Md. Arifuzzaman, **Tomonori Saito**, Corson L. Cramer, Majid Minary-Jolandan, Processing and 3D printing of SiCN polymer-derived ceramics, *Int. J. App. Cer. Tech.*, 2021 on-line
6. Subarna Samanta, Sungjin Kim, **Tomonori Saito**, Alexei P. Sokolov, “Polymers with Dynamic Bonds: Adaptive Functional Materials for Sustainable Future”, *J. Phys. Chem. B* 2021, 125, 33, 9389–9401, **Journal Cover**
7. Martin Tress, Maximilian Vielhauer, Pierre Lutz, Rolf Mülhaupt, Friedrich Kremer, Kunyue Xing, Sirui Ge, Pengfei Cao, **Tomonori Saito**, Alexei Sokolov, “Polymer Dynamics in Nanostructured Environments: Structure-Property Relations Unraveled by Dielectric Spectroscopy”, *ACS Symposium Series* Vol. 1375, Chapter 10 p 223-238
8. Christine Fisher, Bruce J. Warmack, Yongchao Yu, Lydia N. Skolrood, Kai Li, Pooran C. Joshi, **Tomonori Saito**, Tolga Aytug, “All-aerosol-jet-printed highly sensitive and selective polyaniline-based ammonia sensors: a route toward low-cost, low-power gas detection”, *J Mater Sci*, 2021, 56 (22), 12596-12606
9. X. Chelsea Chen, Yiman Zhang, Laura C. Merrill, Charles Soulen, Michelle L. Lehmann, Jennifer L. Schaefer, Zhijia Du, **Tomonori Saito**, Nancy J. Dudney, “Gel composite electrolyte – an effective way to utilize ceramic fillers in lithium batteries”, *J. Mater. Chem. A*, 2021, 9, 6555–6566
10. Guang Yang*, Michelle L. Lehmann, Sheng Zhao, Bingrui Li, Sirui Ge, Peng-Fei Cao, Frank M. Delnick, Alexei P. Sokolov, **Tomonori Saito***, Jagjit Nanda*, Anomalously high elastic modulus of a poly(ethylene oxide)-based composite electrolyte, *Energy Storage Materials* 35 (2021) 431–442

11. Jackson K. Wilt, Dustin Gilmer, Sungjin Kim, Brett G. Compton, **Tomonori Saito***, “Direct Ink Writing Techniques for In-situ Gelation and Solidification”, *MRS Communications*, 2021 (11) 106–121
12. Bingrui Li, Sheng Zhao, Jiadeng Zhu, Sirui Ge, Kunyue Xing, Alexei P. Sokolov, **Tomonori Saito***, Peng-Fei Cao*, “Rational Polymer Design of Stretchable Poly(ionic liquid)s Membranes for Dual Applications”, *Macromolecules* 2021, 54, 896–905, **Journal Cover**
13. Martin Tress, Sirui Ge, Kunyue Xing, Peng-Fei Cao, **Tomonori Saito**, Anne-Caroline Genix, Alexei P. Sokolov, “Turning Rubber into a Glass: Mechanical Reinforcement by Microphase Separation”, *ACS Macro Lett.* 2021, 10, 2, 197–202

2020

14. Sheng Zhao, Yiman Zhang, Hoang Pham, Jan-Michael Y. Carrillo, Bobby G. Sumpter, Jagjit Nanda, Nancy J. Dudney, **Tomonori Saito**, Alexei P. Sokolov*, Peng-Fei Cao*, “Improved Single-Ion Conductivity of Polymer Electrolyte via Accelerated Segmental Dynamics”, *ACS Applied Energy Materials* 2020, 3, 12, 12540–12548
15. Anjali N. Preman, Hyocheol Lee, Jungwoo Yoo, Il Tae Kim*, **Tomonori Saito***, Suk-kyun Ahn* “Progress of 3D Network Binders in Silicon Anodes for Lithium Ion Batteries” *J. Mater. Chem. A*, 2020, 8, 25548–25570
16. Zhen Zhang, Natasha Ghezawi, Bingrui Li, Sirui Ge, Sheng Zhao, **Tomonori Saito***, Diana Hun*, Peng-Fei Cao*, “Autonomous Self-Healing Elastomers with Unprecedented Adhesion Force”, *Advanced Functional Materials*, 2020, 2006298, **Journal Cover, Frontispiece**
17. Corson L. Cramer, Herb Armstrong, Alexis Flores-Betancourt, Lu Han, Amy M. Elliott, Edgar Lara-Curzio, **Tomonori Saito**, Kashif Nawaz, “Processing and properties of SiC composites made via binder jet 3D printing and infiltration and pyrolysis of preceramic polymer”, *Int. J. Ceramic Eng. Sci.* 2020, 2, 320–331.
18. Umesh M. Shrestha, Lu Han, **Tomonori Saito**, Kenneth S. Schweizer, Mark D. Dadmun, “Mechanism of Soft Nanoparticle Diffusion in Entangled Polymer Melts” *Macromolecules* 2020 53, 17, 7580–7589
19. Lu Han*, Michelle L. Lehmann, Jiadeng Zhu, Tianyi Liu, Zhengping Zhou, Xiaomin Tang, Chien-Te Hsieh, Alexei P. Sokolov, Pengfei Cao, Xi Chen, **Tomonori Saito***, “Recent developments and challenges in hybrid solid electrolytes for lithium-ion batteries” *Front. Energy Res.* 2020, 8, 202
20. Sahar Rostom, B. Tyler White, Guangcui Yuan, **Tomonori Saito**, Mark D. Dadmun, “Polymer Chain Diffusion in All-Polymer Nanocomposites: Confinement vs Chain Acceleration”, *J. Phys. Chem. C* 2020, 124, 18834–18839
21. Dustin Gilmer, Lu Han, Eunice Hong, Derek Sidel, Alexander Kisliuk, Shiwang Cheng, Dan Brunermer, Amy Elliott*, **Tomonori Saito***, “An in-situ crosslinking binder for binder jet additive manufacturing”, *Additive Manufacturing* 35 (2020) 101341
22. Peng-Fei Cao*, Bingrui Li, Guang Yang, Sheng Zhao, Jacob Townsend, Kunyue Xing, Zhe Qiang, Konstantinos D. Vogiatzis, Alexei P. Sokolov, Jagjit Nanda, **Tomonori Saito***, “Elastic Single-Ion Conducting Polymer Electrolytes: Toward a Versatile Approach for Intrinsically Stretchable Functional Polymers”, *Macromolecules* 2020, 53, 3591–3601
23. Shilun Gao, Feiyuan Sun, Alexander Brady, Yiyang Pan, Andrew Erwin, Dandan Yang, Vladimir Tsukruk Andrew G. Stack, **Tomonori Saito**, Huabin Yang, Peng-Fei Cao, “Ultra-efficient polymer binder for silicon anode in high-capacity lithium-ion batteries”, *Nano Energy* 73 (2020) 104804
24. Sirui Ge, Martin Tress, Kunyue Xing, Peng-Fei Cao, **Tomonori Saito**, Alexei P. Sokolov, “Viscoelasticity in associating oligomers and polymers: experimental test of the bond lifetime renormalization model”, *Soft Matter*, 2020, 16, 390–401

25. Michelle L. Lehmann, Guang Yang*, Jagjit Nanda*, **Tomonori Saito***, “Well-designed Crosslinked Polymer Electrolyte Enables High Ionic Conductivity and Enhanced Salt Solvation”, *Journal of The Electrochemical Society*, 2020, 16,7 070539

2019

26. Tao Hong, Peng-Fei Cao*, Sheng Zhao, Bingrui Li, Connor Smith, Michelle Lehmann, Andrew J. Erwin, Shannon M. Mahurin, Surendar R. Venna, Alexei P. Sokolov, **Tomonori Saito***, “Tailored CO₂-philic Gas Separation Membranes via One-pot Thiol-ene Chemistry”, *Macromolecules*, 2019, 52, 5819–5828
27. Martin Tress, Kunyue Xing, Sirui Ge, Pengfei Cao, **Tomonori Saito**, Alexei Sokolov, “What dielectric spectroscopy can tell us about supramolecular networks” *Eur. Phys. J. E*, 2019, 42, 133
28. Michelle L. Lehmann, Guang Yang*, Dustin Gilmer, Kee Sung Han, Ethan C. Self, Rose E. Ruther, Sirui Ge, Bingrui Li, Vijayakumar Murugesan, Alexei P. Sokolov, Frank M. Delnick, Jagjit Nanda*, **Tomonori Saito***, “Tailored Crosslinking of Poly(Ethylene Oxide) Enables Mechanical Robustness and Improved Sodium-Ion Conductivity”, *Energy Storage Materials*, 2019, 21, 85–96
29. Benjamin Doughty, Anne-Caroline Genix, Ivan Popov, Bingrui Li, Sheng Zhao, **Tomonori Saito**, Daniel A. Lutterman, Robert L. Sacci, Bobby G. Sumpter, Zaneta Wojnarowska, Vera Bocharova, “Structural correlations tailor conductive properties in polymerized ionic liquids” *Phys. Chem. Chem. Phys.*, 2019, 21(27), 14775-14785
30. Anne-Caroline Genix, Vera Bocharova, Bobby Carroll, Michelle Lehmann, **Tomonori Saito**, Susan Krueger, Lilin He, Philippe Dieudonné-George, Alexei P. Sokolov, and Julian Oberdisse, “Understanding the Static Interfacial Polymer Layer by Exploring the Dispersion States of Nanocomposites”, *ACS Appl. Mater. Interfaces*, 2019, 11 (19), 17863–17872
31. Peng-Fei Cao,* Guang Yang, Bingrui Li, Yiman Zhang, Sheng Zhao, Shuo Zhang, Andrew Erwin, Zhengcheng Zhang, Alexei P. Sokolov, Jagjit Nanda,* **Tomonori Saito***, “Rational Design of a Multifunctional Binder for High-Capacity Silicon-Based Anodes”, *ACS Energy Lett.* 2019, 4, 1171–1180
32. Halie J. Martin, B. Tyler White, Guangcui Yuan, **Tomonori Saito**, Mark D. Dadmun, “Relative Size of the Polymer and Nanoparticle Controls Polymer Diffusion in All-Polymer Nanocomposites”, *Macromolecules*, 2019, 52, 2843–2852
33. Kaushik Biswas*, Dustin Gilmer, Natasha Ghezawi, Peng-Fei Cao, **Tomonori Saito***, “Demonstration of self-healing barrier films for vacuum insulation panels”, *Vacuum* 164 (2019) 132–139
34. Guang Yang, Robert L. Sacci, Ilia N. Ivanov, Rose E. Ruther, Kevin A. Hays, Yiman Zhang, Peng-Fei Cao, Gabriel M. Veith, Nancy J. Dudney, **Tomonori Saito**, Daniel T. Hallinan, Jagjit Nanda, Probing Electrolyte Solvents at Solid/Liquid Interface Using Gap-Mode Surface-Enhanced Raman Spectroscopy, *Journal of The Electrochemical Society*, 166 (2) A1-A10 (2019)

2018

35. Kunyue Xing, Martin Tress, Peng-Fei Cao, Fei Fan, Shiwang Cheng, **Tomonori Saito**, Alexei P. Sokolov, “The Role of Chain-End Association Lifetime in Segmental and Chain Dynamics of Telechelic Polymers”, *Macromolecules*, 2018, 51 (21), pp 8561–8573
36. Halie J. Martin, B. Tyler White, Huiqun Wang, Jimmy Mays, **Tomonori Saito**, Mark D. Dadmun, Effect of Solvent Quality and Monomer Water Solubility on Soft Nanoparticle Morphology, Chapter 7, pp 117-137, *ACS Symposium Series #1296, Gels and Other Soft Amorphous Solids*

37. Rose E. Ruther, Guang Yang, Frank M. Delnick, Zhijiang Tang, Michelle L. Lehmann, **Tomonori Saito**, Yujie Meng, Thomas A. Zawodzinski Jr., and Jagjit Nanda, “Mechanically Robust, Sodium-Ion Conducting Membranes for Nonaqueous Redox Flow Batteries”, *ACS Energy Lett.*, 2018, 3 (7), 1640–1647
38. Alexander I. Wiechert, Wei-Po Liao, Eunice Hong, Candice E. Halbert, Sotira Yiacoumi, **Tomonori Saito***, Costas Tsouris*, “Influence of hydrophilic groups and metal-ion adsorption on polymer-chain conformation of amidoxime-based uranium adsorbents”, *Journal of Colloid and Interface Science* 524 (2018) 399–408
39. Peng-Fei Cao*, Bingrui Li, Tao Hong, Jacob Townsend, Zhe Qiang, Kunyue Xing, Konstantinos D. Vogiatzis, Yangyang Wang, Jimmy W. Mays, Alexei P. Sokolov, **Tomonori Saito***, “Super-Stretchable, Self-Healing Polymeric Elastomers with Tunable Properties”, *Advanced Functional Materials*, 2018, 1800741
40. Kevin A. Hays, Rose E. Ruther, Alexander J. Kukay, Pengfei Cao, **Tomonori Saito**, David L. Wood III, Jianlin Li, “What makes lithium substituted polyacrylic acid a better binder than polyacrylic acid for silicon-graphite composite anodes?”, *Journal of Power Sources* 384 (2018) 136–144
41. Kunyue Xing, Martin Tress, Pengfei Cao, Shiwang Cheng, **Tomonori Saito**, Vladimir N. Novikov, Alexei P. Sokolov, “Hydrogen-bond strength changes network dynamics in associating telechelic PDMS”, *Soft Matter*, 2018, 14, 1235-1246
42. Konstantinos Misichronis, Weiyu Wang, Shiwang Chen, Yangyang Wang, Umesh Shrestha, Mark Dadmun, Jimmy W. Mays, **Tomonori Saito***, “Design, Synthesis and Characterization of Lightly Sulfonated Multigraft Acrylate-based Copolymer Superelastomers” *RSC Advances*, 2018, 8, 5090-5098
43. Peng-Fei Cao, *Michael Naguib, Zhijia Du, Eric Stacy, Bingrui Li, Tao Hong, Kunyue Xing, Dmitry N. Voylov, Jianlin Li, David L. Wood, III, Alexei P. Sokolov, Jagjit Nanda, **Tomonori Saito***, “Effect of Binder Architecture on the Performance of Silicon/Graphite Composite Anodes for Lithium-ion Batteries” *ACS Appl. Mater. Interfaces*, 2018, 10, 3470–3478
44. Tao Hong, Sophia Lai, Shannon M. Mahurin, Peng-Fei Cao, Dmitry N. Voylov, Harry M. Meyer, III, Christopher B. Jacobs, Jan-Michael Y. Carrillo, Alexander Kisliuk, Ilia N. Ivanov, De-en Jiang, Brian K. Long, Jimmy W. Mays, Alexei P. Sokolov, **Tomonori Saito***, “Highly-permeable Oligo (ethylene oxide)-co-Poly(dimethylsiloxane) Membranes for Carbon Dioxide Separation”, *Advanced Sustainable Systems*, 2018, 2, 1700113, **selected for a journal back cover**

2017

45. Carter Abney, Richard Mayes, **Tomonori Saito**, Sheng Dai, “Materials for the Recovery of Uranium from Seawater” *Chem Review*, 2017, 117 (23), 13935–14013
46. Vera Bocharova, Zaneta Wojnarowska, Peng-Fei Cao, Yao Fu, Rajeev, Bingrui Li, Vladimir N. Novikov, Sheng Zhao, Alexander M. Kisliuk, **Tomonori Saito**, Jimmy W. Mays, Bobby, G. Sumpter, Alexei P. Sokolov, Influence of Chain Rigidity and Dielectric Constant on the Glass Transition Temperature in Polymerized Ionic Liquids, *J. Phys. Chem. B*, 2017, 121 (51), 11511–11519
47. Halie J. Martin, B. Tyler White, Christopher J. Scanlon, **Tomonori Saito***, Mark D. Dadmun*, “Tunable synthetic control of soft polymeric nanoparticle morphology”, *Soft Matter*, 2017, 13, 8849-8857
48. Zaneta Wojnarowska, Hongbo Feng, Mariana Diaz, Alfredo Ortiz, Inmaculada Ortiz, Justyna Knapik-Kowalczyk, Miguel Vilas, Pedro Verdía, Emilia Tojo, **Tomonori Saito**, Eric W. Stacy, Nam-Goo Kang, Jimmy W. Mays, Danuta Kruk, Patryk Wlodarczyk, Alexei P. Sokolov, Vera Bocharova, Marian Paluch, “Revealing the Charge Transport Mechanism in Polymerized Ionic Liquids: Insight from High Pressure Conductivity Studies”, *Chem. Mater.*, 2017 29 (19), 8082–8092

49. Zaneta Wojnarowska, Hongbo Feng, Yao Fu, Shiwang Cheng, Bobby Carroll, Rajeev Kumar, Vladimir N. Novikov, Alexander M. Kisluk, **Tomonori Saito**, Nam-Goo Kang, Jimmy W. Mays, Alexei P. Sokolov, Vera Bocharova, “Effect of Chain Rigidity on the Decoupling of Ion Motion from Segmental Relaxation in Polymerized Ionic Liquids: Ambient and Elevated Pressure Studies” *Macromolecules*, 2017, 50 (17), 6710–6721
50. Peng-Fei Cao*, Bingrui Li, Tao Hong, Kunyue Xing, Dmitry N. Voylov, Shiwang Cheng, Panchao Yin, Alexander Kisluk, Shannon M. Mahurin, Alexei P. Sokolov, and **Tomonori Saito***, “Robust and Elastic Polymer Membranes with Tunable Properties for Gas Separation”, *ACS Appl. Mater. Interfaces* 2017, 9, 26483–26491
51. Peng-Fei Cao*, Zaneta Wojnarowska, Tao Hong, Bobby Carroll, Bingrui Li, Hongbo Feng, Leo Parsons, Weiyu Wang, Bradley S. Lokitz, Shiwang Cheng, Vera Bocharova, Alexei P. Sokolov, **Tomonori Saito***, “A star-shaped single lithium-ion conducting copolymer by grafting a POSS nanoparticle”, *Polymer* 124 (2017) 117-127
52. Hongbo Feng, Tao Hong, Shannon M. Mahurin, Konstantinos D. Vogiatzis, Kevin R. Gmernicki, Brian K. Long, Jimmy W. Mays, Alexei P. Sokolov, Nam-Goo Kang*, **Tomonori Saito***, “Gas separation mechanism of CO₂ selective amidoxime poly(1-trimethylsilyl-1-propyne) membranes”, *Polymer Chemistry*, 2017, 8, 3341–3350
53. Ali Eftekhari, **Tomonori Saito**, “Synthesis and properties of polymerized ionic liquids” *European Polymer Journal* 90 (2017) 245–272
54. Tao Hong, Sabornie Chatterjee, Shannon M. Mahurin, Fei Fan, Ziqi Tian, De-en Jiang, Brian K. Long, Jimmy W. Mays, Alexei P. Sokolov, **Tomonori Saito***, “Impact of tuning CO₂-philicity in polydimethylsiloxane-based membranes for carbon dioxide separation”, *Journal of Membrane Science* 530 (2017) 213–219
55. Rajeev Kumar, Jyoti P. Mahalik, Vera Bocharova, Eric W. Stacy, Catalin Gainaru, **Tomonori Saito**, Mallory P. Gobet, Steve Greenbaum, Bobby G. Sumpter, Alexei P. Sokolov, “A Rayleighian approach for modeling kinetics of ionic transport in polymeric media”, *The Journal of Chemical Physics* 146, 064902 (2017)

2016

56. Catalin P. Gainaru, Eric W. Stacy, Vera Bocharova, Mallory Gobet, Adam P. Holt, **Tomonori Saito**, Steve Greenbaum, and Alexei P. Sokolov, “Mechanism of Conductivity Relaxation in Liquid and Polymeric Electrolytes: Direct Link between Conductivity and Diffusivity”, *J. Phys. Chem. B*, 2016, 120 (42), pp 11074–11083
57. Michael Naguib*, **Tomonori Saito***, Sophia Lai, Matthew S Rager, Tolga Aytug, M Parans Paranthaman*, Meng-Qiang Zhao, Yury Gogotsi, “Ti₃C₂T_x (MXene)–polyacrylamide nanocomposite films”, *RSC Advances* 2016 6 (76), 72069-72073
58. Kevin R Gmernicki, Eunice Hong, Christopher R Maroon, Shannon M Mahurin, Alexei P Sokolov, **Tomonori Saito**, Brian K Long, “Accessing Siloxane Functionalized Polynorbornenes via Vinyl-Addition Polymerization for CO₂ Separation Membranes”, *ACS Macro Letters* 2016, 5, 879-883
59. Adam P Holt, Vera Bocharova, Shiwang Cheng, Alexander M Kisluk, Benjamin Tyler White, **Tomonori Saito**, David Uhrig, Jyoti P Mahalik, Rajeev Kumar, Adam E Imel, Thusitha Etampawala, Halie Martin, Nicole Sikes, Bobby G Sumpter, Mark D Dadmun, Alexei P Sokolov, “Controlling Interfacial Dynamics: Covalent Bonding versus Physical Adsorption in Polymer Nanocomposites”, *ACS nano*, 2016, 10 (7) 6843-6852

60. Kunyue Xing, Sabornie Chatterjee, **Tomonori Saito**, Catalin Gainaru, and Alexei P. Sokolov, Impact of Hydrogen Bonding on Dynamics of Hydroxyl-Terminated Polydimethylsiloxane, *Macromolecules*, 2016, 49 (8), 3138-3147, DOI: 10.1021/acs.macromol.6b00262
61. Dmitry Voylov,* **Tomonori Saito**,* Bradley Lokitz, David Uhrig, Yangyang Wang, Alexander Agapov, Adam Holt, Vera Bocharova, Alexander Kisliuk, Alexei P. Sokolov, “Graphene Oxide as a Radical Initiator: Free Radical and Controlled Radical Polymerization of Sodium 4-Vinylbenzenesulfonate with Graphene Oxide” *ACS Macro Lett.* 2016, 5, 199–202
62. Shiwang Cheng, Adam P. Holt, Huiqun Wang, Fei Fan, Vera Bocharova, Halie Martin, Thusitha Etampawala, B. Tyler White, **Tomonori Saito**, Nam-Goo Kang, Mark D. Dadmun, Jimmy W. Mays, Alexei P. Sokolov, “Unexpected Molecular Weight Effect in Polymer Nanocomposites” *PhysRevLett.* 2016, 116, 038302
63. Sabornie Chatterjee, Vyacheslav Bryantsev, Suree Brown, J. Casey Johnson, Christopher Grant, Richard T. Mayes, Benjamin Hay*, Sheng Dai, **Tomonori Saito*** "Synthesis of Naphthalimidedioxime Ligand-Containing Fibers for Uranium Adsorption from Seawater" *Ind. Eng. Chem. Res.* 2016, 55, 4161–4169
64. Suree Brown*, Sabornie Chatterjee, Meijun Li, Yanfeng Yue, Costas Tsouris, Christopher J. Janke, **Tomonori Saito***, Sheng Dai*, "Uranium Adsorbent Fibers Prepared by Atom-Transfer Radical Polymerization from Chlorinated Polypropylene and Polyethylene Trunk Fibers", *Ind. Eng. Chem. Res.* 2016, 55, 4130–4138
65. Suree Brown*, Yanfeng Yue, Li-Jung Kuo, Nada Mehio, Meijun Li, Gary Gill, Costas Tsouris, Richard T. Mayes, **Tomonori Saito***, and Sheng Dai*, “Uranium Adsorbent Fibers Prepared by Atom-Transfer Radical Polymerization (ATRP) from Poly(vinyl chloride)-co-chlorinated poly(vinyl chloride) (PVC-co-CPVC) Fiber” *Ind. Eng. Chem. Res.* 2016, 55, 4139–4148 DOI: 10.1021/acs.iecr.5b03355

2015

66. Tao Hong, Zhenbin Niu, Xunxiang Hu, Kevin Gmernicki, Shiwang Cheng, Fei Fan, J. Casey Johnson, Eunice Hong, Shannon Mahurin, De-en Jiang, Brian Long, Jimmy Mays, Alexei Sokolov, **Tomonori Saito***, “Effect of Cross-Link Density on Carbon Dioxide Separation in PDMS Norbornene Membranes” *ChemSusChem*, 2015, 8, 3595 – 3604, **selected for journal cover**, Cover and Cover Profile, 3522, 3524
67. Sabornie Chatterjee, **Tomonori Saito***, “Lignin-derived Advanced Carbon Materials” *ChemSusChem*, 2015, 8, 3941 – 3958
68. Sabornie Chatterjee, **Tomonori Saito**, Priyanka Bhattacharya “Lignin-derived Carbon Fibers” *Lignin in Polymer Composites, 1st Edition* Chapter 11, 2015, 207-216
69. Fei Fan, Yangyang Wang, Tao Hong, Maximilian F. Heres, **Tomonori Saito**, Alexei P. Sokolov, “Ion Conduction in Polymerized Ionic Liquids with Different Pendant Groups”, *Macromolecules*, 2015, 48 (13), 4461–4470
70. Ziqi Tian, **Tomonori Saito**, and De-en Jiang.”Ab Initio Screening of CO₂-philic Groups”, *J. Phys. Chem. A* 2015, 119 (16), 3848–3852

2014

71. Gopal K. Mor, David Jones, Thinh P. Le, Zhengrong Shang, Patrick J. Weathers, Megumi K. B. Woltermann, Kiarash Vakhshouri, Bryan P. Williams, Sarah A. Tohran, **Tomonori Saito**, Rafael Verduzco, Alberto Salleo, Michael A. Hickner, Enrique D. Gomez, “Contact Doping with Sub-Monolayers of Strong Polyelectrolytes for Organic Photovoltaics” *Advanced Energy Materials* 2014, 4 (13) 1400439
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2009 and earlier

98. Xin Wang, Shaoan Cheng, Yujie Feng, Matthew D. Merrill, **Tomonori Saito**, Bruce E. Logan, "Use of Carbon Mesh Anodes and the Effect of Different Pretreatment Methods on Power Production in Microbial Fuel Cells" *Environmental Science & Technology* 2009, 43(17), 6870-6874.
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100. **Tomonori Saito**, Kim C. Harich and Timothy E. Long, "Pseudo-Living Anionic Telomerization of 1,3-butadiene," *Macromolecular Chemistry and Physics*, 2008, 209(19), 1983-1991 **Selected for a journal cover.**

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105. **Tomonori Saito**, Satoshi Tsuneda, Kyoichi Saito and Akira Hirata, “Treatment of Wastewater Containing Antimony,” *Mizu Shori Gijutsu (Water Purification and Liquid Water Treatment)* 2001, 42, (3), 103-111 (in Japanese) highlighted in another journal “Yosui To Haisu”.

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1. **Tomonori Saito**, Pengfei Cao, Super-stretchable self-healing polymer” US Patent No. 11,008,461 B2, May 18, 2021
2. **Tomonori Saito**, Pengfei Cao, Jagjit Nanda,” Block graft copolymer binders and their use in silicon-containing anodes of lithium-ion batteries” US Patent No. 11,005,101 B2, May 11, 2021
3. **Tomonori Saito**, Pengfei Cao, Jagjit Nanda, “Crosslinked functional binders and their use in silicon-containing anodes of lithium-ion batteries” US Patent No. 10897045 B2, Jan 19 2021
4. Sheng Dai, Suree Brown, **Tomonori Saito**, “Surface-Functionalized Polyolefin Fibers and Their Use in Methods For Extracting Metal Ions from Liquid Solutions” US Patent No. 10391472 B2, August 27, 2019
5. Tao Hong, Sabornie Chatterjee, Brian K. Long, De-en Jiang, Shannon M. Mahurin, Jimmy W. Mays, Alexei Sokolov, **Tomonori Saito**, “Cross-linked Polymeric Membranes for Carbon Dioxide Separation” US Patent No. 9873094 B2, January 23, 2018
6. Amit K. Naskar, Marcus A. Hunt, **Tomonori Saito**, “Methods for preparation of carbon fibers from polyolefin fiber precursor” US Patent No. 9828770 B2, November 27, 2017
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8. Amit K. Naskar, **Tomonori Saito**, Joseph M. Pickel, Frederick S. Baker, Cliff Eberle, Robert E. Norris, Jr., Jonathan R. Mielenz, “Lignin-Derived Thermoplastic Co-Polymers and Methods of Preparation” U.S. Patent No. 8,748,537 issued: June 10, 2014 *licensed on March 2015*

Mentoring History

He currently mentors a few staff members, 2 postdocs, and 5 graduate students. The list of current and past advisees with

current institution is listed as follows:

Postdoctoral Advisees:

Dr. Zhenbin Niu, currently at Dow Corning
Dr. Sabornie Chatterjee, currently at Rayonier Advanced Materials
Dr. Casey Johnson, Amy Research Laboratory, then currently at DuPont
Dr. Pengfei Cao, Oak Ridge National Laboratory
Dr. Konstantinos Misichronis, currently at BIC
Dr. Lu Han, currently at Kaneka
Dr. Md Anisur Rahman, Oak Ridge National Laboratory
Dr. Sungjin Kim, Oak Ridge National Laboratory
Dr. Arif Arifuzzaman, Oak Ridge National Laboratory

Postmaster Advisees:

Mr. Bingrui Li, currently at graduate school, UTK
Ms. Eunice Hong, currently at Acella Performance Materials

Postbachelor Advisees:

Mr. Tyler White, currently at graduate school, Virginia Tech
Ms. Michelle Lehmann, currently at graduate school, UTK
Ms. Natasha Ghezawi, currently at graduate school, UTK

Graduate Student Advisees:

Dr. Tao Hong, University of Tennessee, Knoxville, currently an assistant professor at Xi'an Jiaotong University
Ms. Michelle Lehmann, University of Tennessee, Knoxville
Mr. Dustin Gilmer, University of Tennessee, Knoxville
Mr. Bingrui Li, University of Tennessee, Knoxville
Ms. Natasha Ghezawi, University of Tennessee, Knoxville
Mr. Jackie Zheng, University of Tennessee, Knoxville

Undergraduate Student (SULI or HERE) Advisees:

Ms. Sophia Lai, currently at graduate school, Harvard University (SULI from Cornell)
Mr. Tyler White, currently at graduate school, Virginia Tech (SULI from UTK)
Mr. Christopher Scanlon, currently at graduate school, University of Southern Mississippi (SULI from Columbus State)
Mr. Connor Smith (SULI from Cornell)
Mr. Jay Hingu (SULI from New Jersey College)
Mr. Leo Parsons, currently at graduate school, UC Davis (SULI from Cal Poly)
Mr. Dustin Gilmer, currently at graduate school, UTK (SULI and HERE from East Tennessee State)
Ms. Michelle Lehmann, currently at graduate school, UTK (SULI and HERE from UTK)
Mr. Hoang Pham, currently at graduate school, UC Davis (HERE from Colorado College)
Mr. Tony Su, currently at graduate school, Northwestern Univ (HERE from Grinnell College)
Mr. Alex Huynh (SULI from U of Houston)
Ms. Maria Furukawa, currently working at SOLVAY (SULI from Georgia Tech)
Mr. Benjamin Stacy, currently at graduate school, U of Texas Austin (SULI from U of Kentucky)
Ms. Lauryn Carver, currently at graduate school, U of Chicago (SULI from U of Oklahoma)
Ms. Christine Fisher, currently at graduate school, Virginia Tech (HERE from CUNY)

Mr. Jackson Wilt (HERE and SULI from UTK), Fulbright Scholar in Netherland

Awards and Membership

2021	2021 R&D 100, “Autonomous self-healing sealant”, Diana Hun, Pengfei Cao, Tomonori Saito , Zhen Zhang, Bingrui Li, Natasha Ghezawi and Zoriana Demchuk
2019	2019 R&D 100, “High Strength Binder System for Additive Manufacturing”, Tomonori Saito , Amy Elliott, Dustin Gilmer, Michelle Lehmann, Lu Han, Rick Lucas, Dan Brunermer
2017	ORNL Research Team Award, Carter Abney, Vyacheslav Bryantsev, Christopher J. Janke, Sheng Dai, Richard Mayes, Tomonori Saito , Costas Tsouris
2016	2016 R&D 100, “U Grabber”, Sheng Dai, Suree Brown, Robin Rogers, Christopher J. Janke, Richard Mayes, Tomonori Saito , Ronnie Hanes
2012	2012 R&D 100, “HiCap Adsorbents”, Christopher J. Janke, Yatsandra Oyola, Sheng Dai, Chris Bauer, Richard Mayes, Tomonori Saito , Xiao-Guang Sun, Costas Tsouris, Jim Brang, Jeff Haggard
2006.5	ACS Polymer Division Travel Award – POLY Biennial Meeting
2005.1- 2005.6	MII (Macromolecules and Interfaces Institute at Virginia Tech) Frontiers in Graduate Research Fellowships
2003.3.5	Best Research Award (Kurita award) in 2003 at 37 th Japan Society on Water Environment Conference in Kumamoto, Japan, Mar. 3-7, 2003
2005 -	Member of American Chemical Society (ACS) (POLY, PMSE)
2016 -	Member of Materials Research Society (MRS)
2018 -	Member of North American Membrane Society (NAMS)
2018 -	Member of the American Institute of Chemical Engineers (AIChE)

Synergistic Activities:

- Oak Ridge National Laboratory, Distinguished Staff Fellow Committee, 2018-
- Georgia Tech MURI Advisory Panel, 2020-
- ACS Division of Polymer Chemistry, Webinar Committee, 2019 –
- Organizer of Symposiums at ACS National Meetings, MRS Meetings, and Euromat.
- Contributor to the workshop report and factual document for DOE BES Roundtable on Chemical Upcycling of Polymers
- Serving as a reviewer for many proposals and many journals such as *Nature*, *Science*, *Nature Communications*, *JACS*, *Advanced Materials*, *Angewandte Chemie*, *Advanced Functional Materials*, *Energy Storage Materials*, *Macromolecules*, *Additive Manufacturing*, *ACS Applied Interfaces*, *J. Mat. Chem. A.*, *ACS Applied Energy Materials*, *Green Chemistry* etc.