

U Hyeok Choi

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Research Interests

Study Physical Properties in Polymeric Materials for Energy Applications

Education

The Pennsylvania State University, University Park, PA, USA

Ph.D., Materials Science and Engineering, December 2012

Thesis topic: Understanding Ion Transport in Ion-containing Polymers for Energy Applications

Thesis advisors: Prof. Ralph H. Colby and Prof. James Runt

The Pennsylvania State University, University Park, PA, USA

M.S., Materials Science and Engineering, December 2009

Thesis topic: Measurement of Conducting Ion Mobility and Concentration in Ion-containing Polymers

Thesis advisor: Prof. Ralph H. Colby

Yonsei University, Seoul, Korea

B.S., Materials Science and Engineering, February 2006

GPA: Summa Cum Laude (4.03/4.30)

University of California at Berkeley, Berkeley, CA, USA

Exchange student (June – August, 2004)

GPA: 3.90/4.00

Academic Experience

Inha University, Incheon, Korea

Professor

September, 2025 – Present

Department of Polymer Science and Engineering

Inha University, Incheon, Korea

Associate Professor

September, 2020 – August, 2025

Department of Polymer Science and Engineering

Inha University, Incheon, Korea

Assistant Professor

March, 2020 – August, 2020

Department of Polymer Science and Engineering

Pukyong National University, Busan, Korea

Assistant Professor

September, 2016 – February, 2020

Department of Polymer Engineering

Korea Institute of Materials Science (KIMS), Changwon, Korea

Senior Researcher

March, 2014 – August, 2016

- Multi-functional polymeric materials for energy storage

The Pennsylvania State University, University Park, PA, USA

Post-doctoral Scholar

February, 2013 – February, 2014

Department of Materials Science and Engineering (Prof. James Runt)

- Precise ethylene-based copolymers and ionomers, NSF:
Systematic and comprehensive investigation of polymer and ion dynamics in precise copolymers and ionomers for membranes for ion-conduction in energy storage applications

The Pennsylvania State University, University Park, PA, USA

Research Assistant

August, 2006 –December, 2012

Department of Materials Science and Engineering

- Ion-containing Polymers for Battery Technology, DoE-BES:
Understanding conduction mechanisms and structure of ionomeric single-ion conductors and the role of plasticization for lithium ion batteries using broadband dielectric spectroscopy
- Ionic Liquids in Electro-Active Devices, MURI:
Fundamental investigations of ion transport in polymerized ionic liquids for electro-active devices using broadband dielectric spectroscopy, rheology and X-ray scattering.

Teaching Assistant **Spring, 2011**
 Department of Materials Science and Engineering
 Polymer Processing Technology (MATSE 448)

Mentor **Summer, 2010, 2011 & 2013**
 Department of Materials Science and Engineering
 Guided Research Experience for Undergraduates (REU) in Soft Materials
 (Poster session: the students won 2nd (2010) & 1st (2011))

Teaching Assistant **Fall, 2008**
 Department of Materials Science and Engineering
 Polymer Rheology and Processing (MATSE 447)

Samsung Advanced Institute of Technology, Yongin-si, Korea
Researcher **March - July, 2006**
 Material Devices Research Center-Photonics Program team
 : VECSEL (Vertical Extended Cavity Surface Emitting Laser) green laser

Yonsei University, Seoul, Korea
Intern **January - March, 2006**
 Nanopolymer Laboratory (Prof. Cheolmin Park)
 : Dispersion of Single-walled Carbon Nanotubes (SWNTs) in a Non-polar Solvent

Honors

- 2025 Toray Mid-Career Research Award from the Polymer Society of Korea **April, 2025**
- Highest honors at Yonsei University, Seoul, Korea **February, 2006**
- Honors student at Yonsei University, Seoul, Korea **February, 2005 & 2001**
- High honors student at Yonsei University, Seoul, Korea **February, 2000**

Scholarship

- Full scholarship at Korean Scholarship Association of Jeong Su (2000-2005)
- Honors scholarship at Yonsei University, Korea (September, 1999)

Memberships

- Editor Board Member: Macromolecular Research (SCI-indexed Journal) **2025 ~ Present**

- Associate Editor: Macromolecular Research (SCI-indexed Journal) **2023 ~ Present**
- Publishing Editor: Macromolecular Research (SCI-indexed Journal) **2021 ~ 2022**
- Council Member (2024 & 2025), Executive Board Member (2020, 2021, & 2024), Committee Member for Academic Education (2023), Treasurer, Energy Division (2024), & General Secretary, Energy Division (2025), **Polymer Society of Korea (PSK)**
- Board Member (2025), International Cooperation Committee (2025), & Secretary for Academic Affairs and General Affairs, Environmental Energy Division (2023, 2024, & 2025), **Korean Society of Industrial and Engineering Chemistry (KSIEC)**
- Board Member, International Cooperation Committee (2024 & 2025), **Korean Electrochemical Society (KECS)**
- The Electrochemical Society (ECS), Member **2024 ~ Present**
- The American Physical Society (APS), Member **2008 ~ Present**
- The Material Research Society (MRS), Member **2006 ~ 2010**

Publications

Journals:

- 87.** Jeon, Y.; Kwon, H.; Kim, S.W.; Kim, G.; Knight, S. J.; Lee, Y.*; **Choi, U.H.*** "Integrated Electrolyte–Binder Platforms Based on Covalent Adaptable Networks for Circular Lithium Metal Batteries". *Submitted* (2025)
- 86.** Gong, S.H.; Shin, S.; Lim, H.J.; Kwak, J.H.; Yoo, Y.; Kim, I.S.; Handayani, P.L.; **Choi, U.H.**; Park, J.E.; Lee, J.E.; Nahm, S.; Yu, S.-H.; Chung, K.Y.; Chun, D.W.; Lee, K.H.; Kwak, S.K.; Kim, H.-S.* "Cation-Anion Synergy at Trace Levels Stabilizes Zn Anodes in Aqueous Batteries". *Submitted* (2025)
- 85.** Handayani, P.; Kim, G.; Cho, A.; Jeon, Y.; Kim, N.; Kim, S.; Ahn, S.; Jeong, H.; **Choi, U.H.*** "Uniform and High Li⁺ Transporting Polymer Electrolytes for Stable and Long-Cycle-Life Lithium Metal Batteries: Current Status and Future". *Submitted* (2025)
- 84.** Yun, S.; Handayani, P.; **Choi, U.H.*** "Weakly Coordinating Single-Ion Conductors Integrated with High-Dielectric Zwitterions for Accelerated Lithium-Ion Transport" *ChemSusChem* 18, 2500684 (2025)
- 83.** Chae, J.; Handayani, P.; Kim, T.; **Choi, U.H.*** "In Situ Silica-Bridged Nanophase Hybrid Ionogel Polymer Electrolytes for High-Energy Flexible Supercapacitors" *Macromol. Res.* (2025)
- 82.** Yang, M.; Jeon, Y.; Yoon, Y.; **Choi, U.H.***; Kim, C.B.* "Fully Recyclable, Catalyst-Free, Highly Adhesive, and Resilient Poly(β -Amino Esters) Covalent Adaptable

Network-Based Solid Polymer Electrolytes for Lithium Metal Batteries" *J. Mater. Chem. A* (2025)

81. Handayani, P.; **Choi, U.H.*** "Modulating phase separation via multiple hydrogen bonding in polyurethane-based gel polymer electrolytes for all-solid-state supercapacitors" *Small Methods*, 2500881 (2025)

80. You, S.; Kim, S.; Handayani, P.L.; Jung, S.; Park, J.H.*; **Choi, U.H.*** "Dynamic Networks via Polymerizable Deep Eutectic Monomers for Uniform Li⁺ Transport at Interfaces in Lithium Metal Batteries" *Adv. Funct. Mater.* 2500232 (2025)

79. Handayani, P.L.; Yun, S.; Kim, K.; **Choi, U.H.*** "Fluorinated Functional Units for Li⁺ Flux Homogenization in Silica Framework-Based Zwitterionic Single Ion Conductors for Stable Lithium Metal Batteries" *Adv. Energy Mater.* 15, 2405505 (2025)

78. Cho, A.H.; Je, J.H.; **Choi, U.H.*** "Ion-Anchoring Dipole-Integrated Composite Elastomer Electrolyte and Cathode for High-Performance Lithium Metal Batteries via Multiple-Bridge Engineering" *Adv. Energy Mater.* 15, 2405312 (2025)

77. Shin, J.C.; Kim, T.Y.; **Choi, U.H.**; Lee, M.* "Pyrrolidinium-Based Polyurethane Ionenenes: Influence of Counterions, Chain Extenders, and PEG Blocks on Thermal Properties and Ion Conduction" *ACS Appl. Polym. Mater.* 7, 3067 (2025)

76. Biutty, M.; Jang, S.; Je, J.H.; **Choi, U.H.**; Kee, S.; Kim, Y.; Kim, J.; Roh, J.W.; Kim, J.H.; Yoo, S. I.* "Interfacial Ion Transport of Porous Polydimethylsiloxane–Polydopamine Composites for Solar Thermoelectric Conversion" *Adv. Sustain. Syst.* 9, 2400509 (2024)

75. Handayani, P.; Lee, Y.J.; **Choi, U.H.*** "High-Performance Zwitterionic Hydrogel Polymer Electrolytes for Aqueous Zinc-Ion Batteries: Superior Ionic Conductivity and Stability" *Polym. Korea* 48, 639 (2024)

74. Choi, G.; Kim, S.H.; Yang, B.-J.; Jung, J.W.; **Choi, U.H.***; Park, C.* "Facile supramolecular processing of recyclable adaptive polymer composites for highly reproducible sensory materials" *Chem. Eng. J.* 497, 154730 (2024)

73. Biutty, M.; Kim, H.; Handayani, P.; Eom, Y.; **Choi, U.H.**; Kim, J.H.; Kim, M.H.; Yoo, S. I.* "Self-powered Smart Pressure Sensors by Stimuli-responsive Ion Transport within Layered Hydrogels" *Chem. Eng. J.* 495, 153565 (2024)

72. Kwon, H.; Kim, S.; Park, H.; Park, J.S.; Park, J.; Lee, Y.; Yang, S.J.*; **Choi, U.H.*** "Enhancing Energy Density in Flexible All-Solid-State Supercapacitors via Dielectricizer Zwitterion-Containing Quasi-Solid-State Polymer Electrolyte" *Adv. Funct. Mater.* 34, 2406727 (2024)

71. Lee, D.; Ahn, C.W.; Lee, Y.*; **Choi, U.H.***; Kim, J.* "Centrifugal-gravity-enforced Deposition of MXene Electrodes for High-performance and Ultra-stable Microsupercapacitors" *ACS Appl. Mater. Interfaces* 16, 26004 (2024)
70. Je, J.H.; **Choi, U.H.*** "High-Performance Environmentally Adaptive Flexible Supercapacitors via Triple-Network Hydrogel Polymer Electrolytes with Chemical-Hydrophobic-Ionic Association Networks". *Chem. Eng. J.* 483, 149386 (2024)
69. Lee, D.; Park, G.; **Choi, U.H.***; Kim, J.* "Quasi-Solid Polymer Electrolytes with Cerebral Cortex-Like Branched Network for High Performance Microsupercapacitors". *Small* 2308821 (2024)
68. Kim, T.Y.; Yun, S.; Chae, J.A.; Kim, H.J.*; **Choi, U.H.*** "Nanohybrid Gel Polymer Electrolytes Based on Vinyl-Functionalized Mesoporous Silica Nanoparticles for Lithium Metal Batteries". *ACS Appl. Energy Mater.* 7, 48 (2024)
67. Park, S.M.; **Choi, U.H.*** " Exceptionally Flexible and Stable Quasi Solid State Supercapacitors via Salt-in-Polyampholytes Electrolyte with Non-Freezable Properties". *Chem. Eng. J.* 479, 147384 (2024)
66. Lee, J.; Kim, S.; Kwon, H.; Jo, S.; Ryu, D.Y.*; **Choi, U.H.***; Kim, B.-S.* "Single-Ion Conducting Polyether Electrolytes via Orthogonal Post-Polymerization Modification". *Macromolecules* 56, 7520 (2023)
65. Choi, H.; Kim, Y.; Kim, S.; Kim, S.; Kim, J.; Yun, E.; Kweon, H.; Amoli, V.*; **Choi, U.H.***; Lee, H.*; Kim, D.H.* "Ions-Silica Percolated Ionic Dielectric Elastomer Actuator for Soft Robots". *Adv. Sci.* 2303838 (2023)
64. Lee, D.; Park, G.; Kim, Y.; Choi, J.*; **Choi, U.H.***; Kim, J.* "Tailoring Ion Dynamics in Energy Storage Conductors for Ultra-stable, High-performance Solid-state Microsupercapacitor Array". *Chem. Eng. J.* 472, 144903 (2023)
63. **Choi, U.H.***; Puji, L.H.; Song, Y.H.; Kim, T.; Han, A.; Colby, R.H. "Ionic Conduction and Dielectric Response of Nanoparticle-Coupled Hydrogel Network Polymer Electrolytes". *Macromolecules* 56, 3393 (2023)
62. Lee, S.; **Choi, U.H.*** "High Ion Conducting Double Network Crosslinked Gel Polymer Electrolytes for High-Performance Supercapacitors". *Macromol. Chem. Phys.* 224, 2200460 (2023)
61. Park, S.M.; **Choi, U.H.*** "Highly stretchable and conductive hybrid gel polymer electrolytes enabled by a dual cross-linking approach". *Macromol. Res.* 31, 141 (2023)
60. Shin, J.C.; Kim, T.Y.; Kim, H.J.; **Choi, U.H.**; Park, H.S.; Lee, M.* "New organic ionic plastic crystals based on pyrrolidinium dication for a solid-phase electrolyte". *Bull.*

Korean Chem. Soc. 44, 310 (2023)

59. Kim, S.; Jung, H.K.; Handayani, P.L.; Kim, T.; Jung, B.M.; **Choi, U.H.*** "Fast Li⁺ Transport via Silica Network-Driven Nanochannels in Ionomer-in-Framework for Lithium Metal Batteries". *Adv. Funct. Mater.* 33, 2210916 (2023)
58. Nguyen, T.H.; Lee, D.; Song, Y.; **Choi, U.H.**; Kim, J.* " High Ion Conductivity Sodium-based Ionic Gel Polymer Electrolyte for High-performance and Ultra-stable Micro-supercapacitor". *ACS Appl. Mater. Interfaces* 15, 3054 (2023)
57. Handayani, P.L.; Kim, T.; Song, Y.H.; Park, J.S.; Yang, S.J.*; **Choi, U.H.*** "Tailoring Molecular Interaction in Heteronetwork Polymer Electrolytes for Stretchable, High-Voltage Fiber Supercapacitors". *Chem. Eng. J.* 452, 139432 (2023)
56. Park, J.H.; Jung, S.; Aluru, N.; Kim, T.; Lee, S.B.; **Choi, U.H.***; Lee, J.* "Enthalpic and Entropic Contributions to Fast Lithium Ion Conduction in Solid-State Aqueous Polymer Electrolytes". *J. Phys. Chem. C* 126, 16777 (2022)
55. Kim, Y.M.; Kwon, J.H.; Kim, S.; **Choi, U.H.**; Moon, H.C.* " Ion-cluster-mediated ultrafast self-healable ionoconductors for reconfigurable electronics". *Nat. Commun.* 13, 3769 (2022)
54. Biutty, M.N.; Koo, J.-M.; Kim, J.H.; Kim, S.; **Choi, U.H.**; Imani, K.B.C.; Yoon, J.; Chang, B.-Y.; Yoo, S.I.* "Ion transport through layered hydrogels for low- frequency energy harvesting toward self-powered chemical systems". *J. Mater. Chem. A* 10, 11881 (2022)
53. Lee, D.; Song, Y.; Song, Y.; Oh, S.J.; **Choi, U.H.***; Kim, J.* "Multi-Foldable and Environmentally-Stable All-Solid-State Supercapacitor Based on Hierarchical Nano-Canyon Structured Ionic-Gel Polymer Electrolyte Dawoon". *Adv. Funct. Mater.* 32, 2109907 (2022)
52. Handayani, P.L.; Nulandaya, L.; Cheon, J.Y.; Kim, T.; Yoo, S.; **Choi, U.H.*** "Self-Assembled, Block Copolymer Electrolyte Membranes with Silica Network-Derived Nanochannels for All-Solid-State Supercapacitors". *Chem. Eng. J.* 429, 132273 (2022)
51. Kim, S.; **Choi, U.H.*** "The effect of inorganic nanoparticles on ion conduction in poly(lithium acrylate)-based composite polymer electrolytes for energy storage devices". *Mol. Cryst. Liq. Cryst.* 1-8 (2022)
50. Jeong, M.U.; Song, Y.H.; Jeong, J.H.; Lee, Y.; **Choi, U.H.**; Eom, Y.* "Preparation of porous polyacrylonitrile membrane-based gel polymer electrolyte for solid-state supercapacitor". *Mol. Cryst. Liq. Cryst.* 729, 20 (2021)
49. Kim, Y.; Lee, D.; Seong, J.; Bak, B.; **Choi, U.H.**; Kim, J.* "Ionic Liquid-based

Molecular Design for Transparent, Flexible, and Fire-retardant Triboelectric Nanogenerator (TENG) for Wearable Energy Solutions”. *Nano Energy* 84, 105925 (2021)

48. Jeong, M.U.; Goh, Y.; Kwon, D.-K.; **Choi, U.H.*** "The effect of lithium salt type on ionic conductivity of poly(vinylidene difluoride)-based solid polymer electrolytes”. *Mol. Cryst. Liq. Cryst.* 705, 93 (2020)

47. Handayani, P.L.; **Choi, U.H.*** "Flexible and high ion conducting solid polymer electrolytes prepared via ring-opening polymerization”. *Mol. Cryst. Liq. Cryst.* 705, 99 (2020)

46. **Choi, U.H.**; Price, T.L.; Schoonover, D.V.; Xie, Renxuan; Gibson, H.W.; Colby, R.H.* "Role of Chain Polarity on Ion and Polymer Dynamics: Molecular Volume-Based Analysis of Dielectric Constant for Polymerized Norbornene-based Ionic Liquids”. *Macromolecules* 53, 10561 (2020)

45. Park, J.H.; Jung, S.Y.; Song, Y.H.; Aluru, N.R.; Kim, T.; Lee, S.B.; **Choi, U.H.***; Lee, J.* "Water-Assisted Increase of Ionic Conductivity of Lithium Poly(acrylic acid)-Based Aqueous Polymer Electrolytes”. *ACS Appl. Energy Mater.* 3, 10119 (2020)

44. Biutty, M.; Koo, J.M.; Zakia, M.; Handayani, P.; **Choi, U.H.**; Yoo, S.I. "Dielectric Control of Porous Polydimethylsiloxane Elastomers with Au Nanoparticles for Enhancing the Output Performance of Triboelectric Nanogenerators" *RSC Adv.* 10, 21309 (2020)

43. Song, Y.H., Kim, T.; **Choi, U.H.*** "Tuning Morphology and Properties of Epoxy-Based Solid Polymer Electrolytes by Molecular Interaction for Flexible All-Solid-State Supercapacitors”. *Chem. Mater.* 32, 3879 (2020)

42. **Choi, U.H.**; Price, T.L.; Schoonover, D.V.; Gibson, H.W.; Colby, R.H. "The Effect of Oligo(oxyethylene) Moieties on Ion Conduction and Dielectric Properties of Norbornene-Based Imidazolium Tf₂N Ionic Liquid Monomers”. *Macromolecules* 53, 4990 (2020)

41. Lee, D.; Song, Y.H.; **Choi, U.H.***; Kim, J.* "Highly Flexible and Stable Solid-State Supercapacitors Based on a Homogenous Thin Ion Gel Polymer Electrolyte Using a Poly(dimethylsiloxane) Stamp”. *ACS Appl. Mater. Interfaces* 11, 42221 (2019)

40. Lee, M.; Gibson, H.W.; Kim, T.; Colby, R.H.; **Choi, U.H.*** "Ion–Dipole-Interaction-Driven Complexation of Polyethers with Polyviologen-Based Single-Ion Conductors”. *Macromolecules* 52, 4240 (2019)

39. Lee, M.S.; Whang, D.R.; Song, Y.H.; Kim, J.T.; Yang, M.H.; **Choi, U.H.***; Chang,

- D.W.* "Effects of pyridine and pyrrole moieties on supercapacitive properties of imine-rich nitrogen-doped graphene". *Carbon* 152, 915 (2019)
38. Park, B.; Kim, T.; Jeon, S.; Kwon, S.J.; Jang, H.K.; Jung, B.M.; Ahn, S.-K.; **Choi, U.H.**; Lee, J.; Lee, S.B. "Influence of Intermolecular Interactions on Molecular Geometry and Physical Quantities in Electrolyte Systems". *Molecular Physics* 117, 1790 (2019)
37. Emon, O.F.; Lee, J.; **Choi, U.H.**; Kim, D.-H.; Lee, K.-C; Choi, J.-W. "Characterization of a Soft Pressure Sensor on the Basis of Ionic Liquid Concentration and Thickness of the Piezoresistive Layer". *IEEE SENSORS JOURNAL* 19, 6076 (2019)
36. Lee, M.; Kwon, Y.K.; Kim, J.; **Choi, U.H.*** "Effect of Poly(ethylene glycol) Crystallization on Ionic Conduction and Dielectric Response of Imidazolium-Based Copolyester Ionomers". *Macromolecules* 52, 2314 (2019)
35. Price, T.L.; **Choi, U.H.**; Schoonover, D.V.; Arunachalam, M; Xie, R.; Lyle, S.; Colby, R.H.; Gibson, H.W. "Ion Conducting ROMP Monomers Based on (Oxa)norbornenes with Pendant Imidazolium Salts Connected via Oligo(oxyethylene) Units and with Oligo(ethyleneoxy) Terminal Moieties". *Macromolecules* 52, 1371 (2019)
34. Price, T.L.; **Choi, U.H.**; Schoonover, D.V.; Wang, D.; Heflin, J.R.; Xie R.; Colby, R.H.; Gibson, H.W. "Studies of Ion Conductance in Polymers Derived from Norbornene Imidazolium". *Macromolecules* 52, 1389 (2019)
33. Lee, J.; Song, B.; Subbiah, R.; Chung, J.J.; **Choi, U.H.**; Park, K.; Kim, S.-H.; Oh, S.J. "Effect of chain flexibility on cell adhesion: Semi-flexible model-based analysis of cell adhesion to hydrogels". *Scientific Reports* 9, 2463 (2019)
32. Chae, H.; Lee, Y.-H; Yang, M.; Yoon, W.-J; Yoon D.K.; Jeong, K.-U; Song, Y.H.; **Choi, U.H.**; Lee, M. "Interesting phase behaviors and ion-conducting properties of dicationic N-alkylimidazolium tetrafluoroborate salts". *RSC Adv.* 9, 3972 (2019)
31. Jang, H.K.; Jung, B.M.; **Choi, U.H.***; Lee, S.B.* "Ion Conduction and Viscoelastic Response of Epoxy-Based Solid Polymer Electrolytes Containing Solvating Plastic Crystal Plasticizer". *Macromol. Chem. Phys.* 219, 1700514 (2018)
30. **Choi, U.H.**; Jung, B.M. "Ion Conduction, Dielectric and Mechanical Properties of Epoxy-Based Solid Polymer Electrolytes Containing Succinonitrile". *Macromol. Res.* 26, 459 (2018)
29. Kim, O.; Kim, K.; **Choi, U.H.**; Park, M.J. "Tuning anhydrous proton conduction in single-ion polymers by crystalline ion channels". *Nat. Commun.* 9, 5029 (2018)
28. Kwon, S.J.; Kim T.; Jung, B.M.; Lee, S.B.; **Choi, U.H.*** "Multifunctional Epoxy-

Based Solid Polymer Electrolytes for Solid- State Supercapacitors". *ACS Appl. Mater. Interfaces* 10, 35108 (2018)

27. Choi, U.H.; Kwon, Y.K.; Lee, M. "Correlating morphology to thermal and electrical properties in imidazolium-poly(ethylene glycol) copolyesters". *Polymer* 146, 420 (2018)

26. Choi, U.H.; Park, J.H.; Kim, J. "Manipulation and Investigation of Uniformly-Spaced Nanowire Array on a Substrate via Dielectrophoresis and Electrostatic Interaction". *Nanomaterials* 8, 456 (2018)

25. Kwon, S.J.; Jung, B.M.; Kim, T.; Byun, J.; Lee, J.; Lee, S.B.; **Choi, U.H.*** "Influence of Al₂O₃ Nanowires on Ion Transport in Nanocomposite Solid Polymer Electrolytes". *Macromolecules* 51, 10194 (2018)

24. Choi, U.H.; Kim, J. "Precise Placement of Metallic Nanowires on a Substrate by Localized Electric Fields and Inter-Nanowire Electrostatic Interaction". *Nanomaterials* 7, 335 (2017)

23. Lee, M.; Lee, Y.-H.; Park, J.H.; **Choi, U.H.** "Bis-imidazolium iodide organic ionic plastic crystals and their applications to solid state dye-sensitized solar cells". *Organic Electronics* 48, 241 (2017)

22. Choi, U.H.; Colby, R.H. "The Role of Solvating 12-Crown-4 Plasticizer on Dielectric Constant and Ion Conduction of Poly(ethylene oxide) Single-Ion Conductors". *Macromolecules* 50, 5582 (2017)

21. Kim, Y.; Kwon, S.J.; Jang, H.K.; Jung, B. M.; Lee, S.-B.; **Choi, U.H.*** "High Ion Conducting Nanohybrid Solid Polymer Electrolytes via Single-Ion Conducting Mesoporous Organosilica in Poly(ethylene oxide)". *Chem. Mater.* 29, 4401 (2017)

20. Kim, O.; Kim, H.; **Choi, U.H.;** Park, M.J. "One-Volt-Driven Superfast Polymer Actuators based on Single-Ion Conductors". *Nat. Commun.* 7, 13576 (2016)

19. Choi, U.H.; Liang, S.; Chen, Q.; Runt, J.; Colby, R.H. "Segmental Dynamics and Dielectric Constant of Polysiloxane Polar Copolymers as Plasticizers for Polymer Electrolytes". *ACS Appl. Mater. Interfaces* 8, 3215-3225 (2016)

18. Choi, U.H.; Mittal, A.; Price, T.L.; Colby, R.H.; Gibson, H.W. "Imidazolium-based Ionic Liquids as Initiators in Ring Opening Polymerization: Ionic Conduction and Dielectric Response of End-Functional Polycaprolactones and Their Block Copolymers". *Macromol. Chem. Phys.* 217, 1270-1281 (2016)

17. Jo, G.; Kim, O.; Kim, H.; **Choi, U.H.;** Lee, S.-B.; Park, M.J. "End-functionalized block copolymer electrolytes: effect of segregation strength on ion transport efficiency". *Polymer Journal* 1-8 (2016)

16. Cho, S.; Choi, J.R.; Jung, B.M.; **Choi, U.H.**; Lee, S.-K.; Kim, K.H.; Lee, S.-B. "Electro-magnetic Properties of Composites with Aligned Fe-Co Hollow Fibers". *AIP Advances* **6**, 055920 (2016)
15. Liang, S.; Chen, Q.; **Choi, U.H.**; Bartels, J.; Bao, N.; Runt J.; Colby, R.H. "Plasticizing Li Single-ion Conductors with Low-Volatility Siloxane Copolymers and Oligomers Containing Ethylene Oxide and Cyclic Carbonates". *J. Mater. Chem. A* **3**, 21269-21276 (2015)
14. **Choi, U.H.**; Mittal, A.; Price, T.L.; Lee, M.; Gibson, H.W.; Runt J.; Colby, R.H. "Molecular Volume Effects on the Dynamics of Polymerized Ionic Liquids and their Monomers". *Electrochim. Acta* **175**, 55-61 (2015)
13. **Choi, U.H.**; Middleton, L.R.; Soccio, M.; Buitrago, C.F.; Aitken, B.S.; Masser, H.; Wagener, K.B.; Winey, K.I.; Runt, J. "Dynamics of Precise Ethylene Ionomers Containing Ionic Liquid Functionality". *Macromolecules* **48**, 410-420 (2015)
12. Lee, M.; **Choi, U.H.**; Colby, R.H.; Gibson, H.W. "Ion Conduction in a Semicrystalline Polyviologen and Its Polyether Mixtures". *Macromol. Chem. Phys.* **216**, 344-349 (2015)
11. Liang, S.; O'Reilly, M.V.; **Choi, U.H.**; Shiao, H.-S.; Bartels, J.; Chen, Q.; Runt, J.; Winey, K.I.; Colby, R.H. "High Ion-Content Siloxane Phosphonium Ionomers with Very Low T_g". *Macromolecules* **47**, 4428-4437 (2014)
10. **Choi, U.H.**; Liang, S.; O'Reilly, M.V.; Winey, K.I.; Runt, J.; Colby, R.H. "Influence of Solvating Plasticizer on Ion Conduction of Polysiloxane Single-Ion Conductors ". *Macromolecules* **47**, 3145-3153 (2014)
9. **Choi, U.H.**; Ye, Y.; Cruz, D.S.L.; Winey, K.I.; Elabd, Y.A.; Runt J.; Colby, R.H. "Dielectric and Viscoelastic Responses of Imidazolium-based Ionomers with Different Side Chain Lengths and Counterions". *Macromolecules* **47**, 777-790 (2014)
8. Kesava, S.V.; Dhanker, R.; Kozub, D.R.; Vakhshouri, K.; **Choi, U.H.**; Colby, R.H.; Wang, C.; Hexemer, A.; Giebink, N.C.; Gomez, E.D. "Mesoscopic Structural Length Scales in P3HT/PCBM Mixtures Remain Invariant for Various Processing Conditions". *Chem. Mater.* **25**, 2812-2818 (2013)
7. **Choi, U.H.**; Mittal, A.; Price, T.L.; Gibson, H.W.; Runt J.; Colby, R.H. "Polymerized Ionic Liquids with Enhanced Static Dielectric Constants". *Macromolecules* **46**, 1175-1186 (2013)
6. Liang, S.; **Choi, U.H.**; Liu, W.; Runt, J.; Colby, R.H. "Synthesis and Lithium Ion Conduction of Polysiloxane-based Single-Ion Conductors Containing Novel Weak-

Binding Borates". *Chem. Mater.* **24**, 2316-2323 (2012)

5. Choi, U.H.; Lee, M.; Wang, S.; Liu, W.; Winey, K.I.; Gibson, H.W.; Colby, R.H. "Ionic Conduction and Dielectric Response of Poly(imidazolium acrylate) Ionomers". *Macromolecules*, **45**, 3974-3985 (2012)

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3. Lee, M.; **Choi, U.H.;** Cruz, D.S.L.; Mittal, A.; Winey, K.I.; Colby, R.H.; Gibson, H.W. "Imidazolium Polyesters: Structure-Property Relationships in Thermal Behavior, Ionic Conductivity, and Morphology". *Adv. Funct. Mater.* **21**, 708-717 (2011)

2. Lee, M.; **Choi, U.H.;** Colby, R.H.; Gibson, H.W. "Ion Conduction in Imidazolium Acrylate Ionic Liquids and their Polymers". *Chem. Mater.* **22**, 5814-5822 (2010)

1. Sung, J.; Park, J.M.; **Choi, U.H.;** Huh, J.; Jung, B.; Min, B.G.; Ahn, C.H.; Park, C. "Control of SWNT Dispersion by Block Copolymers with a Side-chain Polarity Modifier". *Macromol. Rapid Commun.* **28**, 176-182 (2007)

Proceedings:

1. Liang, S.; **Choi, U.H.;** Runt, J.; Colby, R.H. "Synthesis and Characterization of Polysiloxane-Based Single-Ion Conductors". *PMSE Preprints (American Chemical Society, Division of Polymer Materials: Science and Engineering)* (2011)

2. Mittal, A.; Gibson, H.W.; Lee, M.; **Choi, U.H.;** Colby, R.H.; La Cruz, D.S.L.; Winey, K.I. "Designing and Developing Imidazolium-based Monomers for Ion-conducting Polyelectrolytes". *Polymer Preprints (American Chemical Society, Division of Polymer Chemistry)* **52**, (2011).

3. Lee, M.; **Choi, U.H.;** Colby, R.H.; Gibson, H.W. "Room-temperature Ionic Liquid Monomers and Their Polymers: Synthesis and Characterization of Poly(imidazolium acrylate)s". *Polymer Preprints (American Chemical Society, Division of Polymer Chemistry)* **50**, 624-625 (2009).

4. Wang, Y.; Liang, S.; Liu, W.; **Choi, U.H.;** Colby, R.H. "Synthesis and Characterization of Polar Polysiloxanes". *Polymer Preprints (American Chemical Society, Division of Polymer Chemistry)* **50**, 866-867 (2009).

Book

Chapters

1. Choi, U.H.; Runt, J. In *Encyclopedia of Polymeric Nanomaterials*; Kobayashi, S., Müllen, K., Eds.; Springer, 2015; Mechanical and Electrical Properties of Ion-Containing Polymers, pp 1197-1202.

2. Choi, U.H.; Runt, J. In *Encyclopedia of Polymeric Nanomaterials*; Kobayashi, S.,

Müllen, K., Eds.; Springer, 2015; Structures in Ion-Containing Polymers, pp 2345-2351.

Selected

Presentations

1. The Polymer Society of Korea, 2017 Spring Meeting, Presenter (invited) "*Understanding Ion Transport in Polymeric Single-Ion Conducting Electrolytes*", Korea, April 7, 2017.
2. American Physical Society (APS) March Meeting (DPOLY), Presenter "*Understanding Ion Transport in Epoxy based Polymer Electrolyte*", New Orleans, LA, March 2017.
3. The 3rd Korea-Japan International Symposium on Materials Science & Technology, Presenter (invited) "*Understanding Ion Transport in Polymeric Energy Materials*", Korea, November 16, 2016.
4. The 10th Asian-Australasian Conference on Composite Materials, Presenter "*Understanding Ion Transport in Epoxy-based Polymer Electrolytes*", Korea, October 18, 2016.
5. International Symposium for Advanced Materials Research, Presenter (invited) "*Dynamics of Polymerized Ionic Liquids and Their Monomers*", Taiwan, August 16 – 20, 2015.
6. 6TH Congress On Ionic Liquids (COIL) Conference, Presenter "*Molecular Volume Effects on the Dynamics of Polymerized Ionic Liquids and Their Monomers*", Jeju, June 16 - 20, 2015
7. International Union of Pure and Applied Chemistry (IUPAC) World Polymer Congress, Presenter "*Ionic Conduction and Dielectric Response of Poly(imidazolium acrylate) Ionomers*", Blacksburg, VA, June 2012.
8. APS (DPOLY) Meeting, Presenter "*Ion Conduction and Dielectric Response of Imidazolium-based Single-ion Conductors*", Boston, MA, March 2012.
9. APS (DPOLY) Meeting, Poster Presentation "*Effect of Solvating Plasticizers on Ion Conduction of Polysiloxane Single-ion Conductors with Lithium Tetraphenyl Borate and Cyclic Carbonate Side Chains*", Boston, MA, March 2012.
10. 4TH Congress On Ionic Liquids (COIL) Conference, Presenter "*Conductivity and Dielectric Behavior of Imidazolium-Based Monomers and Polymers*", Arlington, Virginia, June 15 - 18, 2011.
11. APS (DPOLY) Meeting, Presenter "*Understanding Ion Transport in Plasticized Polymer Electrolytes using Dielectric Spectroscopy*", Dallas, TX, March 2011.
12. APS (DPOLY) Meeting, Poster Presentation "*Time Scales of Ion Transport in*

Imidazolium-based Polymers", Dallas, TX, March 21-25, 2011.

13. MRS Spring Meeting, Presenter "*Understanding Ion Transport in Imidazolium-based Polymers Using Dielectric Spectroscopy*", San Francisco, CA, April 5-9, 2010.

14. MRS Spring Meeting, Poster Presentation "*Effects of the Structure and Ion Type on the Ionic Conductivity of Imidazolium-based Polymer*", San Francisco, CA, April 5-9, 2010.

15. Polymers and Ionic Liquids Conference, Poster Presentation "*Understanding Ion Transport in Imidazolium-based Polymers using Dielectric Spectroscopy*", Arlington, October 5-7, 2009.

16. APS (DPOLY) Meeting, Presenter "*Understanding Ion Transport in Polymerized Ionic Liquids using Dielectric Spectroscopy*", Pittsburgh, PA, March 2009.

17. MRS Fall Meeting, Poster in Dynamics of Soft Matter "*Understanding Ion Transport in Ionomers using Dielectric Spectroscopy*", Boston, December 4-6, 2008.

18. Gordon Research Conference (GRC), Poster in Polymer Physics "*Understanding Ion Transport in Ionomers using Dielectric Spectroscopy*", Newport, June 29-July 4, 2008.