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Associate Professor

School of Chemical Engineering, Sungkyunkwan University (SKKU)

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Education

2009.12 - 2013.05 *Ph.D.*, Department of Chemistry,

RWTH Aachen University, Aachen, Germany

* *Thesis – Novel fabrication approaches toward nanostructured functional surfaces: from artificial leaves to block copolymer template*

2007.03 - 2009.08 *M. Sc.*, Department of Fine Chemical Engineering and Chemistry,

Chungnam National University, Daejeon, South Korea

* *Thesis - Fabrication of silicate nanomold and hybrid polymer microwell by imprinting techniques for practical applications.*

2000.03 - 2007.02 *B. Sc.*, Department of Fine Chemical Engineering and Chemistry,

Chungnam National University, Daejeon, South Korea

* *2001.05 - 2003.07 Military Service*

Employment

2023.09 – present Associate Professor

School of Chemical Engineering

Sungkyunkwan University, Suwon, South Korea

2018.09 – 2023.08 Assistant Professor (2018.09~2022.09) / Associate Professor (2022.10~2023.08)

Department of Polymer Nanoscience and Technology

Jeonbuk National University, Jeonju, South Korea

2017.12 – 2018.08	Senior Engineer, Global Technology Center Samsung Electronics, Suwon, South Korea
2016.06 – 2017.12	Postdoctoral Research Associate Department of Chemical Engineering and Biomolecular Engineering North Carolina State University, Raleigh, USA
2013.07 – 2016.06	Senior Research Engineer Advanced Functional Materials Research Team Hyundai Motor Company, Hwaseong, South Korea

Honors/Awards

2022.06	Front Cover Article in <i>Applied Materials Today</i>
2022.02	JBNU (Jeonbuk National University) Young Fellow
2020. 05	Miwon Sangsa Young Scientist Award at the Korean Society of Industrial and Engineering Chemistry
2013.02	Soft Matter World 2013 Calendar Image Competition Winner (September)
2011.08	Front Cover & Hot Paper in <i>Journal of Materials Chemistry</i>
2009.12 – 2012. 11	Ph.D. Fellowship - RWTH Aachen University

Research Interest

- Stretchable and soft electronics using liquid metals
- Electrochemistry (Energy Storage, Energy Harvesting and Water Splitting)
- Polymer physics (Physical behavior of polymers at surfaces and interfaces) / Conducting Polymers

Peer-reviewed publications

1. S. K. Pati, D. Patra*, S. Muduli, S. Mishra, S. Park*, “Energy Storage Application of Conducting Polymers Featuring Dual Acceptors: Exploring Conjugation and Flexible Chain Length Effects”, *Small*, 2023, 2300689.
2. S. Kim, M. Saito, Y. Wei, P. Bhuyan, M. Choe, T. Fujie, K. Mondal, S. Park*, “Stretchable, Soft and Wearable Polymeric Heaters and Strain Sensors Fabricated using Liquid Metals”, *Sens. Actuator A Phys.*, 2023, 114317.
3. P. Bhuyan, Y. Wei, M. Choe, D. Cho, S. Lee, S. Park*, "Liquid-Metal-Microdroplets-Incorporated

Ultrasoft Dielectric Gel toward Stretchable and Healable Waste-Energy-Harvesting Devices", *Nano Energy*, 2023, 108, 108214.

4. Q. T. Nguyen, U. T. Nakate*, J. Chen, S. Park, S. Park*, "Evolution of Novel Nanostructured MoCoFe-based Hydroxides Composites Toward High-Performance Electrochemical Applications: Overall Water Splitting and Supercapacitor", *Compos. B. Eng.*, 2023, 252, 110528.
5. D. Patra, X. Zhan, R. Linthoinganbi, S. Muduli, S. Mishra, Y. Liu, **S. Park***, "Synthesis and Application of Dual Electron-Deficient Featured Copolymers and their Sequential Fluorination for Ambipolar Organic Thin Film Transistors", *J. Mater. Chem. C*, 2023, 11, 1457-1463.
6. S. Kim, S. Lee, P. Bhuyan, Y. Wei, S. Kim, K. Shimizu, J. Shintake, **S. Park***, "Stretchable and Soft Electrode Adhesion and Capacitive Sensors Enabled by Spider Web-Inspired Interdigitated Liquid Metal Subsurface Microwires", *Chemical Engineering Journal*, 2023, 456, 141018.
7. Q. T. Nguyen, U. T. Nakate*, J. Chen, S. Park, **S. Park***, "Ceria Nanoflowers Decorated Co₃O₄ Nanosheets Electrodes for Highly Efficient Electrochemical Supercapacitors", *Appl. Surf. Sci.*, 2023, 613, 156034.
8. P. Bhuyan, Y. Wei, D. Cho, U. T. Nakate, S. Kim, S. Lee, M. Choe, H. Jeon*, **S. Park***, "Multifunctional Ultrasoft Electronics Enabled by Uncrosslinked Polysiloxane Elastomers Patterned with Rheologically Modified Liquid Metal Electrodes: Beyond Current Soft and Stretchable Electronics", *Chemical Engineering Journal*, 2023, 453, 139832.
9. S. Lee, P. Bhuyana, K. J. Bae, J. Yu, H. Jeon, **S. Park***, "Interdigitating Elastic Fibers with a Liquid Metal Core Toward Ultrasoft and Soft Capacitive Sensors: From 1D Fibers to 2D Electronics", *ACS Appl. Electron. Mater.*, 2022, 4, 12, 6275-6283.
10. Q. T. Nguyen, U. T. Nakate*, J. Chen, Y. Wei, **S. Park***, "High-performance oxygen evolution reaction activity at low and higher current densities using nanostructured CeO₂ and plasma-assisted Bi@CeO₂ electrocatalysts", *Mater. Sci. Eng. B*, 2022, 2022, 286, 116014.
11. J. Chen, U. T. Nakate*, Q. T. Nguyen, Y. Wei, **S. Park***, "Surface Activated Co₃O₄/MoO₃ Nanostructured Electrodes by Air-Plasma Treatment Toward Enhanced Supercapacitor", *Mater. Sci. Eng. B*, 2022, 285, 115928.
12. D. Patra, **S. Park***, "Solution Processable Benzotrithiophene (BTT)-Based Organic Semiconductors: Recent Advances and Review", *Macromol. Rapid Commun.*, 2022, 43, 21, 2200437.
13. S. Kim, S. Kim, K. Hong, M. D. Dickey, **S. Park***, "Liquid Metal Coated Magnetic Particles Toward Writable, Non-Wettable, Stretchable Circuit Boards and Directly Assembled Liquid Metal- Elastomer Conductors", *ACS Appl. Mater. Interfaces*, 2022, 14, 32, 37110–37119.
14. J. Chen, U. T. Nakate*, Q. T. Nguyen, **S. Park***, "Electrodeposited Bi(OH)₃@Mo(OH)₄ Nanostructured Electrode for High-performance Supercapacitor Application", 2022, *Ceram. Int.*, 2022, 48, 15, 22458-22466.
15. Q. T. Nguyen, U. T. Nakate*, J. Chen, D. T. Tran, **S. Park***, "Hybrid Nanostructured Bismuth– Cobalt Oxides/Hydroxides Binder Free Electrodes Fabricated by Two-Step Electrodeposition for High–

- Performance Supercapacitors", *Int. J. Energy Res.*, 2022, 46, 9, 12254-12265.
16. Y. Wei, S. Kim, S. Kim, P. Bhuyan, K. Hong, D. T. Tran, K. -U. Jeong, **S. Park***, "Liquid Metal Fillers Enabled Remote Actuating and Localizing Reversible Wrinkles on Polymeric Bilayer", *Appl. Mater. Today*, 2022, 28, 101537. (Front Cover)
 17. J. Chen, U. T. Nakate*, D. T. Tran, **S. Park***, "Cobalt-Incorporated Tellurium Nanostructured Electrocatalysts for Hydrogen Evolution Reaction in Acidic Electrolyte", *Int. J. Energy Res.*, 2022, 46, 9, 13044-13058.
 18. V. K. Singh, U. T. Nakate, P. Bhuyan, J. Chen, D. T. Tran, **S. Park***, "Mo/Co Doped 1T-VS2 Nanostructures as a Superior Bifunctional Electrocatalyst for Overall Water Splitting in Alkaline Media", *J. Mater. Chem. A*, 2022, 10, 9067-9079.
 19. U. T. Nakate, Y. T. Yu, **S. Park***, "Hydrothermal synthesis of ZnO nanoflakes composed of fine nanoparticles for H₂S gas sensing application" *Ceram. Int.*, 2022, 48, 28822-28829.
 20. J. Koo, J. Jang, M. Oh, M. Kim, J. Hyeong, S. -I. Lim, Y. Cao, D. T. Tran, **S. Park**, J. -U. Jeong, "Cyanostilbene-Based AIEgen Smart Film: Optical Switching by Engineering Molecular Packing Structure and Molecular Conformation Through Thermal and Photoinduced Monotropic Phase Transition", *Adv. Optical Mater.*, 2022, 10, 2200405.
 21. M. Lee, S. Paria, S. Mondal, G. -B. Lee, B. Shin, S. Kim, **S. Park**, C. Nah*, "Amphiphilic Block Copolymer and Silica Reinforced Epoxy Composite with Excellent Toughness and Delamination Resistance for Durable Electronic Packaging Application", *Polymer*, 2022, 245, 124679.
 22. U. T. Nakate, P. Bhuyan, Y. T. Yu, **S. Park***, "Synthesis and Characterizations of Highly Responsive H₂S Sensor using P-type Co₃O₄ Nanoparticles /Nanorods Mixed Nanostructures", *Inter. J. Hydrog. Energy*, 2022, 47, 12, 8145-8154.
 23. U. T. Nakate, Y. T. Yu, **S. Park***, "Hierarchical CuO Nanostructured Materials for Acetaldehyde Sensor Application", *Microelectron. Eng.*, 2022, 251, 111662.
 24. V. Kishnani, **S. Park**, U. T. Nakate, K. Mondal, A. Gupta*, "Nano-functionalized Paper-based IoT enabled Devices for Point-of-Care Testing: A Review", *Biomed. Microdevices*, 2022, 24, 2.
 25. D. Cho, P. Bhuyan, D. Sin, E. Kim, H. Kim, **S. Park***, "Stretchable, Soft, and Variable Stiffness Elastomer Foam with Positive and Negative Piezoresistivity Enabled by Liquid Metal Inclusion", *Adv. Mater. Technol.*, 2022, 7, 5, 2101092.
 26. P. Bhuyan, V. K. Singh, **S. Park***, "2D and 3D Structuring of Free Standing Metallic Wires Enabled by Room Temperature Welding for Soft and Stretchable Electronics", *ACS Appl. Mater. Interfaces*, 2021, 13, 30, 36644–36652.
 27. S. -I. Lim, J. Koo, J. Jang, M. Oh, D. T. Tran, **S. Park**, D. -Y. Kim*, K. -U. Jeong*, "Development of Diketopyrrolopyrrole-Based Smart Inks by Substituting Ionic Pendants and Engineering Molecular Packing Structures", *ACS Appl. Mater. Interfaces*, 2021, 13, 26, 31206-31214.
 28. P. Bhuyan, Y. Wei, D. Sin, J. Yu, C. Nah, K. -U. Jeong, M. D. Dickey, **S. Park***, "Soft and Stretchable Liquid Metal Composites with Shape Memory and Healable Conductivity", *ACS Appl. Mater.*

Interfaces, 2021, 13, 24, 28916-28924.

29. U. T. Nakate, Y. T. Yu, **S. Park***, "High Performance Acetaldehyde Gas Sensor based on p-n Heterojunction Interface of NiO Nanosheets and WO₃ Nanorods", *Sens. Actuators B Chem.*, 2021, 344, 130264.
30. U. T. Nakate, V. K. Singh, Y. T. Yu, **S. Park***, "WO₃ Nanorods Structures for High-performance Gas Sensing Application", *Mater. Lett.*, 2021, 299, 130092.
31. D. Sin, V. K. Singh, P. Bhuyan, Y. Wei, H. -M. Lee, B. -J. Kim, **S. Park***, "Ultrastretchable Thermo- and Mechanochromic Fiber with Healable Metallic Conductivity", *Adv. Electron. Mater.*, 2021, 7, 2100146.
32. **S. Park***, J. Shintake, E. Piskarev, Y. Wei, I. Joshipura, E. Frey, T. Neumann, D. Floreano, M. D. Dickey*, "Stretchable and Soft Electrode Adhesion Using Liquid-Metal Subsurface Microelectrodes", *Adv. Mater. Technol.*, 2021, 6, 9, 2100263.
33. Y. -J. Choi, S. Park, D. -G. Kang, S. -I. Lim, J. Koo, D. T. Tran, **S. Park**, K. -U. Jeong*, "Transfer and Amplification of Iodine-Based Diacetylene Amphiphiles to Anisotropic Optical Properties by Uniaxial Orientation in Thin Films", *ACS Appl. Mater. Interfaces*, 2021, 13, 19, 22884-22890.
34. D. -G. Kang, M. Park, H. Ko, M. Rim, **S. Park**, D. T. Tran, M. -J. Yoo, N. Kim, K. -U. Jeong*, "Thermal Energy Harvest and Reutilization by the Combination of Thermal Conducting Reactive Mesogens and Heat-Storage Mesogens", *ACS Appl. Mater. Interfaces*, 2021, 13, 11, 13637-13647.
35. Y. Wei, S. Lee, M. Choe, P. Bhuyan, E. Kim, H. Jeon, G. Kang, C. Nah, **S. Park***, "Non-Polymeric Thin Wires by Drawing Materials near Room Temperature", *Nano Select*, 2021, 2, 608-614.
36. Y. J. Choi, S. Park, W. J. Yoon, S. I. Lim, J. Koo, D. G. Kang, **S. Park**, N. Kim, K. -U. Jeong*, "Imidazolium-Functionalized Diacetylene Amphiphiles: Strike a Lighter and Wear Polaroid Glasses to Decipher the Secret Code", *Adv. Mater.*, 2020, 32, 39, 1-7.
37. M. Park, D. G. Kang, H. Ko, M. Rim, D. T. Tran, **S. Park**, M. Kang, T. W. Kim, N. Kim, K. -U. Jeong*, "Molecular Engineering of a Porphyrin-Based Hierarchical Superstructure: Planarity Control of a Discotic Metallomesogen for High Thermal Conductivity", *Mater. Horizons*, 2020, 7 (10), 2635-2642.
38. Y. Wei, T. Kshetri, P. Bhuyan, C. Nah, **S. Park***, "Hierarchical Patterns on Laminated Composite Bilayer Films via Surface Roughness-Mediated Buckling Instability", *Compos. B. Eng.*, 2020, 190, 107929.
39. **S. Park**, N. Baugh, H. Shah, D. P. Parekh, I. Joshipura, M. D. Dickey*, "Ultrastretchable Elastic Shape Memory Fibers with Electrical Conductivity", *Adv. Sci.*, 2019, 6, 1901579.
40. **S. Park***, "Manipulating the Sequences of Block Copolymer Patterns on Corrugated Substrates", *Polymer*, 2019, 121726.
41. **S. Park***, "Complex Core-Shell Morphologies of Block Copolymers Revealed Beneath the Surface", *Appl. Surf. Sci.*, 2019, 494, 309-314.
42. C. Lan, Z. Zhou, H. Ren*, **S. Park**, S. H. Lee*, "Fast-Response Microlens Array Fabricated using Polyvinyl Chloride Gel", *J. Mol. Liq.*, 2019, 283, 155-159.
43. P. Sen, Y. Xiong, Q. Zhang, **S. Park**, M. D. Dickey, W. You, H. Ade, M. W. Kudenov, B. T. O'Connor,

- “Shear Enhanced Transfer Printing of Conducting Polymer Thin Films”, *ACS Appl. Mater. Interfaces*, 2018, 10, 31560-31567.
44. **S. Park**, U. Nallainathan, K. Mondal, P. Sen, M. D. Dickey, “Light-induced buckles localized by polymeric inks printed on bilayer films”, *Small*, 2018, 14, 1704460.
 45. **S. Park**, K. Mondal, R. M. Treadway, V. Kumar, S. Ma, J. Holvey, M. D. Dickey, “Silicones for stretchable and durable soft devices: beyond sylgard-184”, *ACS Appl. Mater. Interfaces*, 2018, 10, 11261-11268.
 46. H. -M. Yang, C. W. Park, **S. Park**, J. -D. Kim, “Cross-linked magnetic nanoparticles with a biocompatible amide bond for cancer-targeted dual optical/magnetic resonance imaging”, *Colloids Surf B Biointerfaces*, 2018, 161, 183-191.
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 48. **S. Park**, X. Cheng, A. Böker, L. Tsarkova, “Hierarchical manipulation of block copolymer patterns on 3D topographic substrates: beyond graphoepitaxy”, *Adv. Mater.*, 2016, 28, 6900-6905.
 49. **S. Park***, S. Park, D. H. Jang, H. S. Lee, C. H. Park, “Anti-fogging behavior of water-absorbing polymer films derived from isosorbide-based epoxy resin”, *Mater. Lett.*, 2016, 180, 81-84.
 50. **S. Park**, P. van Rijn, A. Böker, “Artificial Leaves via Reproduction of Hierarchical Structures by a Fast Molding and Curing Process”, *Macromol. Rapid Commun.*, 2012, 33, 1300-1303.
 51. H. -H. Park, **S. Park**, H. Kim, H. Lim, D. -P. Kim, J. Lee, “Non-sticky polyvinylsilazane stamp with high durability for UV-nanoimprint lithography”, *Microelectron. Eng.*, 2012, 98, 130-133.
 52. **S. Park**, L. Tsarkova, S. Hiltl, S. Roitsch, J. Mayer, A. Böker, “Guiding block copolymers into sequenced patterns via inverted terrace formation”, *Macromolecules*, 2012, 45, 2494-2501.
 53. **S. Park**, A. Böker, “Ceramic nanowrinkles via a facile replication process”, *J. Mater. Chem.*, 2011, 21, 11734-11736. (Front Cover article and Highlighted as a ‘Hot Article’)
 54. **S. Park**, H. -H. Park, O. H. Han, S. A. Chae, D. Lee, D. -P. Kim, “Non-sticky silicate replica mold by phase conversion approach for nanoimprint lithography applications”, *J. Mater. Chem.*, 2010, 20, 9962-9967.
 55. **S. Park**, D. -H. Lee, H. -I. Ryoo, T. -W. Lim, D. -Y. Yang, D. -P. Kim, “Fabrication of three-dimensional SiC ceramic microstructures with near-zero shrinkage via dual crosslinking induced stereolithography”, *Chem. Commun.*, 2009, 4880-4882.

Patents Issued

1. **S. Park**, Y. Wei, “Method for Preparing Hierarchical Surface and Method for Fabricating Elastic Polymer Film Having Hierarchical Surface Patterns by Using the Same”, KR 10-2217103
2. **S. Park**, S. Y. Kim, “An infrared optical filter”, KR 10-1806698, US 15340854
3. **S. Park**, J. Shim, J. M. Kim, D. M. Sim, J. S. Choi, Y. S. Jung, “Method for manufacturing antifogging porous silica thin film”, KR 10-1673720, US 14878914

4. J. Shim, S. Y. Kim, **S. Park**, Y. S. Jung, D. M. Sim, K. M. Baek, M. –J. Choi, “Method for manufacturing of substrate and substrate”, KR 10-1655154
5. S. Park, S. Y. Kim, S. –R. Lee, Y. –H. Kim, J. –H. Seo, “Planar lighting mirror and automobile side mirror system”, US 9527436B2 / KR 10-1592676
6. D. –P. Kim, **S. Park**, L. –Y. Hong, “Highly durable silica hard nano mold for nanoimprint lithography and its manufacturing method”, KR 10-0900496

Patents Pending

1. **S. Park**, S. Kim, “Methods of Preparing Liquid Metal Composites and Liquid Metal Particles and Forming Conductive Patterns”, KR 10-2022-0010586
2. H. Jeon, **S. Park**, S. Lee, “Composite Fiber Structure with Excellent Elasticity and Reactivity and Manufacturing Method Thereof”, KR 10-2022-0076552
3. H. Jeon, **S. Park**, M. Choe, D. H. Sin, “Composite Fiber Capable of Discoloration by Various External Stimuli and Manufacturing Method Thereof”, KR 10-2022-0076551
4. **S. Park**, P. Bhuyan, S. Lee, “Methods of Preparing 2D or 3D Structures and 2D or 3D Structures Made by the Same”, KR 10-2021- 0191163
5. **S. Park**, H. S. Lee, J. H. Jee, C. H. Park, “Composition for Anti-Fogging Coating and Coating Film Including the Antifogging Coating”, US 10570309B2
6. H. Jeon, W. Seo, O. Kwon, G. Kang, M. Yun, **S. Park**, Y. Wei, S. Lee, M. Choe, E. Kim, “Micro wire and Method of Manufacturing the Same”, KR-10-2020-0096707
7. G. Kang, W. Seo, M. Yun, H. Jeon, **S. Park**, S. Lee, M. Choe, E. Kim, “Micro wire and Method of Manufacturing the Same”, KR-10-2020-0094158
8. G. Kang, W. Seo, M. Yun, H. Jeon, **S. Park**, S. Lee, M. Choe, E. Kim, “Micro Fiber and Method of Manufacturing Same”, US 202200032353A1
9. **S. Park**, C. B. Soun, “Anti-fouling surface coating materials”, US 15377617, KR 1020160045723
10. **S. Park**, H. S. Lee, J. H. Jee, C. H. Park, “A composition for antifogging coating and a coating film comprising the same”, US 15262641, KR 1020150171710
11. **S. Park**, “A high water-repellent coating thin film having improved adhesive strength”, KR 1020150171710
12. **S. Park**, J. Shim, “A high weather-resistant and water-repellent multi-layer thin film and a method of manufacturing the same”, KR 1020150132986

References

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-No more statement hereinafter-

August 23 2023

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