YeSeo Park

Department of Material Science and Engineering
University of Delaware, Newark, DE, U.S.
E-mail: yseo@udel.edu

EDUCATION

UNIVERSITY OF DELAWARE Aug. 2024
Ph.D in Material Science and Engineering -Present

CARNEGIE MELLON UNIVERSITY June. 2024
Summer Research Assistant (Advisor: Dr. Tagbo H. Niepa & Dr. Mohammad Islam) - Aug. 2024

UNIVERSITY OF PITTSBURGH (Advisor: Dr. Kenneth L. Urish) Sep. 2022
Master of Science in Chemical and Petroleum Engineering -Apr. 2024
- Cumulative GPA: 3.667 / 4.00

INHA UNIVERSITY (Advisor: Dr. Sang Eun Shim) Sep. 2020
Master of Science in Chemical Engineering -Aug. 2022
- Cumulative GPA: 4.00 / 4.00 (4.44 / 4.50)

Bachelor of Science in Chemical Engineering Mar. 2018
- Cumulative GPA: 3.39 / 4.00 (3.58 / 4.50) -Aug. 2020
- *Honor student in 2nd semester, 2019*

DANKOOK UNIVERSITY ***(****transferred)* Mar .2015
Bachelor of Science in Animal Resource Science -Mar. 2017
- Cumulative GPA: 3.78 / 4.00 (4.08 / 4.50)
- *Top honor student in whole semesters*

HONORS & AWARDS

- INHA Challenger Advisor's Recommendation Scholarship Sep. 2020
Inha University, Incheon, South Korea -Aug. 2022
- **The Encouragement Prize of 'KICHE Fall meeting and International Symposium'** Oct. 2019
The Korean Institute of Chemical Engineers, Daejeon, South Korea
- **The Silver Prize of 'Introductory Design Contest of Chemical Engineering'** Dec. 2018
Department of Chemical Engineering, Inha University, Incheon, South Korea
- Top honor Scholarship for Academic Excellence Sep. 2015
Dankook University, Cheonan, South Korea -Feb. 2017
- National Scholarship and Financial Aid Scholarship for Undergraduate Students Mar. 2015
Korea Student Aid Formation, South Korea -Sep. 2020

RESEARCH INTERESTS

Sol-gel chemistry
- Polymethylsilsesquioxane aerogel
- Photocatalytic TiO_2/SWCNT aerogel
- Antibacterial Au@Ag nanoparticles

Biomaterials
- Drug delivery & Wound healing
- Self-assembly & Self-healing
- Biocompatible materials

Flame Retardant Performances
- Synergistic N, P-flame retardants
- Green flame retardants
- Polymeric flame retardants

RESEARCH EXPERIENCES

Microinterface Laboratory at CARNEGIE MELLON UNIVERSITY
Summer Research Assistant (Advisor: Dr. Tagbo H. Niepa & Dr. Mohammad Islam)
"Synthesized crystalline titania/carbon-nanotube aerogels and tested their photocatalytic and antibacterial properties."
- Characterized photocatalytic titania/carbon-nanotube aerogels using SEM, TEM, XRD, Raman, and UV-Vis Spectroscopy.

Adult Reconstructive and Arthroplasty Orthopedic Laboratory at UNIVERSITY OF PITTSBURGH
Graduate Research Assistant (Advisor: Dr. Kenneth L. Urish)
"Synthesized the bimetallic Au@Ag core-shell nanoparticles and tested their antibacterial properties."
- Characterized nanoparticles by using SEM, TEM, Dynamic Light Scattering, and Microplate Reader OD600.

"Investigated the bacterial growth behavior on the Joint-on-a-chip with various parameters"
- Observed the behavior of S.aureus JE2 in a multichamber bioreactor with different flow rates of medium or incubation times.

Polymer Nanomaterials Laboratory at INHA UNIVERSITY
Graduate Research Assistant (Advisor: Dr. Sang Eun Shim)
"Investigated kinetics of sol-gel process for multi-purposed silane aerogel"
- Optimized pore distribution of the methyltrimethoxysilane aerogel varying solvents for mesoporous structures.
- Developed solvent exchange process for controlling the transmittance and preventing capillary forces.
- Characterized materials by using SEM, BET, FT-IR, TGA, and Contact Angle.

"Designed the organic-inorganic hybrid polymethylsilsesquioxane aerogel with phenyl group for flame retardancy"
- Introduced the phenyl-derived compounds into silane precursor for super hydrophobic and high absorbance properties.
- Fabricated DOPO-vinyltrimethoxysilane methyltrimethoxysilane aerogel with the synergistic effect of N, P-flame retardants.

- Characterized polymethylsilsesquioxane aerogel by using NMR, SEM, TGA, and Microcalorimetry.

*** Research Assistant:** Led a project on "Aerogel Materials Research Project", *Funded by the National Research Foundation.*

*** Research Assistant:** Participated in a project on "Development of Encapsulation Technology to Improve Engine Thermal Efficiency Using Super-Insulated Materials", *Funded by the Korea government (MSIT).*

PUBLICATIONS

(1) **Y. Park,** J.Choi, B. Kim, S.H. Baeck*, S. E. Shim* and Y. Qian*, "Synergistic effects of P and Si on the flame retardancy in a polymethylsilsesquioxane aerogel prepared under ambient pressure drying", 05.11.2023, DOI: 10.1007/s10973-023-12244-8

(2) [a]D. Shin, [a]S. Hwang, **Y. Park**, J. Kim, S. Lee, S. Hong, Y. Qian* and S. E. Shim*, "Rapid and efficient anti-bacterial activity of molybdenum-tungsten oxide from n-n heterojunctions and localized surface plasmon resonance", Applied Surface Science, 09.01.2022, DOI: 10.1016/j.apsusc.2022.153496

(3) B. Kim, J.Choi, **Y. Park,** Y. Qian and S. E. Shim*, "Semi-rigid polyurethane foam and polymethylsilsesquioxane aerogel composite for thermal insulation and sound absorption", Macromolecular, 04.30.2022, DOI: 10.1007/s13233-022-0026-8

PATENTS

(1) J. Choi, **Y. Park**, B. Kim, S. E. Shim, "Manufacturing method of increased fireproof and flame-retardant and flame-retardant silicon rubber composites filled with carbonated fly ash and silicone composites produced by the same method", *patent Korea*, 10-2019-0159578, (2019)

PRESENTATIONS

International

(1) **Y. Park,** Y. Qian, S. E. Shim *, "Investigation on the structure of polymethylsilsesquioxane aerogel with various solvents", Fall Meeting, *The Rubber Society of Korea*, Daegu, Rep. of Korea, 17-18th Nov, 2021

(2) **Y. Park**, B. Kim, J. Choi, S. E. Shim *, "Flame Retardant DOPO-VTS additives in the Silica Aerogel", Fall Meeting, *Materials Info 2021*, Online, 27-29th Sep, 2021

Domestic

(1) **Y. Park**, J. Lee, S. E. Shim *, "A novel flame retardant DOPO-derivatives in a chitosan aerogel: a synergistic effect of containing nitrogen, phosphorus and silicon", Fall Meeting, *The Polymer Society of Korea*, Gyeongju, 20-22nd Sep, 2021

(2) J. Choi, **Y. Park,** B. Kim, S. E. Shim *, "Polyurethane foam/silica aerogel composite for the thermal and acoustic insulation", Fall meeting, *The Rubber Society of Korea*, Online, Rep. of Korea, 5-6th Nov, 2020

EXTRACURRICULAR ACTIVITIES

- **Conference Staff** — Nov. 2021
  Silicon for Chemical and Solar Industry, Daecheon, South Korea
- **Hot Disk Method Thermal Conductivity Analyzer Training** — Oct. 2021
  KEM, Incheon, South Korea
- **Aerogel Synthesis Training** — Sep. 2021
  Yonsei University, Seoul, South Korea
- **Microcalorimetry Analyzer Training** — Sep. 2021
  Korea Institute of Science and Technology (KIST), Wanju, South Korea
- **Rubber Technology Seminar** — Jul. 2021
  The Rubber Society of Korea, Jeju, South Korea

SKILLS & CHARACTERIZATIONS

Skills

- Sol-Gel Chemistry Synthesis
- Aerogel Synthesis with Super Critical Dryer
- Organic Synthesis with Vacuum Distillation Unit
- Crystallization of Amorphous Metal with Furnace
- Bimetallic Au@Ag Nanoparticles Synthesis
- Bacteria/Cell Culture
- Biofilm assay, MIC test, Disk diffusion, Agar dilution

Characterization

- Morphological Analysis: SEM, TEM, Scion Image Analyzer
- Chemical Analysis: NMR, FT-IR, XPS, XRD, EA, UV-Vis
- Thermal Analysis: TGA, DSC, Microcalorimetry Analyzer
- Mechanical and Surface Analysis: UTM, BET, CA, DLS
- Bacteria Growth Analysis: Microplate Reader OD600, OM
- Computational Analysis: MATLAB, Python, COMSOL
- Others: Datagraph, ChemDraw, Origin, Hansen Solubility

TEACHING EXPERIENCES

- **Teaching Assistant, Physical Chemistry in Chemical Engineering (CHE 2100)** — Mar. 2021
- **Teaching Assistant, Polymer Chemistry in Chemical Engineering (CHE 4308)** — -June. 2021

Held office hours on a weekly basis, answered questions in person, marked and proctored exams.

- **Laboratory Assistant, Chemical Engineering Experiments in Chemical Engineering (CHE 3202)** — Sep. 2020 -Dec. 2020

Ran 12 classes in a week, taught theories, and led experiments of 'Gas Absorption and Diffusion'.