

Jinyoung Kim, Ph. D

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RESEARCH INTEREST

I am a chemical engineer with research interests centered on membrane separation and the synthesis of functional polymers, porous materials, and polymer composites. My work encompasses material and system design, experimental synthesis and characterization, industrial applications, and ultimately the demonstration of materials-based solutions for diverse technological challenges.

RESEARCH EXPERIENCE

- 2025 - 2023 - Research Scientist II (2025-present), Department of Chemical Engineering, Georgia Tech**
Postdoctoral Scholar, Department of Chemical Engineering, Georgia Tech
Faculty Advisor: William J. Koros, Professor of Chemical Engineering
Faculty Collaborations: Ryan Lively, Krista Walton
Project: "Removal of Cyclic Siloxanes from Silicone Fluids" Development of a novel CO₂-driven "Sorp-vection" membrane separation process, an emerging technology for selective purification of silicone oils by removing cyclic siloxanes. (Funded by The Dow Chemical Company)
- 2022-2023 Postdoctoral Scholar, KIST, Seoul, South Korea**
Division: Materials Architecturing Research Center
Faculty Advisor: Seung Sang Hwang, Albert S. Lee
Project: "Research and Development of Electro-Super Cellulose for Advanced Applications"
- 2021-2022 Research Specialist, LG Innotek, CTO group, Seoul, South Korea**
Division: CTO Research Division
Project: "Development of High-Reliability, Anti-Yellowing Polyurethane Acrylate (PUA) Materials for Front and Rear Lighting Applications of Electric Vehicles", Case Study Nexlide, an automotive LED light guide technology, installed in the Hyundai IONIQ 5.

EDUCATION

- 2014-2021 Ph.D. in Chemical & Biomolecular Engineering, Yonsei University, Seoul, South Korea**
Thesis: New Progress in Synthetic Technology of Porous Polyimide Aerogel and Sponge: Synthesis and Application
Faculty Advisor: Haksoo Han, Professor of Chemical & Biomolecular Engineering
- 2010-2013 B.S. in Chemical & Biomolecular Engineering, Yonsei University, Seoul, South Korea**
Faculty Advisor: Eunkyung Kim, Professor of Chemical & Biomolecular Engineering

FELLOWSHIP & AWARDS

Fellowships

Yonsei BK21 Plus Fellowship, 2014-2015

Global Ph.D. Fellowship Grant through the National Research Foundation of Korea (NRF) funded by the Ministry of Education (**Reward \$30000/year**), 2015-2020

Awards

Creativity Contest Awards, KSA (Korean Standards Association). 2016

BK-21 Best Student Award, Yonsei University, 2017

Excellent Paper Award, The Korean Hydrogen & New Energy Society. 2017

Shark Tank Award, 2025 SEED Conference, 2025

PUBLICATIONS

Total: 12 publications as main author, 12 publications as contributing author.

Leading Author Journal Articles († indicates equal contribution) (Listed in Reverse Chronological Order)

PUBLICATION LIST

1. **Kim, J.**, B. Ghufuran and W. J. Koros* High-Pressure Hollow Fiber Membrane Module Design and Fabrication. *The Journal of Membrane Science Letters*, **Submitted, 2026**
2. Im, M., Kim, I., Oh, J., Nzisso, K. A. C., **Kim, J.**, & Cho, S. [Multi-objective optimization of an ammonia-cracking process for hydrogen production using NSGA-III: Balancing economy with NO_x and CO₂ emissions](#). *International Journal of Hydrogen Energy*, 225, 154421. **2026**
3. **Kim, J.**, Y. Cao, W. Qiu, Z. Liu, S. Schlosser, R. Haghpahan, D. Katsoulis, J. Rose, S. Kim, H. A. Balogun, R. Lively and W. J. Koros*. [Sorp-Vection-Based Membrane Silicone Oil Purification](#). *Angewandte Chemie*, **2025**, e202516848
4. **Kim, J.**†, Kim, G.†, Baek, S., Kwon, J., Kim, J., Kim, S. Y., ... & Han, H. [Simple assembling process for polyimide aerogel and its application in water pollutants absorption](#). *Journal of Porous Materials*, 29(3), 861-868. **2022**
5. Lee, J.; Baek, S.; Kim, J.; Lee, S.; **Kim, J.***; Han, H.* [Highly Soluble Fluorinated Polyimides Synthesized with Hydrothermal Process towards Sustainable Green Technology](#) *Polymers* 13(21), 3824, **2021**
6. Yuan-Hu, L.†, **Kim, J.**†, Lee, S., Kim, G., & Han, H. [Efficiency improvement of a fuel cell cogeneration plant linked with district heating: Construction of a water condensation latent heat recovery system and analysis of real operational data](#). *Applied Thermal Engineering*, 117754. **2021**
7. **Kim, J.**†, Kim, G.†, S. Y., Lee, S., Kim, Y., Lee, J., ... & Han, H. [Fabrication of highly flexible electromagnetic interference shielding polyimide carbon black composite using hot-pressing method](#). *Composites Part B: Engineering*, 109010. **2021**
8. Kim, G.†, **Kim, J.**†, Jeong, J., Lee, D., Kim, M., Lee, S., ... & Han, H. [High Temperature Applicable Separator by Using Polyimide aerogel/polyethylene Double-Layer Composite Membrane for High-Safety Lithium Ion Battery](#). *Int. J. Electrochem. Sci*, 14, 7133-7148. **2019**
9. Lee, D.†, **Kim, J.**†, Kim, S., Kim, G., Roh, J., Lee, S., & Han, H. [Tunable pore size and porosity of spherical polyimide aerogel by introducing swelling method based on spherulitic formation mechanism](#). *Microporous and Mesoporous Materials*. 288, 109546. **2019**
10. Li Y.†, **Kim, J.**†, Kim, S., & Han, H. [Use of latent heat recovery from liquefied natural gas combustion for increasing the efficiency of a combined-cycle gas turbine power plant](#). *Applied Thermal Engineering*, 161, 114177. **2019**
11. **Kim, J.**, Kwon, J., Lee, D., Kim, M., & Han, H. [Heat dissipation properties of polyimide nanocomposite films](#). *Korean Journal of Chemical Engineering*, 33(11), 3245-3250. **2016**
12. **Kim, J.**, Kwon, J., Kim, S. I., Kim, M., Lee, D., Lee, S., ... & Han, H. [One-step synthesis of nano-porous monolithic polyimide aerogel](#). *Microporous and Mesoporous Materials*, 234, 35-42. **2016**
13. **Kim, J.**, Kwon, J., Kim, M., Do, J., Lee, D., & Han, H. [Low-dielectric-constant polyimide aerogel composite films with low water uptake](#). *Polymer Journal*, 48(7), 829. **2016**

Contributing Author Journal Articles (Listed in Reverse Chronological Order)

14. Cao Y., Liu Z., **Kim J.**, Schlosser S., Lively R. P. & Koros W. J. High-efficiency separation of H₂/CH₄, using ultrasensitive carbon molecular sieve hollow fiber membranes-a scalable path forward. *Advanced Materials*, **Submitted. 2026**
15. Liu, Z., Cao, Y., Qiu, W., **Kim, J.**, Campbell, Z. S., Schlosser, S., & Koros, W. J. [Insights on influence of polymer molecular weight on gas sorption, transport and plasticization in glassy 6FDA-DAM polyimide membranes](#). *Journal of Membrane Science*, 712, 123242. **2024**
16. Kim, J., Baek, S., Lee, J., Lee, S., Ahn, C., **Kim, J.**, & Han, H. [Improvement of trade-off between mechanical properties and dielectric of polyimide with surface modified silica nanoparticle for wafer level packaging](#). *Journal of Industrial and Engineering Chemistry*, 114, 438-445. **2022**
17. Kim, S. Y., Han, S., Lee, S., Kang, J. H., Yoon, S., Park, W., ... & Bae, Y. S. [Discovery of High-Performing Metal-Organic Frameworks for On-Board Methane Storage and Delivery via LNG-ANG Coupling: High-Throughput Screening, Machine Learning, and Experimental Validation](#). *Advanced Science*, 9(21), 2201559. **2022**
18. Lee, S., Kim, G., **Kim, J.**, Kim, D., Lee, D., Han, H., & Kim, J. [Nitrogen-Doped Porous Carbon Structure from Melamine-Assisted Polyimide Sheets for Supercapacitor Electrodes](#). *Advanced sustainable systems*, 2(6), 1800007. **2018**
19. Kim, K., Yoo, T., Lee, J., Kim, M., Lee, S., Kim, G., ... & Han, H. [The effects of hydroxyl groups on the thermal and optical properties of poly \(amide-imide\) s with high adhesion for transparent films](#). *Progress in Organic Coatings*, 112, 37-43. **2017**

20. Kim, M., Kim, G., **Kim, J.**, Lee, D., Lee, S., Kwon, J., & Han, H. [New continuous process developed for synthesizing sponge-type polyimide membrane and its pore size control method via non-solvent induced phase separation \(NIPS\)](#). *Microporous and Mesoporous Materials*, 242, 166-172. **2017**
21. Kim, K., Yoo, T., Ha, H., **Kim, J.**, Han, P., & Han, H. [The Effects of Amide Groups on the Thermal and Optical Properties of Poly \(amide-imide\) s with Low Residual Stress for Microelectronic Devices](#). *Macromolecular Chemistry and Physics*, 217(10), 1174-1184. **2016**
22. Kim, K., Yoo, T., **Kim, J.**, Ha, H., & Han, H. [Effects of dianhydrides on the thermal behavior of linear and crosslinked polyimides](#). *Journal of Applied Polymer Science*, 132(6). **2015**
23. Kwon, J., **Kim, J.**, Park, D., & Han, H. [A novel synthesis method for an open-cell microsphere polyimide for heat insulation](#). *Polymer*, 56, 68-72. **2015**
24. Kwon, J., **Kim, J.**, Park, D., Seo, J., Han, P., & Han, H. [Water sorption behavior in polyimide thin films controlled by inorganic additives](#). *Macromolecular Research*, 22(4), 431-435. **2014**
25. Kwon, J., **Kim, J.**, Lee, J., Han, P., Park, D., & Han, H. [Fabrication of polyimide composite films based on carbon black for high-temperature resistance](#). *Polymer Composites*, 35(11), 2214-2220. **2014**
26. Kwon, J., **Kim, J.**, Yoo, T., Park, D., & Han, H. [Preparation and characterization of spherical polyimide aerogel microparticles](#). *Macromolecular Materials and Engineering*, 299(9), 1081-1088. **2014**

INTELLECTUAL PROPERTIES

► Yonsei University (2014 – 2019)

1. **Kim, J.**, Kwon, J., and Han, H. "Micro-pored Polyimide sponge and method for preparation of the same" KR 10-1739842, **2017/05/19** (Granted). Country: KR
2. **Kim, J.**, Kwon, J., and Han, H. "Nanoporous microspherical polyimide aerogel and method for manufacturing the same" KR 10-2136283, **2020/07/15** (Granted). Country: KR
3. **Kim, J.**, Kwon, J., and Han, H. "Micro-pored Polyimide sponge and method for preparation of the same" US10442894B2, **2019/10/15** (Granted). Country: US
4. **Kim, J.**, Kwon, J., and Han, H. "Nanoporous micro-spherical polyimide aerogels and method for preparing same" US10,975,218, **2021/04/13** (Granted). Country: US

► LG Innotek: CTO Research Group (2021 – 2022)

5. **Kim, J.**, Kim W. "resin composition and lighting device comprising same", WO2024010371, **2024/01/11** (Granted) Country: PCT

► Georgia Tech (2023 – 2025)

6. **Kim, J.**, Qiu, W., Cao, Y., W. J. Koros. "METHOD OF PURIFYING POLYSILOXANE COMPOSITION" Provisional Patent Application No.: 63/888,197, **2025/09/25 (Applied)**. Country: US
7. **Kim, J.**, W. J. Koros, Lively R. "Disclosure on Advanced Sorp-vection with Flow Control Strategies for Enhanced Siloxane Separation". Provisional Patent Application. (Filed). Country: US

PRESENTATIONS

Conference Talks

1. GT x UGA Networking Seminar, Atlanta, GA, April 5, 2025
2. North American Membrane Society, Nashville, TN, May 17-21, 2025.
3. American Institute of Chemical Engineers, Boston, MA, November 2-6, 2025.

Poster Presentations

4. Scientists and Engineers Early Career Development Workshop(KSEA-SEED), Atlanta, GA, Aug. 5-6, 2025.
5. AIChE Annual Meeting, San Francisco, CA, US, Nov. 13-18, 2016.
6. IUPAC 11th International Conference on Advanced Polymers via Macromolecular Engineering, Yokohama, Japan, Oct. 18-22, 2015
7. IUPAC International Symposium on Advanced Polymeric Materials: Commemorating the 40th Anniversary of the Polymer Society of Korea (PSK), Jeonju, South Korea, Oct. 4-7, 2016
8. MRS 2017, Boston, MA, USA November 26- Dec. 1, 2017
9. 22-International Conference on Organic Synthesis, Florence, Italy, Sept. 16-21, 2018

PROFESSIONAL SERVICE

Reviewers for *High Performance Polymers, Polymer, Polymer Engineering & Science*
Member of the North American Membrane Society and American Institute of Chemical Engineers

EXPERIENCE WITH TEACHING & MENTORSHIP

Teaching Assistant

Responsibilities included developing new class materials and exam questions, leading class discussions, grading assignments and exams, and meeting with students individually.

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| 1. Heat Transfer (Spring 2015) | Yonsei University, Seoul, South Korea |
| 2. Physical Chemistry II (Fall 2015) | Yonsei University, Seoul, South Korea |
| 3. Chemical Engineering Experiment, (Spring and Fall 2017) | Yonsei University, Seoul, South Korea |
| 4. Polymer Synthesis Experiment, (Fall 2019) | Yonsei University, Seoul, South Korea |

Mentees at Georgia Tech(5/2025-present)

Bhatti, Ghufan K., undergraduate student in chemical engineering (05/25-present)

Project Title: Sorp-vection module fabrication method for membrane separation

Mentees at Yonsei University(03/2014-03/2021)

Gunhwi Kim, Daero Lee, Myeongsoo Kim, graduate student in chemical engineering (05/15-05/17)

Project Title: One-step synthesizing method of porous polyimide structure and tailoring properties

OUTREACH & LEADERSHIP EXPERIENCE

- President, Yonsei global fellowship student community (GPF), Yonsei University (2016–2018)

Led a team of 40 members to organize academic seminars and outreach programs for undergraduate students; initiated mentorship pairing between seniors and freshmen.

- President of Chemical and Biomolecular Engineering Graduate Student Organization (2015–2016)

Represented graduate students in departmental affairs; organized academic seminars, social events, and faculty–student meetings to improve communication and research collaboration within the department.

- Chief Editor, Engineering Department Press, Yonsei University (2012–2013)

Directed content planning and editorial work for the department's student magazine, highlighting research achievements and student initiatives.

- Server management in Engineering Department, Yonsei University (2012–2013)

Established and managed the department's Chinese-language website to support international student outreach; maintained server infrastructure and coordinated content updates for multilingual accessibility.

- Vice President of Undergraduate Student Organization, Yonsei University (2010–2011)

EXPERIENCE WITH WRITING GRANTS

As Principle investigator : (Total Funding Secured : \$ 150,000)

1. National Research Foundation of Korea (NRF) funded by the Ministry of Education(South Korea), **Global Ph.D Research Grant, 03/01/15-03/01/19, PI: Jinyoung Kim**, "Invention and further development of novel method for synthesizing spherical polyimide aerogel"

As Contributing Author :

1. The Dow Chemical Company, U.S. (03/01/21 – 12/30/25) (PI: William J. Koros) "Removal of Cyclic Siloxanes from Silicone Fluids"
2. National Research Foundation of Korea (NRF) (06/01/17 – 02/28/20) (PI: Haksoo Han) "Ezbaro – High Efficiency Porous Nano Metal Hybrid Material for Bio/Energy Storage System"
3. Ministry of Science and ICT (MSIT) (05/01/15 – 04/30/16) (PI: Haksoo Han) "Flexible Separator Binder Material Development for High Temperature Secondary Cell"
4. Ministry of Science and ICT (MSIT) (01/31/14 – 12/21/14) (PI: Haksoo Han) "Energy Transition Materials and Structure Development for Electrochemistry"
5. National Research Foundation of Korea (NRF) (05/01/13 – 04/30/14) (PI: Haksoo Han) "Low-Temperature Curing Polyimide Material Development for Semiconductor Application with High Thermal Property"