

Mihee Kim, Ph.D.

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Summary

- US Legal Permanent Resident (“Green Card holder”) since Oct. 2020
- Polymer chemistry expert with extensive research experiences in biomedical applications
- Excellent teamwork and communication skills developed through interdisciplinary collaborations with researchers across various science & engineering disciplines
- Author of 15 journal publications (including 8 first-author papers), 1 book chapter, and 2 patents

Education**Pohang University of Science & Technology (POSTECH), Pohang, South Korea**

Ph.D. Polymer Chemistry Feb. 2015
 B.S. Chemistry (major) / Life Science (minor) Aug. 2008

McGill University, Montreal, QC, Canada

Visiting Summer Session Student, Organic Chemistry Jul. 2006

Experiences

Los Alamos National Laboratory, Scientist 2 Jan. 2022 – Present

Materials Physics & Applications Division, Center for Integrated Nanotechnologies

The Dow Chemical Company, Senior Research Specialist Jan. 2020 – Nov. 2021

Formulation Science, Core R&D, Michigan Operations

University of Minnesota, Postdoctoral Research Associate Jun. 2015 – Jan. 2020

Department of Chemical Engineering & Materials Science, Advisors: Frank Bates / Benjamin Hackel

POSTECH, Graduate Researcher Sep. 2008 – Feb. 2015

Department of Chemistry, Advisor: Moonhor Ree

Journal Publication

Google Scholar profile: <https://scholar.google.com/citations?user=ZJljudgAAAAJ&hl=en&oi=ao>

Total citation: 469, h-index: 12 (as of Jan. 7, 2022)

15. **Kim, M.**; Heinrich, F.; Haugstad, G.; Yu, G.; Yuan, G.; Satija, S. K.; Zhang, W.; Seo, H. S.; Metzger, J. M.; Azarin, S. M.; Lodge, T. P.; Hackel, B. J.; Bates, F. S. Spatial distribution of PEO–PPO–PEO block copolymer and PEO homopolymer in lipid bilayers. *Langmuir* **2020**, *36*, 3393–3403.
14. **Kim, M.**; Vala, M.; Ertsgaard, C. T.; Oh, S.-H.; Lodge, T. P.; Bates, F. S.; Hackel, B. J. Surface plasmon resonance study of the binding of PEO–PPO–PEO triblock copolymer and PEO homopolymer to supported lipid bilayers. *Langmuir* **2018**, *34*, 6703–6712.
13. Vidyasagar, A.; Ku, S. H.; Kim, M.; **Kim, M.**; Lee, H. S.; Pearce, T. R.; McCormick, A. V.; Bates, F. S.; Kokkoli, E. Design and characterization of a PVLA–PEG–PVLA thermosensitive and biodegradable hydrogel. *ACS Macro Lett.* **2017**, *6*, 1134–1139.
12. **Kim, M.**; Haman, K. J.; Houang, E. M.; Zhang, W.; Yannopoulos, D.; Metzger, J. M.; Bates, F. S.; Hackel, B. J. PEO–PPO diblock copolymers protect myoblasts from hypo-osmotic stress in vitro dependent on copolymer size, composition, and architecture. *Biomacromolecules* **2017**, *18*, 2090–2101.
11. Houang, E. M.; Haman, K. J.; **Kim, M.**; Zhang, W.; Lowe, D. A.; Sham, Y. Y.; Lodge, T. P.; Hackel, B. J.; Bates, F. S.; Metzger, J. M. Chemical endgroup modified diblock copolymers elucidate anchor and chain mechanism of membrane stabilization. *Mol. Pharmaceutics* **2017**, *14*, 2333–2339.
10. Kim, J. C.*; **Kim, M.***; Jung, J.; Lee, J.; Ree, B. J.; Kim, H.; Kim, I. J.; Kim, J. R.; Ree, M. Synthesis,

- physicochemical characteristics, and biocompatibility of self-assemble polymers bearing guanine, cytosine, uracil, and thymine moieties. *J. Polym. Sci. Polym. Chem.* **2015**, *53*, 1151–1160. (*equally contributed authors)
9. Heo, K.; Kim, Y. Y.; Kitazawa, Y.; **Kim, M.**; Jin, K. S.; Yamamoto, T.; Ree, M. Structural characteristics of amphiphilic cyclic and linear block copolymer micelles in aqueous solutions. *ACS Macro Lett.* **2014**, *3*, 233–239.
 8. Zo, H. J.; Lee, J.-S.; Song, K.-W.; **Kim, M.**; Lee, G.; Park, J. S. Incorporation of graphene oxide into cyclodextrin–dye supramolecular hydrogel. *J. Incl. Phenom. Macrocycl. Chem.* **2014**, *79*, 357–363.
 7. Kim, J. C.; Rho, Y.; Kim, G.; **Kim, M.**; Kim, H.; Kim, I. J.; Kim, J. R.; Ree, M. New self-assembled brush glycopolymers: Synthesis, structure and properties. *Polym. Chem.* **2013**, *4*, 2260–2271.
 6. **Kim, M.***; Kim, J. C.*; Rho, Y.*; Jung, J.; Kwon, W.; Kim, H.; Ree, M. Bacterial adherence on self-assembled films of brush polymers bearing zwitterionic sulfobetaine moieties. *J. Mater. Chem.* **2012**, *22*, 19418–19428. (*equally contributed authors)
 5. Kim, J. C.*; **Kim, M.***; Jung, J.*; Kim, H.; Kim, I. J.; Kim, J. R.; Ree, M. Biocompatible characteristics of sulfobetaine-containing brush polymers. *Macromol. Res.* **2012**, *20*, 746–753. (*equally contributed authors)
 4. Park, J. S.; Jeong, S.; Ahn, B.; **Kim, M.**; Oh, W.; Kim, J. Selective response of cyclodextrin–dye hydrogel to metal ions. *J. Incl. Phenom. Macrocycl. Chem.* **2011**, *71*, 79–86.
 3. Jung, J.; Kim, J. C.; Rho, Y.; **Kim, M.**; Kwon, W.; Kim, H. Ree, M. Molecular layer-by-layer self-assembly and mercury sensing characteristics of novel brush polymers bearing thymine moieties. *ACS Appl. Mater. Interfaces* **2011**, *3*, 2655–2664.
 2. Kim, J. C.*; Jung, J.*; Rho, Y.*; **Kim, M.***; Kwon, W.; Kim, H.; Kim, I. J.; Kim, J. R.; Ree, M. Well-defined DNA-mimic brush polymers bearing adenine moieties: Synthesis, layer-by-layer self-assembly, and biocompatibility. *Biomacromolecules* **2011**, *12*, 2822–2833. (*equally contributed authors)
 1. **Kim, M.**; Rho, Y.; Jin, K. S.; Ahn, B.; Jung, S.; Kim, H.; Ree, M. pH-Dependent structures of ferritin and apoferritin in solution: Disassembly and reassembly. *Biomacromolecules* **2011**, *12*, 1629–1640.

Book Chapter

1. Ree, M.; Kim, D. M.; Jung, J.; Rho, Y.; Ahn, B.; Jin, S.; **Kim, M.** Reflectivity, GI-SAS and GI-diffraction: X-ray. In *Polymer Science: A Comprehensive Reference*; Matyjaszewski, K., Möller, M., Eds.; Elsevier B. V.: Amsterdam, Netherlands, 2012; Vol. 2, pp 433–463.

Patents

2. Ree, M.; Kim, J. C.; **Kim, M.**; Rho, Y.; Kim, H.; Jung, J.; Park, S.; Kwon, W.; Choi, J. Dialkyl aminoalkyl sulfone and their mimics containing self-assembled brush polyether-based polymers for bio-applications, preparation thereof and products comprising the polymer. South Korea Patent No. 1012603280000, Apr. 26, 2013.
1. Ree, M.; Kim, J. C.; Rho, Y.; Kim, G.; Kim, H.; Jung, J.; Kwon, W.; Choi, J.; **Kim, M.**; Park, S. Carbohydrates and their mimics containing self-assembled brush polyether-based polymers for bio-applications, preparation thereof, and products comprising the polymers. South Korea Patent No. 1012187590000, Dec. 28, 2012.

Selected Presentations

- *Mechanistic study of block copolymer interaction with cell membranes and model lipid bilayers*, Los Alamos National Laboratory, Los Alamos, NM (invited seminar, Aug. 2021)
- *Mechanistic study of block copolymer interaction with cell membranes and model lipid bilayers*, Department of Biomedical & Chemical Engineering, Syracuse University, Syracuse, NY (invited seminar, Apr. 2019)
- *Mechanistic study of PEO–PPO–PEO triblock and PEO homopolymer interaction with supported lipid bilayer*, Gordon Research Conference – Polymers, South Hadley, MA (poster presentation, Jun. 2019)
- *Surface plasmon resonance study of interaction between membrane protective block copolymers and supported*

lipid bilayer, American Chemical Society Meeting, New Orleans, LA (poster presentation, Mar. 2018)

- *Myoblast protection by poly(ethylene oxide)-poly(propylene oxide) block copolymers against hypo-osmotic stress*, Biophysical Society Meeting, San Francisco, CA (poster presentation, Feb. 2018)
- *Interactions between membrane protective block copolymers and lipid bilayers studied with surface plasmon resonance*, Industrial Partnership for Research in Interfacial & Materials Engineering (IPRIME) Annual Meeting, University of Minnesota, Minneapolis, MN (oral presentation, May 2017)

Teaching Experiences

Recitation instructor	Introduction to Biomolecular Engineering	University of Minnesota	2017
Teaching assistant	General Chemistry Experiments	POSTECH	2009
Teaching assistant	Instrumental Analysis Experiments	POSTECH	2008

Technical Skills

- **Polymer synthesis & characterization:** anionic polymerization, emulsion polymerization, polymer end group chemistry, NMR spectroscopy, MALDI-TOF mass spectrometry, size exclusion chromatography
- **Surface characterization:** atomic force microscopy (AFM), surface plasmon resonance (SPR) spectroscopy, contact angle measurement, spectroscopic ellipsometry
- **Structural characterization:** X-ray/neutron scattering, neutron reflectivity, cryogenic transmission electron microscopy (cryo-TEM)
- **Cell biology:** bacteria/mammalian cell culture, confocal fluorescence microscopy, optical microscopy, cellular assays, immunostaining
- **Computer Software & Programming:** GraphPad PRISM, MATLAB, FORTRAN programming