

Sungjin Kim, Ph.D.

Assistant Professor

Department of Chemical and Biological Engineering

The University of New Mexico, Albuquerque, NM 87131

+1-865-348-8671 | sungjinkim@unm.edu | sungjink@alum.mit.edu

Education

- 2014 – 2020 Ph.D. in Materials Science and Engineering (Samsung Scholarship Fellow)
Massachusetts Institute of Technology
- 2009 – 2011 M.S. in Materials Science and Engineering
Korea Advanced Institute of Science and Technology
- 2008 Undergraduate Exchange Student in Materials Science and Engineering
Georgia Institute of Technology
- 2004 – 2009 B.S. in Materials Science and Engineering
Korea Advanced Institute of Science and Technology

Experiences

The University of New Mexico

- 2023 – Present **Assistant Professor**
Department of Chemical and Biological Engineering

Oak Ridge National Laboratory

- 2023 **R&D Associate Staff**
Manufacturing Science Division, Energy Science and Technology Directorate
- 2020 – 2023 **Postdoctoral Researcher** (Advisor: Prof. Tomonori Saito)
Chemical Sciences Division, Physical Sciences Directorate

Massachusetts Institute of Technology

- 2014 – 2020 **Graduate Research Assistant** (Advisor: Prof. Niels Holten-Andersen)
Laboratory for Bio-Inspired Interfaces
Department of Materials Science and Engineering
- 2019 **Teaching Assistant (6.0/7.0 teaching evaluation by students)**
3.091 Introduction to Solid-State Chemistry (Instructor: Prof. Jeffrey C. Grossman)
Department of Materials Science and Engineering
- 2019 **Undergraduate Thesis Project Mentor**
Undergraduate Research Opportunities Program (UROP)
Department of Materials Science and Engineering

SKC Co., Ltd., SK Group

- 2011 – 2014 **Research Engineer (Serving Korean Military Duty)**
R&D and commercialization of organic-inorganic hybrid reflective films for high-brightness/resolution LCDs (product code: SY100, SY200)
R&D of biaxially stretched nanoporous films for battery separators
Advanced Technology R&D Center

Korea Advanced Institute of Science and Technology

- 2009 – 2011 **Graduate Research Assistant** (Advisor: Prof. Chan Beum Park)
Advanced Biomaterials Laboratory
Department of Materials Science and Engineering

Publications

1. **Kim, S.***, Lee, M., Hong, M., and Holten-Andersen, N.*, 2022. Quantitative correlation between bound water and mechanical stress relaxation in dehydrated metal-coordinate polymer networks. *Chemistry of Materials*, 34(23), pp.10329–10337. [[Link](#)]
2. Zhou, Z., **Kim, S.**, Bowland, C.C., Li, B., Ghezawi, N., Lara-Curzio, E., Hassen, A., Naskar, A., Rahman, M.A.*, and Saito, T.*, 2022. Unraveling a path for multi-cycle recycling of tailored fiber-reinforced vitrimer composites. *Cell Reports Physical Science*, 3(9), p.101036. [[Link](#)] [[Highlighted in ORNL News](#)]
3. Meng, L., Ivanov A., **Kim, S.**, Zhao, X., Kumar, N., Young-Gonzales, A., Saito, T., Bras, W., Gluesenkamp, K., and Bocharova, V.*, 2022. Alginate–sodium sulfate decahydrate phase change composite with extended stability. *ACS Applied Polymer Materials*, 4(9), pp.6563–6571. [[Link](#)]
4. **Kim, S.**, Rahman, M.A., Arifuzzaman, M., Gilmer, D., Li, B., Wilt, J.K., Lara-Curzio, E., and Saito, T.*, 2022. Closed-loop additive manufacturing of upcycled commodity plastic through dynamic crosslinking. *Science Advances*, 8(22), p.eabn6006 [[Link](#)] [[Highlighted in ORNL News](#), [ORNL Review](#), [AAAS EurekAlert!](#), [Elsevier Materials Today News](#), [Science Daily](#), etc.]
5. Mahmoudi, M., **Kim, S.**, Arifuzzaman, M., Saito, T., Cramer, and C., Minary, M.*, 2022. Processing and 3D printing of SiCN polymer-derived ceramics. *International Journal of Applied Ceramic Technology*, 19(2), pp.939-948. [[Link](#)]
6. Rahman, M.A., Bowland, C., Ge, S., Acharya, S.R., **Kim, S.**, Cooper, V.R., Chen, X., Irle, S., Sokolov, A.P., Savara, A. and Saito, T.*, 2021. Design of tough adhesive from commodity thermoplastics through dynamic crosslinking. *Science Advances*, 7(42), p.eabk2451. [[Link](#)]
7. Samanta, S.*, **Kim, S.**, Saito, T. and Sokolov, A.P.*, 2021. Polymers with dynamic bonds: adaptive functional materials for sustainable future. *The Journal of Physical Chemistry B*, 125, 33, pp. 9389-9401. [[Link](#)] [[Front Cover Article](#)]
8. Wilt, J.K., Gilmer, D., **Kim, S.**, Compton, B.G. and Saito, T.*, 2021. Direct ink writing techniques for in situ gelation and solidification. *MRS Communications*, 11(2), pp.106-121. [[Link](#)] [[MRS Journal Highlights](#)]
9. **Kim, S.**⁺, Regitsky, A.U.⁺, Song, J., Ilavsky, J., McKinley, G.H. and Holten-Andersen, N.*, 2021. In situ mechanical reinforcement of polymer hydrogels via metal-coordinated crosslink mineralization. *Nature Communications*, 12(1), pp.1-10. (*equal contribution) [[Link](#)] [[Highlighted in Hanbitsa, BRIC, Nature Chemistry Community](#)]
10. **Kim, S.**, Peterson, A.M. and Holten-Andersen, N.*, 2018. Enhanced water retention maintains energy dissipation in dehydrated metal-coordinate polymer networks: another role for Fe-catechol cross-links?. *Chemistry of Materials*, 30(11), pp.3648-3655. [[Link](#)]
11. **Kim, S.**, Kim, J.H., Lee, J.S. and Park, C.B.*, 2015. Beta-sheet-forming, self-assembled peptide nanomaterials towards optical, energy, and healthcare applications. *Small*, 11(30), pp.3623-3640. [[Link](#)]
12. **Kim, S.** and Park, C.B.*, 2013. Bio-inspired synthesis of minerals for energy, environment, and medicinal applications. *Advanced Functional Materials*, 23(1), pp.10-25. [[Link](#)] [[Highlighted in Hanbitsa, BRIC](#)]
13. **Kim, S.**, Ko, J.W. and Park, C.B.*, 2011. Bio-inspired mineralization of CO₂ gas to hollow CaCO₃ microspheres and bone hydroxyapatite/polymer composites. *Journal of Materials Chemistry*, 21(30), pp.11070-11073. [[Link](#)] [[Front Cover Article](#)]
14. **Kim, S.**, Ku, S.H., Lim, S.Y., Kim, J.H. and Park, C.B.*, 2011. Graphene–biomineral hybrid materials. *Advanced Materials*, 23(17), pp.2009-2014. [[Link](#)]

15. **Kim, S.** and Park, C.B.*, 2010. Dopamine-induced mineralization of calcium carbonate vaterite microspheres. *Langmuir*, 26(18), pp.14730-14736. [[Link](#)]
16. **Kim, S.** and Park, C.B.*, 2010. Mussel-inspired transformation of CaCO₃ to bone minerals. *Biomaterials*, 31(25) pp.6628-6634. [[Link](#)]

Patents

1. Saito, T., **Kim, S.**, Rahman, A., **U.S. Patent** Appln. No.: 17/982,953 Crosslinked Polymeric Composition and its use in Additive Manufacturing ORNL. Ref: 4969.1. Filed: 2022.
2. Kim, M. J., Ju, J. S., Heo, H. Y., Kim, S. H., **Kim, S.**, Son, Y. S.. **Korean Patent** #10-1395110. Porous Polypropylene Film, Preparation Method thereof and Separator for Secondary Battery comprising same. Filed: 2012. Registered: 2014.
3. **Kim, S.**, Ju, J. S., Heo, H. Y., Son, Y. S., Kim, M. J., Kim, S. H.. **Korean Patent** #10-1327891. Porous Film coated with Biopolymer and Separator for Secondary Battery comprising same. Filed: 2012. Registered: 2013.
4. Park, C. B., **Kim, S.**, Ku, S. H., Lim, S. Y., Kim, J. H.. **Korean Patent** #10-1222019. Graphene-Biomineral Hybrid Films and Preparing Method thereof. Filed: 2011. Registered: 2013.
1. Park, C. B., **Kim, S.**, **Korean Patent** #10-1328348. Method for Preparing Hydroxyapatite from Vaterite containing Catecholamine. Filed: 2010. Registered: 2013.

Conference Presentations

1. **Kim, S.**, Rahman, M.A., Arifuzzaman, M., Gilmer, D., Li, B., Wilt, J.K., Lara-Curzio, E., and Saito, T., Closed-loop additive manufacturing of upcycled commodity plastic through dynamic crosslinking. **ACS Fall 2022**, Chicago, IL, USA, Aug. 18 – 25, 2022.
2. Gilmer, D., **Kim, S.**, Elliott, A., Saito, T., Polyethyleneimine binder in binder jetting enables exceptionally strong silica sand structures. **ACS Spring 2022**, San Diego, CA, USA, March 20 - 24, 2022.
3. **Kim, S.**, Regitsky, A., Song, J., Quesada, A.F., McKinley, G.H., Holten-Andersen, N., Bioinspired Metal-Coordinate Mineralization: Effective Metal-Binding Pathway for Mechanical Reinforcement of Organic-Inorganic Hybrid Materials and for Future Hard Tissue Engineering Application. **2019 MRS Fall Meeting & Exhibit**, Boston, MA, USA, Dec. 1 - 6, 2019.
4. Song, J., **Kim, S.**, Saouaf, S., Mankus, D., McKinley, G.H., Holten-Andersen, N., Bio-inspired Mechanical Reinforcement of Hydrated Soft Matter via In Situ Mineralization at Adhesive Mussel-inspired Ligand Sites. **MIT Polymer Day 2019**, Cambridge, MA, USA, Apr. 17, 2019.
5. **Kim, S.**, Holten-Andersen, N., A New Role of Metal-Mediated Hydrogel Crosslinking: Mussel-inspired Metal-coordinate Bonds Remain Wet When Dried. **2018 Gordon Research Conference & Seminar - Bioinspired Multifunctional Dynamic Materials**, Les Diablerets, Switzerland, Jun. 23 - 29, 2018.
6. Regitsky, A., Keshavarz, B., **Kim, S.**, Cazzell, S., McKinley, G.H., Holten-Andersen, N., Bioinspired Mineralization in Hydrogels for Sustainable Applications. **2018 American Physical Society**, Los Angeles, CA, USA, Mar. 5 – 9, 2018.
7. **Kim, S.**, Holten-Andersen, N., Bio-Inspired Stiffening Process Through Dehydration—Using Nature's Trick towards Versatile, Robust Materials in Wet/Dry States. **2016 MRS Fall Meeting & Exhibit**, Boston, MA, USA, Nov. 27 - Dec. 2, 2016.

8. **Kim, S.**, Holten-Andersen, N., Mechanical and Optical Characterization of a Bio-inspired Polymer Material during Reversible Wet-to-Dry Transitions. **2015 MRS Fall Meeting & Exhibit**, Boston, MA, USA, Nov. 29 - Dec. 4, 2015.
9. **Kim, S.**, Ko, J. W., Park, C. B., Synthesis of Hollow CaCO₃ Microspheres and Bone Minerals/Polymer Hybrid Materials by Biomimetic CO₂ Mineralization. **2012 MRS Fall Meeting & Exhibit**, Boston, MA, USA, Nov. 25 - 30, 2012.
10. **Kim, S.**, Park, C. B., Mussel-inspired Transformation of CaCO₃ to Bone Minerals. **2010 Joint Symposium on Materials Science and Engineering for the 21st Century**, KAIST, Daejeon, Korea, Jun. 27 - 30, 2010.

Selected Honors and Awards

- | | |
|-------------|--|
| 2021 | Listed in Hanbitsa (People Glorifying Korea, Notable Korean Scientists) Biological Research Information Center (BRIC), Korea |
| 2014 - 2019 | Samsung Scholarship Samsung Scholarship, Samsung Foundation of Culture |
| 2013 | Fulbright Scholarship Selectee[#] Korean-American Educational Commission (Fulbright Commission) <i># voluntarily declined the award in order to accept Samsung Scholarship</i> |
| 2012 | Research Report of the Year Award – Grand Prize SKC Co., Ltd., SK Group |
| 2012 | Listed in Hanbitsa (People Glorifying Korea, Notable Korean Scientists) Biological Research Information Center (BRIC), Korea |
| 2011 | Outstanding New Researcher Award – Grand Prize SKC Co., Ltd., SK Group |
| 2010 | SKC Industrial R&D Fellowship SKC Co., Ltd., SK Group |
| 2009 – 2011 | National Science and Engineering Graduate Research Scholarship Korea Student Aid Foundation (KOSAF) |
| 2009 – 2011 | Government Scholarship (Natural Sciences and Engineering) Ministry of Education and Science Technology, Government of the Republic of Korea |
| 2006 – 2009 | Departmental Scholarship Department of Materials Science and Engineering, KAIST |
| 2006 – 2007 | National Science and Engineering Undergraduate Scholarship Korea Student Aid Foundation (KOSAF) |