

Kunmo Koo, Ph.D.

Postdoctoral Research Associate

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Research Interests and Contributions

- Development, implementation, and application of novel devices and instrumentation for *in situ* electron microscopy to achieve high spatial, temporal, and spectral clarity.
- Nanoscale investigations of liquid-solid, gas-solid, and plasma-solid interfaces.
- Exploring electron beam-mediated reaction chemistry of soft and hard materials.

Education

2013. 3. - 2020. 8. **Ph.D. in Department of Materials Science and Engineering**
Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Republic of Korea
Thesis title: "Development of Operando Electron Microscopy Platform for High-Resolution Imaging" (Supervisor: Jong Min Yuk)
2009. 2. - 2013. 2. **B.S. in Department of Materials Science and Engineering**
Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Republic of Korea

Professional Appointments

2021. 7. - current **Postdoctoral Research Associate**, Northwestern University Atomic and Nanoscale Characterization Experimental (NUANCE) Center, Evanston, IL
2020. 8. - 2021. 6. **Post-Doc Researcher**, Interdisciplinary Materials Measurement Institute, Korea Research Institute of Standards and Science (KRISS), Daejeon, Republic of Korea

Grants and Awards

2023. 4. **Microscopy and Microanalysis Postdoctoral Scholar Award**, Minneapolis, MN
2022. 9. - 2023. 8. **Fostering Next Generation Researcher**, National Research Foundation of Korea (NRF), Republic of Korea
2020. 8. - 2021. 7. **Postdoctoral Fellowship Program for Young Scientists**, National Research Council of Science & Technology (NST), Republic of Korea
2021. 3. **The Best Cooperative Results Award 2020**, National NanoFab Center, Republic of Korea
2017. 9. **The Best Student Presentation Award**, European Materials Research Society fall meeting, Warsaw, Poland

Journal Publications

1. **K. Koo**, B. Shen, S. -I. Baik, Z. Mao, P. J. M. Smeets, I. Cheuk, K. He, R. d. Reis, L. Huang, Z. Ye, C. Mirkin, X. Hu, and V. P. Dravid, "Formation Mechanism of High-index Faceted Pt-Bi Alloy Nanoparticles by Evaporation-induced Growth from Metal Salts", *Nature Communications*, 14, 3790, 2023 (*Selected as Editor's Highlights*)
2. **K. Koo**, S. M. Ribet, C. Zhang, P. J. M. Smeets, R. d. Reis, X. Hu, and V. P. Dravid, "Effect of the Encapsulation Membrane in Operando Scanning Transmission Electron Microscopy", *Nano Letters*, 22, 10, 4137-4144, 2022
3. **K. Koo**, J. Park, S. Ji, S. Toleukhanova, and J. M. Yuk, "Liquid-Flowing Graphene Chip-Based High-Resolution Electron Microscopy", *Advanced Materials*, 33, 2, 2005468, 2021 (*Inside back cover*)

4. **K. Koo**, K. S. Dae, Y. K. Hahn, and J. M. Yuk, "Live Cell Electron Microscopy Using Graphene Veils", *Nano Letters*, 20, 6, 4708-4713, 2020 (Supplementary cover)
5. B. I. Koo, I. Kim, M. Y. Yang, S. D. Jo, **K. Koo**, S. Y. Shin, K. M. Park, J. M. Yuk, E. Lee, and Y. S. Nam, "Protein-induced Metamorphosis of Unilamellar Lipid Vesicles to Multilamellar Hybrid Vesicles", *Journal of Controlled Release*, 331, 187-197, 2021
6. J. Park, **K. Koo**, N. Noh, J. H. Chang, J. Y. Cheong, K. S. Dae, J. S. Park, S. Ji, I. -D. Kim, and J. M. Yuk, "Graphene Liquid Cell Electron Microscopy: Progress, Applications, and Perspectives", *ACS Nano*, 15, 1, 288–308, 2021 (Invited Review)
7. Noh, J. Park, J. S. Park, **K. Koo**, J. Y. Park, and J. M. Yuk, "Lithographically Patterned Well-Type Graphene Liquid Cells with Rational Designs", *Lab on a Chip*, 20, 15, 2796-2803, 2020
8. K. S. Dae, J. H. Chang, **K. Koo**, J. Park, J. S. Kim, and J. M. Yuk, "Real-time Observation of CaCO₃ Mineralization in Highly Supersaturated Graphene Liquid Cells", *ACS Omega*, vol. 5, no. 24, pp. 14619-14624, 2020 (Supplementary cover)
9. S. Y. Kim, K. S. Dae, **K. Koo**, D. Kim, J. Park, and J. M. Yuk, "Sequential Growth and Etching of Gold Nanocrystals Revealed by High-Resolution Liquid Electron Microscopy", *Physica Status Solidi (a)*, 216, 7, 1970026, 2019 (Cover picture)
10. D. J. Lee, H. S. Park, **K. Koo**, J. Y. Lee, Y. S. Nam, W. Lee, and M. Y. Yang, "Gold Binding Peptide Identified from Microfluidic Biopanning: An Experimental and Molecular Dynamics Study", *Langmuir*, 35, 2, 522-528, 2019

Domestic and International Conference

1. **K. Koo**, X. Hu, and V. P. Dravid, "Resolving Palladium Storage Kinetics at the Atmospheric Pressure Enabled with the Ultrathin Silicon Nitride Gas Cell Transmission Electron Microscopy", the 20th International Microscopy Conference, BEXCO, Busan, Republic of Korea (Sep 10-15, 2023)
2. **K. Koo**, P. J. M. Smeets, X. Hu, and V. P. Dravid, "Analytical *in situ* Gas Transmission Electron Microscopy Enabled with Ultrathin Silicon Nitride Membranes", Microscopy and Microanalysis 2023, Minneapolis Convention Center, Minneapolis, MN, USA (Jul 23-27, 2023)
3. **K. Koo**, S. M. Ribet, R. d. Reis, X. Hu, and V. P. Dravid, "Controlled Growth of High-Index Faceted Nanoparticles Using the Gas Phase Environmental Cell TEM", Microscopy and Microanalysis 2022, Oregon Convention Center, Portland, OR, USA (Jul 31- Aug 4, 2022)
4. **K. Koo**, J. H. Chang, S. Ji, J. Choe, S. Shin, G. -T. Lee, T. -H. Kim, and J. M. Yuk, "Etching Dynamics of Geometrically Confined Silicon Nanostructure", Microscopy and Microanalysis 2022, Oregon Convention Center, Portland, OR, USA (Jul 31- Aug 4, 2022)
5. **K. Koo**, and J. -H. Kwon, "Abnormal Melting Behavior of Colloidal Nanoparticles in Liquid Cell Electron Microscope", 2020 Korean Society of Microscopy Fall meeting, Phoenix Pyeongchang, Pyeongchang, South Korea (November 12-13, 2020)
6. **K. Koo**, S.-W. Nam, S. H. Ko, B. Koo, and J. Y. Lee, "Advanced Silicon Nitride Membrane Liquid Chip Design for Observation of Various Nanomaterials in Transmission Electron Microscope", 2017 European Materials Research Society Fall Meeting, Warsaw University of Technology, Warsaw, Poland (September 18-21, 2017)
7. **K. Koo**, K. S. Dae, S. Y. Song, B. Koo, and J. Y. Lee, "A Scanning Electron Microscopic Observation of Living Bacteria in Graphene Liquid Cell", 2016 European Materials Research Society Spring Meeting, Lille Grand Palais, Lille, France (May 2-6, 2016)
8. **K. Koo**, and J. Y. Lee, "A Scanning Electron Microscopic Observation of Living *Escherichia Coli*. in Graphene Liquid Cell", 2015 Materials Research Society Fall Meeting & Exhibit, Hynes Convention Center, Boston, MA, USA (November 30-December 4, 2015)