

Minhong Lim, Ph.D.

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EDUCATION

Mar. 2020 – Feb.2025	Daegu Gyeongbuk Institute of Science & Technology (DGIST) <i>M.S.-Ph.D. Integrated Course</i> - Department of Energy Science & Engineering - Thesis title: Interface Chemistry and Engineering with Nano-Colloidal Electrolytes in Lithium-Metal Batteries - Advisors: Prof. Hongkyung Lee & Prof. Hochun Lee	Daegu, Korea
Mar. 2016 – Feb. 2020	Daegu Gyeongbuk Institute of Science & Technology (DGIST) <i>B.S in School of Undergraduate Studies</i> Advisor: Prof. Yong Min Lee	Daegu, Korea

PROFESSIONAL EXPERIENCES

June. 2026 – Present	Nanyang Technological University (NTU) <i>Postdoctoral Researcher</i> - School of Mechanical and Aerospace Engineering (MAE) - Principal Investigator: Prof. Mun Sek Kim	Singapore, Singapore
Mar. 2025 – June. 2026	Yonsei University <i>Postdoctoral Researcher</i> - Department of Materials Science and Engineering - Principal Investigator: Prof. Hongkyung Lee	Seoul, Korea

HONORS & AWARDS

Feb. 2026	Post Doc. Researcher Supporting Program , Yonsei University	Seoul, Korea
Nov. 2025	Best Poster Award , International Conference on Advanced Electromaterials, ICAE	Jeju, Korea
Feb. 2025	Post Doc. Researcher Supporting Program , Yonsei University	Seoul, Korea
Dec. 2024	Excellent Research Award , Department of Energy Science and Engineering, DGIST	Daegu, Korea
Dec. 2023	Excellent Research Award , Department of Energy Science and Engineering, DGIST	Daegu, Korea
Dec. 2022	Excellent Research Award , Department of Energy Science and Engineering, DGIST	Daegu, Korea
Nov. 2022	Oral Presentation Award , The Korean Electrochemical Society	Seoul, Korea
Sep. 2022	President's Outstanding Student Award , DGIST	Daegu, Korea
Jan. 2019	Honorable Mention , UGRP, DGIST	Daegu, Korea
Dec. 2018	Best Poster Award , Undergraduate Group Research Program (UGRP), DGIST	Daegu, Korea

RESEARCH INTERESTS & EXPERTISE

- Research Interests:** Electrolyte for Li metal anode (Nano-colloidal electrolyte, Ionic liquid, etc.), Protection layer for Li-sulfur batteries, SEI deterioration behavior analysis
- Electrochemical cells:** Li-metal batteries, Li-ion batteries, and Li-sulfur batteries
- Material synthesis and functionalization:** Inorganic nanoparticle (Silica, Iron oxide, Boron nitride nanosheet, etc.)
- Material coatings:** Li metal protection layer coating, Polymer/composite coating, Spin coating, Blade coating, Sputtering
- Material analysis:** XRD, NMR, Raman, FT-IR, Imaging (SEM & TEM), XPS & TOF-SIMS (Depth profiling, 3D imaging)
- Electrolyte characterization:** Ink spreading test, DLS, NMR, Raman, and FT-IR analysis
- Cell design & fabrication:** Pouch cell manufacturing, 3-electrode coin cells, and Operando optical cells
- Programs for graphical and schematic artworks:** Sigma Plot, Origin, Rhino 3D, Illustrator, and Microsoft Office
- Electrochemical analysis:** Battery cycler (Landt, Biologic, and WonATech), Cyclic voltammetry (LSV and CV), Chronoamperometry, Electrochemical impedance spectroscopy (EIS), Leakage current density.
- Languages:** English (Professional working proficiency), Korean (Native)

- 24 S. Choi†, Y. Lee†, K.-H. Kim, J. Seo, C. H. Lee, **M. Lim***, S.-H. Yu* and H. Lee* “Li-metal protective layer for Li-S batteries” Submitted (2026)
- 23 A. Mariam†, **M. Lim†**, M. Ejaz, S. Jeong, H. Lee* and S. Choe* “Ab Initio Insights into Diluent-Driven Interfacial Reactivity of Locally Concentrated Ionic Liquid Electrolytes at the Lithium Metal Surface” Submitted (2026)
- 22 J. Seo†, S. S. Lee†, S. Jeon†, **M. Lim**, H. Koo, S.-T. Hong, W. Jang*, A. Soon*, and H. Lee* “Lithiophilic Current Collector without Interfacial Penalty in Zero-Excess Lithium Metal Batteries” *Advanced Science* 13(33), e19303 (2026)
- 21 **M. Lim†**, S. Choi†, B. Kim, K.-G. Kim, S. Kim, J. Seo, B. Choi, K.-H. Kim, J. Seo, C. H. Lee, Y.M. Lee*, and H. Lee* “Cross-Optimized Dual-Layer Anode Protection Enhancing Interfacial Adaptivity in Lean-Electrolyte Li-S Batteries” *Journal of Energy Storage* 161, 121818 (2026)
- 20 Y.-K. Hong†, H.-D. Kim†, S. Choi†, **M. Lim**, M. Lee, H. Lee*, and S.-Y. Lee* “Pit-Free Stripping in Discharge-Initiated Lithium Metal Batteries” *ACS Energy Letters* 11(3), 2399–2409 (2026)
- 19 **M. Lim†**, D. Woo†, J. Seo, S. Choi, H.-D. Kim, H. Koo, S. Jeong, M. Ban, S. Kim, J. Hwang*, J. Lee*, and H. Lee* “Intrapore-Structuring Nanocolloids Mediating Solvation and Interfaces in Lithium Metal Batteries” *SusMat* 6(1), e70057 (2026)
- 18 S. Akter†, A. Mariam†, **M. Lim†**, H. Lee*, and S. Choe* “Decoding diluent-driven solvation dynamics in locally concentrated ionic liquid electrolytes” *Journal of Physical Chemistry C* 129(42), 18857–18868 (2025)
- 17 **M. Lim†**, H. Chang†, G. Kim†, J. Seo, B. Kim, J. Lee, S. Choe, H. Lee, J. Moon*, and H. Lee* “Interfacial impacts of diluent-mediated anion conformational changes in locally concentrated ionic liquid electrolytes” *Energy Storage Materials* 79, 104288 (2025)
- 16 S. Lee†, H. Lee†, H. Chang†, **M. Lim**, M. Lee, B. Koo, K.-E. Ryou, S.-M. Bak, H. Lee, J. Moon*, and H. Lee* “Ester-guided dynamic Li⁺ solvation enables plating-less, fast-charging Li-ion batteries” *ACS Nano* 19(16), 15789–15802 (2025)
- 15 S. Park, B. Kim, **M. Lim**, J. Seo, J. Lee, B. Choi, and H. Lee* “Mechanochemical-milling-assisted removal of native passivation layer for refreshing lithium metal anodes” *Energy Storage Materials* 71, 103579 (2024)
- 14 S. Park†, H. Chang†, H. Lee, **M. Lim**, H. An, J. Kang, S. Lee, M. Lee, C. Han, H. Lee, S. Chae*, J. Moon*, and H. Lee* “Diluent-mediated interfacial reactions in localized-high-concentration electrolytes for fast-charging lithium-ion batteries” *Journal of Materials Chemistry A* 12, 16517–16527 (2024)
- 13 **M. Lim†**, J. Lee†, S. Lee†, S. Park, and H. Lee* “Modulation of Li⁺ microenvironment in liquid electrolyte for interface design of Li-metal anodes” *Bulletin of the Korean Chemical Society* 45(8), 648–663 (2024)
- 12 B. Choi†, K. Kim†, **M. Lim†**, B. Kim, J. Seo, J. Lee, S. Park, K.-H. Kim, Y. M. Lee*, and H. Lee* “Surface adaptive dual-layer protection of Li-metal anode for extending cycle-life of Li-sulfur batteries with lean electrolyte” *Advanced Functional Materials* 34(28), 2316838 (2024) *"Hot Topic: Surfaces and Interfaces"*
- 11 J. Seo†, J. Lee†, B. Kim, **M. Lim**, J. Lee, B. Choi, S. Park, G. Kim, and H. Lee* “Regenerating native surface of lithium-metal electrodes via hydrohalic acid-assisted pre-halogenation” *Chemical Engineering Journal* 483, 149188 (2024)
- 10 C. Bak†, K.-G. Kim†, H. Lee†, S. Byun, **M. Lim**, H. An, Y. Roh, H. Lee*, and Y. M. Lee* “Advanced multilayer model electrode for binder distribution within composite electrodes of lithium batteries” *Chemical Engineering Journal* 483, 148913 (2024)
- 9 **M. Lim**, J. Seo, B. Choi, B. Kim, J. Lee, S. Park, and H. Lee* “Intelligent Nano-Colloidal Electrolytes for Stabilizing Lithium Metal Anodes: A Review” *ChemElectroChem*, 11(12), e202300621 (2024) *"Featured in Front Cover Image"*
- 8 H. Lee†, J. Kang†, H. W. Kang, M. Lee, J. Han, **M. Lim**, J. Lee, W. Kwon, D.-H. Nam, B. G. Kim*, and H. Lee* “A hydrophilic Janus-faced separator with functionalized nanocarbon for stable cycling of aqueous Zn-metal batteries” *Journal of Materials Chemistry A* 12, 3623–3632 (2024)

- 7 M. Lee†, Y. Shin†, H. Chang, D. Jin, H. Lee, **M. Lim**, J. Seo, T. Band, K. Kaufmann, J. Moon*, Y. M. Lee*, and H. Lee* “Diagnosis of Current Flow Patterns Inside Fault-Simulated Li-Ion Batteries via Non-Invasive, In Operando Magnetic Field Imaging” *Small Methods* 7(11), 2300748 (2023)
- 6 **M. Lim**, H. An, J. Seo, M. Lee, H. Lee, H. Kwon, H.-T. Kim, D. Esken, R. Takata, H. A Song, and H. Lee* “Modulating Ionic Transport and Interface Chemistry via Surface-Modified Silica Carrier in Nano Colloid Electrolyte for Stable Cycling of Li-Metal Batteries” *Small* 19(43), 2302722 (2023) *"Featured in Inside Back Cover Image"*
- 5 H. An, Y. Roh, Y. Jo, H. Lee, **M. Lim**, M. Lee, Y. M. Lee*, and H. Lee* “Separator Dependency on Cycling Stability of Lithium Metal Batteries under Practical Conditions” *Energy & Environmental Materials* 6(5), e12397 (2023)
- 4 J. Seo, W. Jeong, **M. Lim**, B. Choi, S. Park, Y. Jo, J.-W. Lee*, and H. Lee* “Electrodeposition-guided pre-passivation of Li-metal anode to enable long stable cycling of practical Li-metal batteries” *Energy Storage Materials* 60, 102827 (2023)
- 3 H. Lee†, C. Bak†, **M. Lim**, H. An, S. Byun, Y. M. Lee*, and H. Lee* “Preplanting Nanosilica into Binder-less Battery Electrodes for High-performance Li-ion Batteries” *ACS Applied Nano Materials* 6(4), 3128–3137 (2023)
- 2 Y. Jo†, D. Jin†, **M. Lim**†, H. Lee, H. An, J. Seo, G. Kim, X. Ren, Y. M. Lee*, and H. Lee* “Structural and Chemical Evolutions of Li/Electrolyte Interfaces in Li-metal Batteries: Tracing Compositional Changes of Electrolytes under Practical Conditions” *Advanced Science* 10(2), 2204812 (2023)
- 1 **M. Lim**, S. Kim, J. Kang, D. Jin, H. An, H. Lee, J. Park, M. Lee, J. Seo, H. Lee*, Y. M. Lee*, and H. Lee* “Dynamic Ionic Transport Actuated by Nanospinbar-dispersed Colloidal Electrolytes Toward Dendrite-free Electrodeposition” *Advanced Functional Materials* 32(40), 2204052 (2022) *"Featured in Front Cover Image"*

PATENTS

- 10 H. B. Nam, H. Lee, **M. Lim**, H. Lee “Separator, secondary battery and device comprising the same” Patent No.: 10-2025-0114066 (Application, 2025), 102026104119.1/DE, 19/458,301/US (Application, 2026)
- 9 K. H. Kim, H. Lee, J. Seo, C. Lee, **M. Lim**, S. Choi “An anode for a lithium secondary battery and a lithium secondary battery comprising the same” Patent No.: 10-2025-0176169 (Application, 2025)
- 8 J. Seo, K. H. Kim, B. Choi, B. Kim, C. Lee, H. Lee, **M. Lim** “NEGATIVE ELECTRODE FOR LITHIUM SECONDARY BATTERY AND LITHIUM SECONDARY BATTERY INCLUDING THE SAME” Patent No.: 10-2025-0176210 (Application, 2025)
- 7 H. Lee, H. B. Nam, **M. Lim**, H. Lee “Secondary battery and secondary battery system comprising the same” Patent No.: 10-2024-0200177 (Application, 2024)
- 6 H. Lee, B. Choi, K. H. Kim, J. Seo, **M. Lim**, B. Kim “A negative electrode and a lithium secondary battery comprising the same” Patent No.: 10-2024-0178776 (Application, 2024)
- 5 J. Kim, J. Hong, M. Kim, Y. Song, H. Lee, M. Lee, H. Lee, **M. Lim** “A Method for controlling site-selective distribution of microcapsules” Patent No.: 10-2024-0048733 (Application, 2024)
- 4 J. Kim, H. Lee, M. Lee, J. Lee, **M. Lim**, J. Han “A coating method and device for controlling the regioselective distribution of lithium protective film” Patent No.: 10-2024-0048927 (Application, 2024)
- 3 H. Lee, S. Park, J. Seo, **M. Lim**, B. Choi, B. Kim, J. Lee “Manufacturing method of Lithium metal anode with removed native layer, and lithium metal anode manufactured by the method” Patent No.: PCT/KR2024/009697 (Application, 2024), 10-2023-0114805 (Application, 2023)
- 2 H. Lee, M. Lee, **M. Lim**, Y. Jo, J. Jung “Coin Cell Having Uniform Pressure” Patent No.: 10-2523088 (Granted, 2023)
- 1 H. Lee, **M. Lim**, Y. Jo, Y. M. Lee, D. Jin “Convection Induction Type Electrolyte for Secondary Battery and the Secondary Battery Including the Same” Patent No.: PCT/KR2022/002663 (Application, 2022), 10-2600364 (Granted, 2023)

PRESENTATIONS (International only)

- 6 (Poster) **M. Lim** and H. Lee “Engineering Stable Colloids to Tailor the Li Microenvironment and Interface in Lithium Metal Batteries” 8th International Conference on Advanced Electromaterials (ICAE), November 25–28, 2025, Jeju, Korea.

- 5 (Oral) **M. Lim**, H. Chang, G. Kim, J. Moon, and H. Lee “Interfacial Effects of Anion Conformation Changes Induced by Diluents in Locally Concentrated Ionic Liquid Electrolytes” The 248th ECS Meeting, October 12–16, 2025, Chicago, US.
- 4 (Poster) **M. Lim** and H. Lee “Porous structured SiO₂ Colloidal Electrolyte for Forming Anion Derived SEI while enhanced Li⁺ Dissociation” 2025 Wiley Forum Spring Meeting Nanoscience in Energy Research, May 7–9, 2025, Suwon, Korea.
- 3 (Poster) **M. Lim**, S. Kim, J. Kang, D. Jin, H. An, H. Lee, J. Park, M. Lee, J. Seo, H. Lee, Y. M. Lee and H. Lee “Nanospinbar-Enhanced Ionic Movement in Colloidal Electrolytes for Dendrite-Free Electrodeposition” The 22nd International Meeting on Lithium Batteries (IMLB), June 16–21, 2024, Hong Kong, China.
- 2 (Oral) **M. Lim**, H. An, J. Seo, M. Lee, H. Lee, H. Kwon, H.-T. Kim, D. Esken, R. Takata, H. A Song and H. Lee “Modulating ionic transport and interface chemistry via surface-modified nanoparticle carrier in silica-colloidal electrolyte for Li-metal batteries” 2024 MRS spring Meeting, April 22–26, 2024, Seattle, US.
- 1 (Oral) **M. Lim**, S. Kim, J. Kang, D. Jin, H. An, H. Lee, J. Park, M. Lee, J. Seo, H. Lee, Y. M. Lee and H. Lee “Nanospinbar-Assisted Convective Ionic Transfer Toward Dendrite-Free Li Metal Batteries” The 243rd ECS Meeting, May 28–June 2, 2023, Boston, US.