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### Education

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- Ph.D. Materials Science and Engineering, KAIST** (advisor: Prof. Chan Beum Park) Daejeon, Korea  
Thesis: “Design of Materials for Bio-Inspired Energy Conversion and Storage” 03/2011 ~ 02/2015
- M.S. Materials Science and Engineering, KAIST** (advisor: Prof. Chan Beum Park) Daejeon, Korea  
Thesis: “Development of Light-Harvesting Synthetic Woods for Artificial Photosynthesis” 03/2009 ~ 02/2011
- B.S. Materials Science and Engineering, KAIST** Daejeon, Korea  
03/2005 ~ 03/2009

### Experience

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- Korea Institute of Science & Technology (KIST)** Seoul, Korea  
- Senior Research Scientist 03/2019 ~ present
- Stanford University, Chemical Engineering, Bao Research Group** CA, USA  
- Postdoctoral Fellow (advisor: Prof. Zhenan Bao, co-advisor: Prof. Yi Cui) 11/2015 ~ 12/2018
- KAIST, Materials Science & Engineering, Advanced Biomaterials Lab** Daejeon, Korea  
- Postdoctoral Fellow (advisor: Prof. Chan Beum Park) 03/2015 ~ 10/2015

### Honors and Awards

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- *KIST Scientist of the Month Award*, Sep. 2022
- *KIST Young Fellow*, 2021~present
- *Park Su-Moon Academic Award*, The Korean Electrochemical Society, 2019
- *Wiley APAC Young Researcher Award*, Wiley, 2019
- *MRS Postdoc Award*, Materials Research Society, 2018
- *Postdoctoral Fellowship*, National Research Foundation of Korea, 2017~2018
- *Best Doctoral Thesis Award*, KAIST, 2015
- *Global Ph.D. Fellowship*, National Research Foundation of Korea, 2011~2014

### Publications (†Co-first authors, \*Corresponding author)

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1. S. Gong, Y. Lee, J. Choi, **M. Lee**, K. Y. Chung, H.-G. Jung, S. Jeong\*, H.-S. Kim\*, “In situ mesopore formation in SiO<sub>x</sub> nanoparticles by chemically reinforced heterointerface and use of chemical prelithiation for highly reversible lithium-ion battery anode.” *Small* 2023, 19, 2206238.
2. G. Lim, D. Shin, K. H. Chae, M. K. Cho, C. Kim, S. S. Sohn, **M. Lee**, J. Hong\*, “Regulating dynamic electrochemical interface of LiNi<sub>0.5</sub>Mn<sub>1.5</sub>O<sub>4</sub> spinel cathode for realizing simultaneous Mn and Ni redox in rechargeable lithium batteries.” *Advanced Energy Materials* 2022, 12, 2202049.
3. S. Ko, Y. Yoo, J. Choi, H.-D. Lim, C. B. Park\*, **M. Lee**\*, “Discovery of organic catalysts boosting lithium carbonate decomposition toward ambient air operational lithium-air battery.” *Journal of Materials Chemistry A* 2022, 10, 20464.

4. M. Kwon, J. Lee, S. Ko, G. Lim, S.-H. Yu, J. Hong, **M. Lee\***, “Stimulating Cu-Zn alloying for compact Zn metal growth towards high energy aqueous batteries and hybrid supercapacitors.” *Energy & Environmental Science* 2022, 15, 2889. **Back Cover**
5. M. S. Lee, M. Jeong, Y. S. Nam, J. Moon, **M. Lee**, H.-D. Lim, D. Byun, T. Yim, S. H. Oh\*, “Nitrogen-doped graphitic mesoporous carbon materials as effective sulfur imbibition hosts for magnesium-sulfur batteries.” *Journal of Power Sources* 2022, 535, 231471.
6. J. Choi, H. Jeong\*, J. Jang, A-R. Jeon, I. Kang, M. Kwon, J. Hong\*, **M. Lee\***, “Weakly solvating solution enables chemical prelithiation of graphite-SiO<sub>x</sub> anodes for high-energy Li-ion batteries.” *Journal of the American Chemical Society* 2021, 143, 9169.
7. T. T. Bui, B. Yun, K. Darko, S. B. Shin, J. Kim, J. Hong, **M. Lee**, S. K. Park\*, M-G Kim\*, “Solution processing of lithium-rich amorphous Li-La-Zr-O ion conductor and its application for cycling durability improvement of LiCoO<sub>2</sub> cathode as coating layer.” *Advanced Materials Interfaces* 2021, 8, 2001767.
8. J. Jang<sup>†</sup>, I.Kang<sup>†</sup>, J. Choi, H. Jeong, K.-W. Yi, J. Hong\*, **M. Lee\***, “Molecularly tailored lithium-arene complex enables chemical prelithiation of high-capacity lithium-ion battery anodes.” *Angewandte Chemie Int. Ed.* 2020, 59, 14473. **Back Cover**
9. Y. Tsao<sup>†</sup>, **M. Lee**<sup>†</sup>, E. C. Miller, G. Gao, J. Park, S. Chen, T. Katsumata, H. Tran, L.-W. Wang, M. F. Toney, Y. Cui\*, Z. Bao\*, “Designing a quinone-based redox mediator to facilitate Li<sub>2</sub>S oxidation in Li-S batteries.” *Joule* 2019, 3, 872.
10. Z. Yu, D. G. Mackanic, W. Michaels, **M. Lee**, A. Pei, D. Feng, Q. Zhang, Y. Tsao, C. V. Amanchukwu, X. Yan, H. Wang, S. Chen, K. Liu, J. Kang, J. Qin, Y. Cui\*, Z. Bao\*, “A dynamic, electrolyte-blocking, and single-ion-conductive network for stable lithium-metal anodes.” *Joule* 2019, 3, 2761.
11. V. R. Feig, H. Tran, **M. Lee**, K. Liu, Z. Huang, L. Beker, D. G. Mackanic, Z. Bao\*, “An electrochemical gelation method for patterning conductive PEDOT:PSS hydrogels.” *Advanced Materials* 2019, 31, 1902869.
12. J. Park<sup>†</sup>, **M. Lee**<sup>†</sup>, D. Feng, Z. Huang, A. C. Hinckley, A. Yakovenko, X. Zou, Y. Cui, Z. Bao\*, “Stabilization of hexaaminobenzene in a 2D conductive metal-organic framework for high power sodium storage.” *Journal of the American Chemical Society* 2018, 140, 10315.
13. J. Park, A. Hinckley, Z. Huang, D. Feng, A. Yakovenko, **M. Lee**, S. Chen, X. Zou, Z. Bao\*, “Synthetic routes for a 2D semiconductive copper hexahydroxybenzene metal-organic framework.” *Journal of the American Chemical Society* 2018, 140, 14533.
14. J. Lopez, Y. Sun, D. G. Mackanic, **M. Lee**, A. M. Foudeh, M.-S. Song, Y. Cui\*, Z. Bao\*, “A dual-crosslinking design for resilient lithium ion conductor.” *Advanced Materials* 2018, 30, 1804142.
15. V. R. Feig, H. Tran, **M. Lee**, Z. Bao\*, “Mechanically tunable, conductive interpenetrating network hydrogels that mimic the elastic moduli of biological tissue.” *Nature Communications* 2018, 9, 2740.
16. D. G. Mackanic, W. Michaels, **M. Lee**, D. Feng, J. Lopez, J. Qin, Y. Cui\*, Z. Bao\*, “Crosslinked poly(tetrahydrofuran) as a loosely-coordinating polymer electrolyte.” *Advanced Energy Materials*, 2018, 8, 1800703.

17. D. Feng<sup>†</sup>, T. Lei<sup>†</sup>, M. R. Lukatskaya<sup>†</sup>, J. Park, Z. Huang, **M. Lee**, L. Shaw, S. Chen, A. A. Yakovenko, A. Kulkarni, J. Xiao, K. Fredrickson, J. B. Tok, X. Zou, Y. Cui\*, Z. Bao\*, “Robust and conductive two-dimensional metal–organic frameworks with exceptionally high volumetric and areal capacitance.” *Nature Energy* 2018, 3, 30.
18. **M. Lee**, J. Hong, J. Lopez, Y. Sun, D. Feng, K. Lim, W. C. Cheuh, M. F. Toney, Y. Cui\*, Z. Bao\*, “High-performance sodium–organic battery by realizing four-sodium storage in disodium rhodizonate.” *Nature Energy* 2017, 2, 861. **Highlighted in Nature Energy News and Views**
19. **M. Lee**<sup>†</sup>, J. Hong<sup>†</sup>, B. Lee, S. Lee, C. B. Park\*, K. Kang\*, “Multi-electron redox phenazine for ready-to-charge organic batteries.” *Green Chemistry* 2017, 19, 2980.
20. D. S. Choi, Y. Ni, E. Fernandez-Fueyo, **M. Lee**, F. Hollmann, and C. B. Park\*, “Photoelectroenzymatic oxyfunctionalization on flavin-hybridized carbon nanotube electrode platform.” *ACS Catalysis* 2017, 7, 1563.
21. H. D. Lim, B. Lee, Y. Zheng, J. Hong, J. Kim, H. Gwon, Y. Ko, **M. Lee**, K. Cho, K. Kang\*, “Rational design of redox mediators for advanced Li–O<sub>2</sub> batteries.” *Nature Energy*, 2016, 1, 16066.
22. **M. Lee**, J. U. Kim, K. J. Lee, S. Ahn, Y.-B. Shin\*, J. Shin\*, C. B. Park\*, “Aluminum nanoarrays for plasmon-enhanced artificial photosynthesis.” *ACS Nano* 2015, 9, 6206.
23. H. Kim, J. E. Kwon, B. J. Lee, J. Hong, **M. Lee**, S. Y. Park\*, K. Kang\*, “High energy organic cathode for sodium rechargeable batteries.” *Chemistry of Materials*, 2015, 27, 7258.
24. E. J. Sohn, J. S. Lee, **M. Lee**, K. H. Won\*, C. B. Park\*, “Self-adhesive graphene oxide-wrapped TiO<sub>2</sub> nanoparticles for UV-activated colorimetric oxygen detection.” *Sensors and Actuators B: Chemical* 2015, 213, 322.
25. G. M. Ryu, **M. Lee**, D. S. Choi, C. B. Park\*, “Hematite-based photoelectrochemical platform for visible light-induced biosensing.” *Journal of Materials Chemistry C* 2015, 3, 4483.
26. J. Hong<sup>†</sup>, **M. Lee**<sup>†</sup>, B. Lee, D.-H. Seo, C. B. Park\*, K. Kang\*, “Biologically inspired pteridine redox centers for rechargeable batteries.” *Nature Communications* 2014, 5, 5335.
27. **M. Lee**<sup>†</sup>, J. Hong<sup>†</sup>, H.-D. Lim, S. B. Cho, K. Kang\*, C. B. Park\*, “Organic nanohybrid for fast and sustainable energy storage.” *Advanced Materials* 2014, 26, 2558. **Back Cover**
28. **M. Lee**, J. U. Kim, J. S. Lee, B. I. Lee, J. Shin\*, C. B. Park\*, “Mussel-inspired plasmonic nanohybrids for light harvesting.” *Advanced Materials* 2014, 26, 4463. **Back Cover**
29. J. H. Kim, **M. Lee**, C. B. Park\*, “Polydopamine as a biomimetic electron gate for artificial photosynthesis.” *Angewandte Chemie Int. Ed.* 2014, 126, 6482.
30. **M. Lee**<sup>†</sup>, J. Hong<sup>†</sup>, D.-H. Seo, D. H. Nam, K. T. Nam, K. Kang\*, C. B. Park\*, “Redox cofactor from biological energy transduction as molecularly tunable energy-storage compound.” *Angewandte Chemie Int. Ed.* 2013, 52, 8322. **Front Cover**
31. S. H. Ku, **M. Lee**, C. B. Park\*, “Carbon-based nanomaterials for tissue engineering.” *Advanced Healthcare Materials* 2013, 2, 244.

32. J. H. Kim, **M. Lee**, J. S. Lee, C. B. Park\*, "Self-assembled light-harvesting peptide nanotubes for mimicking natural photosynthesis." *Angewandte Chemie Int. Ed.* 2012, 124, 532.
33. J. Hong, H.-D. Lim, **M. Lee**, S.-W. Kim, H. Kim, S.-T. Oh, G.-C. Chung, K. Kang\*, "Critical role of oxygen evolved from layered Li-excess metal oxides in lithium rechargeable batteries." *Chemistry of Materials* 2012, 24, 2692.
34. **M. Lee**, J. H. Kim, S. H. Lee, S. H. Lee, C. B. Park\*, "Biomimetic artificial photosynthesis by light-harvesting synthetic woods." *ChemSusChem* 2011, 4, 581.
35. J. H. Kim, S. H. Lee, J. S. Lee, **M. Lee**, C. B. Park\*, "Zn-containing porphyrin as a biomimetic light-harvesting molecule for biocatalyzed artificial photosynthesis." *Chemical Communications* 2011, 47, 10227.
36. J. Ryu, S. H. Ku, **M. Lee**, C. B. Park\*, "Bone-like peptide/hydroxyapatite nanocomposites assembled with multi-level hierarchical structure." *Soft Matter* 2011, 7, 7201.
37. **M. Lee**, S. H. Ku, J. Ryu, C. B. Park\*, "Mussel-inspired functionalization of carbon nanotubes for biomimetic mineralization of hydroxyapatite." *Journal of Materials Chemistry* 2010, 20, 8848.