

Jeonghoon Lim

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EDUCATION

Lawrence Berkeley National Laboratory & UC Berkeley Postdoctoral Fellow, Chemical and Biomolecular Engineering	Mar. 2022–Present
Georgia Institute of Technology (Georgia Tech) Ph. D. Mechanical Engineering	Fall 2018–Jan. 2022
Korea Advanced Institute of Science and Technology (KAIST) M.S. Materials Science and Engineering	Mar. 2015–Feb. 2017
Hanyang University (Seoul, South Korea) B.S. Materials Science and Engineering	Mar. 2008–Feb. 2015

RESEARCH INTERESTS

<u>Skills</u>	<u>Catalytic Reactions</u>	<u>Applications</u>
Nanomaterial Synthesis	Nitrate and Nitrogen Reduction	Ammonia Synthesis
Electrochemistry	Oxygen Reduction and Evolution	Fuel Cells & Li-Batteries
Product Measurements	CO ₂ Reduction	Carbon Capture Utilization and Storage

SCHOLARSHIPS AND AWARDS

ECS travel grant	240th ECS Meeting
Best presentation award, Hyundai Motor Company Global Forum	Aug. 2019
Full-tuition scholarship as a GRA, Georgia Tech	Fall 2018–Present
National scholarship, Government of South Korea	Fall 2018–Spring 2020
Full-tuition scholarship, LG Company	Spring 2015–Fall 2016
Excellent graduate award, Hanyang University	Feb. 2015
Full-tuition scholarship, SeAH scholarship foundation	Spring 2012–Fall 2013
Education scholarship, POSCO Steel Company	Spring 2012–Fall 2014
Academic excellence scholarship, Hanyang University	Fall 2011

PUBLICATIONS

1. Y. K. Kwon, D. S. Hong, J. H. Jang, M. J. Kim, S. K. Oh, D. H. Song, **J. Lim**, S. J. Yoo, E. A. Cho*, A Ni-MoOx composite catalyst for the hydrogen oxidation reaction in anion exchange membrane fuel cell. *Appl. Catal., B.* **332** (2023) 122740.
2. **J. Lim**, C. Yu, D. A. Cullen, S. W. Lee*, T. P. Senftle*, and M. C. Hatzell*, PdCu Electrocatalysts for Selective Nitrate and Nitrite Reduction to Nitrogen. *ACS Catal.* **2023**, 13, 87–98.
3. K. Lee, M. J. Lee, **J. Lim**, K. Ryu, M. Li, S. Noda, S. J. Kwon* and S. W. Lee*, Controlled Nitrogen Doping in Crumpled Graphene for Improved Alkali Metal-Ion Storage under Low-Temperature Conditions. *Adv. Funct. Mater.* **2022**, 2209775.
4. S. Jin, O. Allam, **J. Lim**, S. S. Jang*, and S. W. Lee*, Carbon Quantum Dot Modified Reduced Graphene Oxide Framework for Improved Alkali Metal Ion Storage Performance. *Small* **2022**, 18, 2202898.
5. K. Lee, Y. J. Lee, M. J. Lee, J. Han, **J. Lim**, K. Ryu, H. Yoon, B. H. Kim*, B. J. Kim*, and S. W. Lee*, A 3D Hierarchical Host with Enhanced Sodiophilicity Enabling Anode-Free Sodium-Metal Batteries. *Adv. Mater.* **2022**, 34, 2109767.
6. K. Lee†, **J. Lim†** (co-first author), M. J. Lee, K. Ryu, H. Lee, J. Y. Kim, H. Ju, H. S. Cho, B. H. Kim, M. C. Hatzell*, J. Kang*, and S. W. Lee*, Structure-Controlled Graphene Electrocatalysts for High-Performance H₂O₂ Production. *Energy Environ. Sci.* **2022**, 15, 2858-2866.
7. **J. Lim**, C. Jung, D. Hong, J. Bak, J. Shin, M. J. Kim, D. H. Song, C. Lee, J. Lim, H. Lee, H. M. Lee, and E. A. Cho*, Atomically Ordered Pt₃Mn Intermetallic Electrocatalysts for Oxygen Reduction Reaction in Fuel Cells. *J. Mater. Chem. A.* **2022**, 10, 7399-7408.

8. **J. Lim**, K. H. Shin, J. Bak, J. H. Roh, S. J. Lee, G. Henkelman*, and E. A. Cho*, Outstanding Oxygen Reduction Reaction Catalytic Performance of In–PtNi Octahedral Nanoparticles Designed via Computational Dopant Screening. *Chem. Mater.* **2021**, *33*, 22, 8895–8903.
9. **J. Lim**, C. A. Fernandez, S. W. Lee*, and M. C. Hatzell*, Ammonia and Nitric Acid Demands for Fertilizer Use in 2050. *ACS Energy Lett.* **2021**, *6*, 3676–3685.
10. **J. Lim**, C. Y. Liu, J. Park, Y. H. Liu, T. P. Senftle*, S. W. Lee*, and M. C. Hatzell*, Structure Sensitivity of Pd Facets for Enhanced Electrochemical Nitrate Reduction to Ammonia. *ACS Catal.* **2021**, *11*, 7568–7577.
11. M. J. Lee, K. Lee, **J. Lim**, M. Li, S. Noda, S. J. Kwon, B. DeMattia. B. Lee*, and S. W. Lee*, Outstanding Low-Temperature Performance of Structure-Controlled Graphene Anode Based on Surface-Controlled Charge Storage Mechanism. *Adv. Funct. Mater.* **2021**, *31*, 2009397.
12. C. A. Fernandez, N. M. Hortance, Y. H. Liu, **J. Lim**, K. B. Hatzell, and M. C. Hatzell*, Opportunities for Intermediate Temperature Renewable Ammonia Electrosynthesis. *J. Mater. Chem. A*, **2020**, *8*, 15591–15606.
13. M. J. Kim, **J. H. Lim**, J. Bak, D. H. Song, S. K. Oh, and E. A. Cho*, Fe and N co-doped Mesoporous Carbon Nanofibers as a Non-precious Metal Catalyst for Oxygen Reduction Reaction and a Durable Support for Pt Nanoparticles. *ACS Sustainable Chem. Eng.* **2019**, *7*, 17544–17552.
14. D. H. Song, J. Shin, Y. Lee, Y. K. Kwon, **J. H. Lim**, E. J. Kim, S. K. Oh, M. J. Kim*, and E. A. Cho*, Thin Nickel Layer with Embedded WC Nanoparticles for Efficient Oxygen Evolution. *ACS Appl. Energy Mater.* **2019**, *2*, 3452–3460.
15. Y. H. Liu, M. H. Vu, **J. H. Lim**, T. O. Do, and M. C. Hatzell*, Influence of Carbonaceous Species on Aqueous Photo-catalytic Nitrogen Fixation by Titania. *Faraday Discuss.* **2019**, *215*, 379.
16. M. J. Kim, J. Y. Youn, **J. H. Lim**, K. S. Eom, E. A. Cho*, and H. S. Kwon*, Corrosion-resistant Coating for Cathode Current Collector and Wet-seal Area of Molten Carbonate Fuel Cells. *Int. J. Hydrogen Energy*, **2018**, *43*, 11363–11371.
17. **J. H. Lim**, H. Y. Shin, M. J. Kim, H. Lee, K. S. Lee, Y. K. Kwon, D. H. Song, S. K. Oh, H. Kim, and E. A. Cho*, Ga-doped Pt-Ni Octahedral Nanoparticles as a Highly Active and Durable Electrocatalyst for Oxygen Reduction Reaction. *Nano Lett.* **2018**, *18*, 2450–2458.
18. C. Jung, C. Lee, K. Bang, **J. H. Lim**, H. Lee, H. J. Ryu, E. A. Cho*, and H. M. Lee*, Synthesis of Chemically Ordered Pt₃Fe/C Intermetallic Electrocatalysts for Oxygen Reduction Reaction with Enhanced Activity and Durability via a Removable Carbon Coating. *ACS Appl. Mater. Interfaces*, **2017**, *9*, 31806–31815.
19. S. K. Oh, T. H. Cho, M. J. Kim, **J. H. Lim**, K. S. Eom, D. H. Kim, E. A. Cho*, and H. S. Kwon*, Fabrication of Mg-Ni-Sn Alloys for Fast Hydrogen Generation in Seawater. *Int. J. Hydrogen Energy*, **2017**, *42*, 7761–7769.

PATENTS

1. Method of Manufacturing Nanocatalyst for Fuel Cell Electrode, *US 2019/0044154 A1 (Registered)*
2. Nickel-Molybdenum Catalyst, Manufacturing Method Thereof, and Fuel Cell using Same, *KR 10-2010406-0000 (Registered)*
3. Catalysts for Oxygen Reduction Reaction Comprising Porous Carbon Nanofiber Co-doped with Transition Metal and Nitrogen and Preparation Method Thereof, *KR 10-1969547-0000 (Registered)*
4. Synthesis of Porous Co-P Foam by Cathodic Electrodeposition Method, *KR 10-2019-0017284*
5. Manufacturing Method of Nanocatalyst for Fuel Cell Electrode, *KR 10-2017-0097556 (Registered)*
6. Catalyst for Fuel Cell and Method of Manufacturing the Same, and Membrane-Electrode Assembly and Method of Manufacturing the Same, *KR 10-1982744-0000 (Registered)*
7. Manufacturing Method of the Mesoporous Carbon Carrier, *KR 10-2016-0144956*

SELECTED CONFERENCE PRESENTATIONS

International Conference

1. **J. Lim**, S. W. Lee*, and M. C. Hatzell*, "Engineering PdCu Bimetals for Enhanced Electrochemical Nitrate Reduction to Nitrogen and Ammonia", *MRS Fall Meeting*, Nov. 29-Dec. 2, 2021, Boston, USA (*Oral* presentation)
2. (*Invited*) **J. Lim**, S. W. Lee*, and M. C. Hatzell*, "Design Strategies of PdCu Bimetals for Engineering Selectivity Toward Nitrogen and Ammonia from Electrochemical Nitrate Reduction", *240th ECS Meeting*, Oct. 10-14, 2021, Digital Meeting (*Oral* presentation)
3. **J. Lim**, J. Park, S. W. Lee*, and M. C. Hatzell*, "Pd Shape-controlled Nanoparticles Decorated with Metals for Electrochemical Nitrate and Nitrite Reduction", *238th ECS Meeting*, PRiME 2020, Oct. 4-9, 2020, Digital Meeting (*Oral* presentation)
4. (*Invited*) **J. Lim**, J. Park, S. W. Lee*, and M. C. Hatzell*, "Pd Shape-controlled Nanoparticles Decorated with Promoter Metals for Electrochemical Nitrate Reduction", *236th ECS Meeting*, Oct. 13-17, 2019, Atlanta, USA (*Oral* presentation)
5. **J. Lim**, J. Park, S. W. Lee*, and M. C. Hatzell*, "Surface Modification of Pd Shape-controlled Nanoparticles for Electrochemical Nitrate Reduction", *235th ECS Meeting*, May 26-30, 2019, Dallas, USA (*Poster* presentation)
6. **J. H. Lim**, C. W. Jung, D. S. Hong, J. Bak, H. M. Lee, and E. A. Cho*, "Pt₃Mn Intermetallic Catalysts for Oxygen Reduction Reaction in PEMFCs with Improved Activity and Durability", *AiMES 2018*, Sept. 30-Oct. 4, 2018, Cancun, Mexico (*Poster* presentation)

7. M.J. Kim, J. Y. Youn, **J. H. Lim**, K. S. Eom, E. A. Cho*, and H. S. Kwon*, Corrosion Resistant Coatings for Stainless Steel Based Bipolar Plate Components of Molten Carbonate Fuel Cell, **ICAE 2017**, Nov. 21-24, 2017, Jeju island, Korea (**Oral** presentation)
8. (**Invited**) **J.H. Lim**, and E. A. Cho*, Co/Mo₂C Hybrid Catalyst for Oxygen Evolution Reaction in Alkaline Water Electrolysis, **HyMap 2017**, Nov. 05-08, 2017, Busan, Korea (**Oral** presentation)
9. **J. H. Lim**, H. Y. Shin, M. J. Kim, H. I. Lee, K. S. Lee, H. J. Kim, and E. A. Cho*, Effect of Ga-doping on PtNi Octahedral Catalysts for Oxygen Reduction Reaction in PEM fuel cells, **ACEPS-9**, Aug. 21-23, 2017, GyeongJu, Korea (**Oral** presentation)
10. **J. H. Lim**, M. J. Kim, and E. A. Cho*, Effect of Metal-doping on the Electrochemical Properties of Pt-Ni Octahedral Catalysts for Oxygen Reduction Reaction in PEM Fuel Cells, **231th ECS Meeting**, May 29-June. 2, 2017, New Orleans, USA (**Oral** presentation)
11. M. J. Kim, **J. H. Lim**, and E. A. Cho*, Porous Iron-Nitrogen-Carbon Nanofiber as Efficient Oxygen Reduction Reaction Catalyst and Durable Support for Platinum, **231th ECS Meeting**, May 29-June. 2, 2017, New Orleans, USA (**Poster** presentation)

TEACHING EXPERIENCE

Thermodynamics ME 3322 (undergraduate level, ~60 students)

Spring 2021

PROFESSIONAL ACTIVITIES

Session Chair at **236th ECS Meeting** (L09-Old and New Ideas in Georgia ECS)

Oct. 2019

Peer Reviewer

- *Nature Communications* (2 manuscripts)
- *ACS Energy Letter* (3 manuscripts)
- *Applied Catalysis A: General* (1 manuscript)
- *iScience* (1 manuscript)
- *Dalton Transactions* (1 manuscript)