

Hongjun Park, Ph.D.

Professional Appointments

Postdoctoral Scholar, Northwestern University (NU), IL, USA <i>Department of Chemical and Biological Engineering</i>	2023 – present
Postdoctoral Fellow, The University of Texas at Austin (UT Austin), TX, USA <i>Texas Materials Institute</i>	2021 – 2023
Postdoctoral Research Associate, Institute for Basic Science (IBS), Korea <i>Center for Nanomaterials and Chemical Reactions</i>	2020 – 2021

Education

Ph.D. Chemistry, Korea Advanced Institute of Science and Technology (KAIST), Korea, 2020
B.S. Chemistry, KAIST, Korea, 2016

Publications – 23 papers published: 8 as first author & 2 as corresponding author

† denotes shared co-first authorship & * denotes corresponding authorship / ORCID ID: 0000-0002-8978-7342

--- Manuscripts in progress ---

1. G.-J. Na, J.-H. Hwang, **H. Park***, R. Ryoo*, Silanol-Enriched Microporous Zeolites: Improved Dispersion of Pt, Pd, and Ni Nanoparticles for Catalysis, *Catal. Tod.*, **2024**, to be submitted
2. **H. Park***, R. K. Bera, K. Kim, R. Ryoo*, Tailoring Porosity in Zeolite-Templated Nanoporous Carbons for Hybrid Lithium-Ion Capacitor Application, *ACS Appl. Nano Mater.*, **2024**, to be submitted

--- Lead-author publications ---

1. S. Khan[†], H. Park[†], K. Kim, **H. Park***, R. Ryoo*, Hierarchically Porous Zeolite-Templated Carbon Embedded with Manganese Oxide for Long-Cycling Asymmetric Supercapacitor, *Micropor. Mesopor. Mater.*, **2024**, 369, 113050, DOI: 10.1016/j.micromeso.2024.113050
2. **H. Park**, Z. Guo, A. Manthiram*, Effect of Oxidative Synthesis Conditions on the Performance of Single-Crystalline LiMn_{2-x}M_xO₄ (M = Al, Fe, and Ni) Spinel Cathode Materials for Lithium-Ion Batteries, *Small*, **2023**, 20, 2303526, DOI: 10.1002/smll.202303526
3. **H. Park**, A. Manthiram*, Ethanothermal Synthesis of Octahedral-Shaped Doped Mn₂O₃ Single Crystals as a Precursor for LiMn₂O₄ Spinel Cathodes in Lithium-Ion Batteries, *J. Phys. Chem. C*, **2023**, 127, 8515–8522, DOI: 10.1021/acs.jpcc.3c02468
4. S.-K. Lee[†], **H. Park[†]**, K. Cho, J. M. Park, R. Ryoo, U.-H. Lee, J.-S. Chang*, Nanoporous 3D Graphene-Like Zeolite-Templated Carbon for High-Affinity Separation of Xenon from Krypton, *ACS Appl. Nano Mater.*, **2022**, 5, 6864–6876, DOI: 10.1021/acsnm.2c00860
5. **H. Park**, H. Park, J.-C. Kim, M. Choi, J. Y. Park, R. Ryoo*, Sodium-Free Synthesis of Mesoporous Zeolite to Support Pt-Y Alloy Nanoparticles Exhibiting High Catalytic Performance in Propane Dehydrogenation, *J. Catal.*, **2021**, 404, 760–770, DOI: 10.1016/j.jcat.2021.09.011
6. **H. Park**, R. K. Bera*, R. Ryoo*, Microporous 3D Graphene-Like Carbon as Iodine Host for Zinc-Based Battery-Supercapacitor Hybrid Energy Storage with Ultrahigh Energy and Power Densities, *Adv. Energy Sustainability Res.*, **2021**, 2, 2100076, DOI: 10.1002/aesr.202100076
7. **H. Park***, J. H. An, J. Bang, D.-S. Ahn, S. H. Ko, O. Terasaki, W. Youn, I. S. Choi, R. Ryoo*, White Fluorescence of Polyaromatics Derived from Methanol Conversion in Ca²⁺-Exchanged Small-Pore Zeolites, *Mater. Chem. Front.*, **2021**, 5, 4634–4644, DOI: 10.1039/D1QM00299F
8. **H. Park**, J. Bang, S. W. Han, R. K. Bera, K. Kim, R. Ryoo*, Synthesis of Zeolite-Templated Carbons Using Oxygen-Containing Organic Solvents, *Micropor. Mesopor. Mater.*, **2021**, 318, 111038, DOI: 10.1016/j.micromeso.2021.111038
9. **H. Park**, S. K. Terhorst, R. K. Bera, R. Ryoo*, Template Dissolution with NaOH–HCl in Synthesis of Zeolite-Templated Carbons: Effects on Oxygen Functionalization and Electrical Energy Storage

Characteristics, *Carbon*, **2019**, *155*, 570–579, DOI: 10.1016/j.carbon.2019.09.020

--- Other publications ---

1. J.-C. Kim[†]*, J. Lee[†], S. W. Han, **H. Park**, H. Park, J. Y. Park*, R. Ryoo*, Influence of Catalyst Pelletization on Propane Dehydrogenation over Hierarchical MFI Zeolite Supported with Platinum-Yttrium Nanoparticles, *Micropor. Mesopor. Mater.*, **2023**, *357*, 112610, DOI: 10.1016/j.micromeso.2023.112610
2. H. Park, J. Bang, **H. Park**, J. Kim, J.-C. Kim, J. Y. Park*, R. Ryoo*, Surface Silanol Sites in Mesoporous MFI Zeolites for Catalytic Beckmann Rearrangement, *Catal. Sci. Technol.*, **2023**, *13*, 3436–3444, DOI: 10.1039/D3CY00543G
3. W. Lee[†], H. Kim[†], I. Kang, **H. Park**, J. Jung, H.-S. Lee, H. Park, J. S. Park, J. M. Yuk, S. Ryu, J.-W. Jeong, J. Kang*, Universal Assembly of Liquid Metal Particles in Polymers Enables Elastic Printed Circuit Board, *Science*, **2022**, *378*, 637–641, DOI: 10.1126/science.abo6631
4. W. Choi[†], R. K. Bera[†], S. W. Han, **H. Park**, T. W. Go, M. Choi, R. Ryoo*, J. Y. Park*, Doping Effect of Zeolite-Templated Carbon on Electrical Conductance and Supercapacitance Properties, *Carbon*, **2022**, *193*, 42–50, DOI: 10.1016/j.carbon.2022.02.056
5. R. K. Bera*, **H. Park**, R. Ryoo*, Engineering the Active Sites in Hierarchically Porous Graphene-Like Carbon with Co and N-Doped Carbon for High-Performance Zinc-Air Battery, *ChemElectroChem*, **2021**, *8*, 4038–4046, DOI: 10.1002/celec.202100807
6. S. W. Han, **H. Park**, J. Han, J.-C. Kim, J. Lee, C. Jo, R. Ryoo*, PtZn Intermetallic Compound Nanoparticles in Mesoporous Zeolite Exhibiting Excellent Catalytic Function for Propane Dehydrogenation, *ACS Catal.*, **2021**, *11*, 9233–9241, DOI: 10.1021/acscatal.1c01808
7. R. Ryoo*, J. Kim, C. Jo, S. W. Han, J.-C. Kim, **H. Park**, J. Han, H. S. Shin, J. W. Shin, Rare-Earth-Platinum Alloy Nanoparticles in Mesoporous Zeolite for Catalysis, *Nature*, **2020**, *585*, 221–224, DOI: 10.1038/s41586-020-2671-4
8. R. K. Bera*, **H. Park**, S. H. Ko, R. Ryoo*, Highly Dispersed Pt Nanocluster Supported on Zeolite-Templated Carbon for the Oxygen Reduction Reaction, *RSC Adv.*, **2020**, *10*, 32290–32295, DOI: 10.1039/D0RA05654E
9. S. Lee, **H. Park**, J. W. Yoon, K. Kim, S. J. Cho, G. Maurin, R. Ryoo*, J. S. Chang*, Microporous 3D Graphene-like Zeolite-Templated Carbon for Preferential Adsorption of Ethane over Ethylene, *ACS Appl. Mater. Interfaces*, **2020**, *12*, 28484–28495, DOI: 10.1021/acami.0c04228
10. C. Venkatesan*, **H. Park**, J. Kim, S. Lee, R. Ryoo*, Facile Synthesis of Mesoporous Zeolite Y Using Seed Gel and Amphiphilic Organosilane, *Micropor. Mesopor. Mater.*, **2019**, *288*, 109579, DOI: 10.1016/j.micromeso.2019.109579
11. R. K. Bera*, **H. Park**, R. Ryoo*, Co₃O₄ Nanosheet on Zeolite-Templated Carbon as an Efficient Oxygen Electrocatalyst for Zinc-Air Battery, *J. Mater. Chem. A*, **2019**, *7*, 9988–9996, DOI: 10.1039/C9TA01482A
12. S. Lee, C. Jo*, **H. Park**, J. Kim, R. Ryoo*, Sulfonium-Based Organic Structure-Directing Agents for Microporous Aluminophosphate Synthesis, *Micropor. Mesopor. Mater.*, **2019**, *280*, 75–81, DOI: 10.1016/j.micromeso.2019.01.048
13. S. H. Ko*, T. Lee, **H. Park**, D.-S. Ahn, K. Kim, Y. Kwon, S. J. Cho, R. Ryoo*, Nanocage-Confined Synthesis of Fluorescent Polycyclic Aromatic Hydrocarbons in Zeolite, *J. Am. Chem. Soc.*, **2018**, *140*, 7101–7107, DOI: 10.1021/jacs.8b00900
14. Y. Kwon, K. Kim, **H. Park**, J. W. Shin, R. Ryoo*, Anomalously High Lithium Storage in Three-Dimensional Graphene-Like Ordered Microporous Carbon Electrodes, *J. Phys. Chem. C*, **2018**, *122*, 4955–4962, DOI: 10.1021/acs.jpcc.8b00081

Oral Presentations

1. **H. Park**, Platinum-Based Bimetallic Nanoparticle Catalysts for Propane Dehydrogenation: What Is Going on in Early 2020s?, Center for Catalysis and Surface Science Student Seminar Series (CCSSSSS) at Northwestern University, Evanston, IL, USA, **Feb 2024**
2. **H. Park**, Sustainable Chemistry of Inorganic Nanomaterials for Energy and Catalysis Industries, Seminar at Center for Spintronics, Post-silicon Semiconductor Institute at Korea Institute of Science and

- Technology (KIST), Seoul, Korea, **Jan 2024**
3. **H. Park**, Sustainable Chemistry of Inorganic Nanomaterials for Energy Technologies, Seminar at Korea Institute of Energy Technology (KENTECH), Naju, Korea, **Jan 2024**
 4. **H. Park**, Sustainable Chemistry of Inorganic Nanomaterials for Energy and Catalysis, Seminar at Dynamic Materials Design Laboratory, Department of Materials Science and Engineering (DMSE) at KAIST, Daejeon, Korea, **Jan 2024**
 5. **H. Park**, R. Ryoo, Zeolite-Templated Nanoporous Carbon Material as Iodine Host for Zinc-Iodine Battery-Supercapacitor Hybrid Electrode, 128th General Meeting of the Korean Chemical Society, Busan, Korea, **Oct 2021**
 6. **H. Park**, R. K. Bera, R. Ryoo, Energy Storage Applications of Microporous 3D Graphene-like Carbon Materials: Supercapacitor, Battery, and Their Hybrid System, 2021 International Conference on Materials Science and Engineering, Virtual, Australia, **Oct 2021** – *Invited Talk*
 7. **H. Park**, J.-C. Kim, S. W. Han, J. Kim, J. Han, R. Ryoo, Mesoporous Zeolites as Versatile Support for Metal Catalysts in Industrially Relevant Reactions, The 8th Conference of the Federation of European Zeolite Associations (FEZA 2021), Virtual, UK, **Jul 2021**
 8. **H. Park**, R. Ryoo, Which Is Better Precursor for Synthesis of 3D Graphene-like Zeolite-Templated Carbon: Ethylene vs Propylene? 127th General Meeting of the Korean Chemical Society, Virtual, Korea, **Apr 2021**
 9. **H. Park**, R. Ryoo, Comparative Evaluation of Carbon Precursors in Zeolite-Templated Synthesis, International Symposium on Porous Materials 2020, Virtual, Japan, **Nov 2020**
 10. **H. Park**, R. Ryoo, Removal of Zeolite Templates Using NaOH and HCl Instead of HF in Templated Synthesis of Ordered Microporous Carbons, 2019 KICe Fall Meeting and International Symposium, Daejeon, Korea, **Oct 2019**
 11. **H. Park**, T. Lee, R. Ryoo, Synthesis of Microporous 3D Graphene-like Carbons Using Metal-Ion Effect in Zeolite Template for Electrical Energy Storage Applications, 2019 International Conference on Nanospace Materials, Brisbane, Australia, **Oct 2019**
 12. **H. Park**, R. Ryoo, HF-free Synthesis of Zeolite-Templated Carbons Affecting the Electrical Conductivity and Organic Functionalization, 2nd BK21 Symposium of KAIST School of Molecular Science, Daejeon, Korea, **Feb 2019**

Poster Presentations

1. **H. Park**, Platinum-Yttrium Nanoalloys for Propane Dehydrogenation Catalysis, 2024 #RSCPoster conference, Virtual, UK, **Mar 2024**
2. **H. Park**, D. Grimes, O. K. Farha, J. M. Notestein, Alcohol Dehydrogenation Catalysis with Thiolated Metal-Organic Framework Materials, 2023 CD4DC All Hands Meeting at The University of Chicago, Chicago, IL, USA, **Oct 2023**
3. **H. Park**, R. Ryoo, Zeolite and Zeolite-Templated Carbon Materials as Sustainable Catalyst Support: The Impact of Mesoporosity, SUNCAT Center for Interface Science and Catalysis – Summer Institute 2021, Virtual, USA, **Aug 2021**
4. **H. Park**, R. K. Bera, R. Ryoo, 3D Graphene-like Carbon Materials for Battery-Supercapacitor Hybrid: From Li-S to Zn-I₂ System, International Conference on Lithium-Sulfur Batteries (ICLSB 2021), Virtual, Germany, **Jun 2021**
5. **H. Park**, Y. Kim, R. Ryoo, MFI Zeolite Nanosheets with Tunable Thickness by Cooperative Structure Direction of Diammonium Surfactants and Sodium Ions, 19th International Zeolite Conference, Perth, Australia, **Jul 2019**
6. **H. Park**, S. W. Han, K. Kim, R. Ryoo, Facile Synthesis of Ordered Microporous Carbons Using Zeolite Template, KCS Spring Meeting, Jeju, Korea, **Apr 2018**
7. **H. Park**, S. W. Han, K. Kim, R. Ryoo, HF-free Removal of Zeolite Template in Synthesis of Ordered Microporous Carbons, 2018 UQ-IBS/KAIST Workshop on Electrode Materials for Energy Storage, Brisbane, Australia, **Jan 2018**

Research Experience

- 1. Northwestern University (NU), Department of Chemical and Biological Engineering** 2023 – present
Supervisor: Prof. Justin M. Notestein
Collaborator professors: Prof. Omar K. Farha (NU Chemistry), Prof. Edward T. Sargent (NU Chemistry)
 - Design cutting-edge catalysts for hydrogen production, focusing on decarbonization strategies.
 - Lead catalysis research under the Catalyst Design for Decarbonization Center (CD4DC) project, supported by a \$12.5 million grant from the US Department of Energy.
 - Collaborate with 10+ researchers at Northwestern for 3 sub-projects, integrating multidisciplinary expertise
- 2. The University of Texas at Austin, Texas Materials Institute** 2021 – 2023
Supervisor: Prof. Arumugam Manthiram
 - Established facile synthesis methods of single-crystalline spinel cathodes for lithium-ion battery
 - Completed a major industrial research project, driving advancements in battery technology
 - Published 2 first-author papers in peer-reviewed journals in 1.5 year, highlighting significant findings
- 3. Institute for Basic Science, Center for Nanomaterials and Chemical Reactions (CNCR)** 2020 – 2021
Supervisor: Prof. Ryong Ryoo
Collaborator professors: Prof. Jeong Young Park (IBS CNCR), Prof. Jong San Chang (KRICT), Prof. Jiheong Kang (KAIST DMSE)
 - Developed innovative synthesis methods for crafting zeolites, enhancing catalytic performance
 - Directed catalysis research works, focusing on publication of 4 first-author papers within 1.25 years
 - Delivered 3 oral and 2 poster presentations at 5 international conferences, contributing significantly to the global scientific community
- 4. Korea Advanced Institute of Science and Technology, Department of Chemistry**
 - a) Graduate Research** 2016 – 2020
Advisor: Prof. Ryong Ryoo
Collaborator professors: Prof. Osamu Terasaki (ShanghaiTech), Prof. Insung S. Choi (KAIST Chemistry)
 - Led 3D graphene synthesis works, focusing on sustainable and environmentally safe methods
 - Published 7 co-authored papers within 4.5 years, including a contribution to *Nature* paper
 - Regularly managed the operation of a solid-state NMR instrument, ensuring optimal performance
 - b) Undergraduate Research** 2013 – 2015
Advisors: 1) Prof. Ryong Ryoo, 2) Prof. Hyotcherl Ihee
Project 1) Solid-State NMR Characterization of Mesoporous Silicoaluminophosphate (SAPO)-31
Project 2) Measurement of Nanosecond Transient Absorption and Grating Spectroscopies with LASER
- 5. Tokyo Institute of Technology, Department of Chemistry** Summer 2015
Advisor: Prof. Yasuhiro Ohshima (Tokyo Tech Chemistry)
Project: Shooting a Movie of Rotating Nitric Oxide (NO) with LASER-Based Imaging

Teaching Experience

- 1. Northwestern University**
 - Equity in STEM Journal Club** Spring 2024
 - Engaged in reading and discussion sessions aimed at advancing equitable teaching practices in STEM learning contexts
 - Mentored Discussions of Teaching** Winter 2024
 - Explored pedagogical strategies in the Heat Transfer course by Prof. Wesley R. Burghardt (ChBE 322)
 - The Inclusive STEM Teaching Project** Fall 2023
 - Contributed to a virtual learning community on effective teaching methodologies, facilitated by Prof. Viji Sathy at UNC Chapel Hill, one of the two authors of the book “Inclusive Teaching”

2. Korea Advanced Institute of Science and Technology

Teaching Assistant, Special Topics in Physical Chemistry II (CH713)

<Structure Determination of Nano-Structured Materials>

Fall 2019

Teaching Assistant, General Chemistry I (CH101)

Spring 2018

Instructor, General Chemistry Experiment I (CH102)

Spring 2016

- Instructed entire class sections of 30 undergraduates, directing them through laboratory experiments and demonstrating essential practical skills in chemical experimentation
- Assessed student progress through grading quizzes and lab reports, offering constructive feedback to enhance their understanding of chemical principles

Tutor, General Chemistry I (CH101)

Spring 2013 & 2015

- Provided tutoring for 2 undergraduates each semester to enhance their understanding and learning performance in the general chemistry course.

Professional Memberships

Catalysis Club of Chicago (CCC), International Society of Electrochemistry (ISE), International Zeolite Association (IZA), Korean Institute of Chemical Engineers (KIChE), Korean Chemical Society (KCS)

Academic and Community Service

1. Independent Peer Review

JACS, ChemComm, New Journal of Chemistry, Royal Society Open Science, Advanced Science, ChemSusChem, ChemCatChem, Carbon, Diamond and Related Materials

2. Extracurricular Activity

Treasurer, Kaistenn (Graduate Tennis Club), KAIST, Korea

2020 – 2021

President, Stroke (Undergraduate Tennis Club), KAIST, Korea

2013 – 2014

Reporter, KAIST Times (Student-Run Newspaper), KAIST, Korea

2012 – 2013

3. Educational Outreach

Exchange Student, TKT CAMPUS Asia Program, Tokyo Tech, Japan

Summer 2015

Exchange Student, Technical University of Denmark (DTU), Lyngby, Denmark

Fall 2014

4. Volunteering

Scientist Mentor, Pedersen-McCormick Boys & Girls Club, Chicago Uptown, IL, USA

2023 – present

Website Developer, Mutah Station, Al-Karak, Kingdom of Jordan

Summer 2014

Tutoring Volunteer, Regional Children's Center, Korea

Winter – Spring 2014

Selected Honors and Awards

1st Place Prize in #RSCPoster Conference: Catalysis category

2024

National Excellence Scholarship, KAIST: Full-tuition scholarship

2012 – 2020

Excellent Oral Presentation Award (1st Place), 2019 KAIST Dept. Chemistry Workshop

2019

Excellence in Leadership and Volunteer Activity, 2016 KAIST Commencement Ceremony

2016