

Chan Kim

Chemical Engineer · PhD Candidate — Hydrogen, Catalysis & Research Software

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Chemical engineer at Seoul National University × KIST working across four axes — catalysis, reactor systems, code, and economics. I make hydrogen practical: chemical hydride systems, liquid organic carriers, and photothermal ammonia decomposition — and I build the software that runs the research, from literature pipelines to instrument automation. Completing my PhD and open to industry R&D roles in hydrogen, catalysis, and energy systems.

EDUCATION & EXPERIENCE

- 2024 - now **PhD Candidate, Chemical & Biological Engineering** — Seoul National University (Jungwon Park Lab) × KIST
Plasmon-enhanced photothermal ammonia decomposition; reactor systems and instrumentation.
- 2023 - 2024 **Research Intern** — KIST Hydrogen & Fuel Cell Research Center
- 2021 - 2023 **M.S., KHU-KIST Convergence Science & Technology** — Kyung Hee University
- 2015 - 2021 **B.S., Chemistry** — Kyung Hee University

RESEARCH

Photothermal NH₃ decomposition ongoing PhD research

Designing and building the reactor system for plasmon-enhanced photothermal ammonia decomposition, from catalyst to control electronics — the case where the tools and the research are the same story.

Sodium borohydride platform first author - Chem. Eng. J. 2025

A five-study arc on acid-mediated NaBH₄ hydrolysis, from on-board hydrogen generation to a 500-bar, compressor-free charging system. Publicly demonstrated at ADEX 2025.

CO purification for fuel-cell-grade hydrogen patent application (filed)

XPS surface analysis and reaction performance evaluation across the catalyst development effort for low-temperature CO removal.

Formic acid / formate dehydrogenation co-first author - ACS Sus. Chem. Eng. 2022

Operando pH tracking inside the reactor located the acid-formate ratio that maximizes H₂ output.

LOHC & hydrogen economics grand prize - national idea contest

HDSAM-based techno-economic assessment of hydrogen refueling and compression; levelized-cost comparison of competing system designs.

ANALYTICAL TOOLKIT

XPS — main operator; CO-purification patent
in-situ DRIFTS — Science 2026, BN methane oxidation
GC-FID / GC-TCD — battery cathode papers
Plug-flow reactors — SBH high-pressure platform
Operando pH — ACS Sus. Chem. Eng. 2022
TEA (HDSAM) — hydrogen economics

RESEARCH SOFTWARE

8 self-built tools running the lab's literature and data pipelines — from a Gmail-to-Notion literature radar ([get-](#)

AWARDS

Encouragement Award — 2nd Defense Materials & Parts R&D Requirements Competition, KRIT (2025)
Grand Prize — 1st Future Automotive Industry Idea Contest, KAP (2022)
Best Poster Presentation Award — Korean Hydrogen & New Energy Society (2022)

PATENT

Catalyst for low-temperature CO purification — KIST, application 10-2023-0091712 ([filed](#))

SELECTED PRESENTATIONS

ASAP, used by 30+ KIST researchers) to an argument-graph engine over 296 papers.

Python · JavaScript · LLM pipelines · MCP

Gordon Research Conference — Hydrogen-Metal Systems, poster (Switzerland, 2025)

PUBLICATIONS — 11 PEER-REVIEWED

- 11 **Dependence of catalytic properties of strongly supported platinum clusters with atom counts** Science 2026
C. K. Song, J. Jung, S. C. Mandal, S. Kang, T. Y. Kim, **C. Kim**, et al. (incl. T. F. Jaramillo, M. Cargnello, F. Abild-Pedersen, J. Park)
[Science](#) 392, 958–965 (2026) · doi:10.1126/science.aeb3087 · in-situ DRIFTS analysis
- 10 **Efficient aqueous activation of boron nitride colloidal catalysts for enhanced selective methane oxidation under mild conditions**
Y. Kim, H. Kwak, C. Choi, H. Choi, S. Kang, **C. Kim**, Y. Kim, J. Park
[Chemical Engineering Journal](#) (2025) · doi:10.1016/j.cej.2025.165419 · in-situ DRIFTS analysis
- 9 **High-pressure, grid-independent hydrogen generation via chemical hydride hydrolysis: demonstration and deployment strategies** First author
C. Kim, J. Kirk, F. A. Theda, E. On, K. Kim, H. Sohn, S. W. Nam, et al., H. Jeong*, Y. Kim*
[Chemical Engineering Journal](#) 513, 162983 (2025) · doi:10.1016/j.cej.2025.162983
- 8 **Promoter-guided reaction intermediate dynamics enhance perhydro-benzyltoluene dehydrogenation**
E. On§, K. Lee§, Y. Kwak, **C. Kim**, Q. N. Dao, H. Sohn, S. W. Nam, J. Kim, Y. Kim*, H. Jeong*
[ACS Catalysis](#) (2025) · doi:10.1021/acscatal.4c07703 · mechanism-verification experimental design, XPS
- 7 **Reduction-induced oxygen loss: the hidden surface reconstruction mechanism of layered oxide cathodes in lithium-ion batteries**
S. Jeon, G. Lim, H. Lee, H. Park, M. K. Cho, **C. Kim**, et al.
[Advanced Energy Materials](#) (2025) · doi:10.1002/aenm.202404193 · GC product analysis
- 6 **Novel roles of catalysts in producing high-purity high-pressure hydrogen from sodium borohydride**
F. A. Theda§, K. Lee§, **C. Kim**, Y.-J. Lee, K. Kim, H. Sohn, S. W. Nam, Y. Kim, H. Jeong*
[ChemSusChem](#) (2024) · doi:10.1002/cssc.202401694 · apparatus design & construction, mechanism experiments
- 5 **Pore surface engineering of Al₂O₃-supported Ru catalysts with TiO₂ for enhanced selective CO methanation**
Y.-J. Lee§, K. Kang§, **C. Kim**, J. Kirk, H. Sohn, S. W. Nam, J. Kim, H. Jeong*, Y. Kim*
[Applied Surface Science](#) (2024) · doi:10.1016/j.apsusc.2024.159551 · experiments, characterization, product analysis
- 4 **Synergistic structural and electronic influences of Pt bead catalysts on dehydrogenation activity for liquid organic hydrogen carriers**
S. Han§, C. Ahn§, B. J. Shim, E. On, **C. Kim**, H. Sohn, H. Jeong, Y. Kim*, C. W. Yoon*
[Chemical Engineering Journal](#) (2024) · doi:10.1016/j.cej.2024.150446 · XPS analysis
- 3 **Sequential reactions toward a high-pressure H₂ generation from a mixture of sodium borohydride and formic acid**
S. Ramadhani, **C. Kim**, J. Kirk, H. Sohn, S. W. Nam, Y. Kim, K. H. Song*, H. Jeong*
[Cell Reports Physical Science](#) 5, 101759 (2024) · doi:10.1016/j.xcrp.2023.101759 · conceptualization, techno-economic assessment
- 2 **Regulating dynamic electrochemical interface of LiNi_{0.5}Mn_{1.5}O₄ spinel cathode for realizing simultaneous Mn and Ni redox in rechargeable lithium batteries**
G. Lim, D. Shin, K. H. Chae, M. K. Cho, **C. Kim**, S. S. Sohn, M. Lee, J. Hong
[Advanced Energy Materials](#) (2022) · doi:10.1002/aenm.202202049 · GC product analysis
- 1 **Strategy for efficient H₂ production from a mixture of formic acid and formate using operando pH measurements** Co-first author
C. Kim§, K. Lee§, I.-H. Yoo, Y.-J. Lee, S. Ramadhani, H. Sohn, S. W. Nam, J. Kim, Y. Kim*, H. Jeong*
[ACS Sustainable Chemistry & Engineering](#) (2022) · doi:10.1021/acssuschemeng.1c06603 · conceptualization, experiments, characterization, writing