Jihoon Choi, Ph.D.

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Links: https://scholar.google.com/citations?user=vOBjKuQAAAAJ

Research Interests

- **Membrane-based Separation and Transport**
  - Ion transport and selectivity in anion exchange membranes for ionic separation applications
  - Organic solvent nanofiltration for complex molecular separation
- **Membrane Material Development for High Performance**
  - Design and synthesis of thin-film composite and copolymer membranes with tunable functionality
  - Polymer synthesis and modification for ion-selective membrane
  - Organic-inorganic hybrid systems for enhanced selectivity and stability
- **Advanced Membrane Fabrication and Interface Engineering**
  - Initiated chemical vapor deposition for ultrathin and conformal polymer films
  - Tailoring nanoporosity and surface chemistry for targeted molecular transport

Education

Ph.D. in Chemical & Biomolecular Engineering (2021.03 – 2025.02) | *Korea Advanced Institute of Science and Technology (KAIST)* | Daejeon, Korea

- **Advisor**: Prof. Dong-Yeun Koh
- **Dissertation**: [Separation and Fractionation of Organic Solvent-Based Mixtures with Polymer Nanofiltration Membranes]

M.S. in Chemical & Biomolecular Engineering (2019.03 – 2021.02) | *Korea Advanced Institute of Science and Technology (KAIST)* | Daejeon, Korea

- **Advisor**: Prof. Dong-Yeun Koh

B.S. in Chemical & Biomolecular Engineering (2015.03 – 2019.02) | *Korea Advanced Institute of Science and Technology (KAIST)* | Daejeon, Korea

Research Experience

Postdoctoral Researcher (2026.03 – Present) *Hydrogen Energy Research Center* | *Korea Research Institute of Chemical Technology (KRICT)*, Daejeon, Korea

- Designing selective membrane layers to suppress hydrazine crossover in anion exchange membrane water electrolysis, enabling efficient oxygen evolution

Postdoctoral Researcher (2025.03 – 2026.02) *Dept. Of Chemical & Biomolecular Engineering* | *Korea Advanced Institute of Science and Technology (KAIST)*, Daejeon, Korea

- **Advisor**: Prof. Dong-Yeun Koh
- Developing novel polymer membranes for an energy-efficient, room-temperature separation process targeting challenging complex mixture separations.

Graduate Research (2019.03 – 2025.02) *Dept. Of Chemical & Biomolecular Engineering* | *Korea Advanced Institute of Science and Technology (KAIST)*, Daejeon, Korea

- **Advisor**: Prof. Dong-Yeun Koh
- *Key Projects*:

- "Development of iCVD conformal coated polymer composite membrane for organic solvent nanofiltration", (2024.01 – 2024.12) – *KRICT*
- "Large-Scale Chemical Separations via Enthalpy-Entropy Selective Membranes: Integration of Materials, Manufacturing, and Process Engineering", (2023.03 – 2024.02) – *Ministry of Science and ICT*

Publications

(†: Co-first author)

Peer-Reviewed Journal Articles

1. **Choi, J.**†; Kim, D.†; Choi, K.; Seo, H.; Jang, M.-J.; So, H.; Im, S. G.; Yoo, Y.*; Koh, D.-Y.* A Strategic Design of iCVD Copolymers for High-Performance Organic Solvent Nanofiltration Membranes with Tunable Permeance and Selectivity. ***Chem. Eng. J.*** 2025, *524*, 169165.
2. **Choi, J.**; Shin, W.-C.; Seo, H.; Heo, H.; Jang, M.-J.; Koh, D.-Y.* Tailoring MnO_2 nanodomains in organic-inorganic hybrid interfaces toward tunable hydrocarbon separation. ***J. Membr. Sci.*** 2025, *736*, 124615.
3. Jang, M.-J.; Chen, Y.; **Choi, J.**; Seo, H.; Chung, Y. G.; Koh, D.-Y.* Enhancing interchain interactions in spirobifluorene-based microporous polyimides for high-performance organic solvent nanofiltration. ***J. Membr. Sci.*** 2025, *733*, 124298.
4. **Choi, J.**†; Choi, K.†; Kwon, Y.; Kim, D.; Yoo, Y.; Im, SG.*; Koh, D.-Y.* Ultrathin organosiloxane membrane for precision organic solvent nanofiltration. ***Nat. Commun.*** 2024, *15*, 2800.
5. Kim, C.; Koh, D.-Y.; Lee, Y.; **Choi, J.**; Cho. HS.; Choi, M.* Bottom-up synthesis of two-dimensional carbon with vertically aligned ordered micropores for ultrafast nanofiltration. ***Sci. Adv.*** 2023, *9*, eade7871.
6. Oh, B.; Seo, H.; **Choi, J.**; Lee, S.; Koh, D.-Y.* Electron-Mediated Control of Nanoporosity for Targeted Molecular Separation in Carbon Membranes. ***Nat. Commun.*** 2022, *13* (1), 4972.

Manuscripts Under Review

1. **Choi, J.**†; Seo, H.†; Lee, M.; Shin, W.-C.; Choi, K.; Jang, M.-J.; Im, S. G.; Lee, J.W.*; Lively, R.P.*; Koh, D.-Y.* Selective Crude Oil Fractionation via Dynamic Deposition on Mesopores. ***Nature***, **Under revision**.

Honors and Awards

- **Excellent Paper Presentation Award** (2024), The Membrane Society of Korea Fall Meeting, Korea

Conference Presentations

1. **2025 |** The Korean Institute of Chemical Engineers (KIChE) Fall Meeting, "Crude Oil Fractionation Enabled by Dynamic Deposition Layer on Mesoporous Membranes", **Oral presentation**

2. **2024 |** The Membrane Society of Korea Fall Meeting, "MnO_2 Incorporation into Polybenzimidazole Membranes for Liquid Hydrocarbon Separation", **Poster presentation**
3. **2024 |** Gordon Research Seminar (GRS) & Conference (GRC) on Membranes: Materials and Processes, "Ultrathin Organosiloxane Membrane for Precision Organic Solvent Nanofiltration", **Poster presentation**
4. **2023 |** 13th International Congress on Membranes & Membrane Processes (ICOM), "Precise Molecular Discrimination with Organosiloxane Composite Membrane via Organic Solvent Nanofiltration", **Oral presentation**
5. **2022 |** 33rd International Symposium on Chemical Engineering (ISChE), "Precise Molecular Level Separation of Organosiloxane Membrane via Organic Solvent Nanofiltration", **Oral presentation**
6. **2022 |** The Korean Institute of Chemical Engineers (KIChE) Fall Meeting, "Precise Molecular Discrimination with Organosiloxane Membranes via Organic Solvent Nanofiltration", **Poster presentation**
7. **2022 |** The Korean Institute of Chemical Engineers (KIChE) Spring Meeting, "Organosiloxane Composite Membrane for Organic Solvent Nanofiltration", **Oral presentation**

Reference

1. **Prof. Dong-Yeun Koh** (Ph.D. Advisor), Department of Chemical & Biomolecular Engineering | Korea Advanced Institute of Science and Technology (KAIST), South Korea, Email: dongyeunkoh@kaist.ac.kr
2. **Prof. Ryan P. Lively** (Collaborator), School of Chemical and Biomolecular Engineering | Georgia Institute of Technology, USA, Email: ryan.lively@chbe.gatech.edu
3. **Dr. Sungjun Kim** (Postdoctoral Advisor), Hydrogen Energy Research Center | Korea Research Institute of Chemical Technology (KRICT), South Korea, Email: sj.kim93@krict.re.kr