

Stanford



Taigyu Joo

Postdoctoral Scholar, Chemical Engineering

Bio

BIO

Taigyu Joo (TJ) is a postdoctoral researcher in Professor William Tarpeh's group. His research focuses on designing membranes for separating ions and gases from wastewater, with an emphasis on electrochemical separation techniques.

PROFESSIONAL EDUCATION

- Doctor of Philosophy, Massachusetts Institute of Technology (2024)
- Master of Science, Massachusetts Institute of Technology (2021)
- Doctor of Philosophy, Massachusetts Institute of Technology , Chemical Engineering (2024)
- Master of Science, Massachusetts Institute of Technology , Chemical Engineering Practice (2021)
- Bachelor of Science, Carnegie Mellon University , Chemical Engineering (2018)

STANFORD ADVISORS

- William Tarpeh, Postdoctoral Faculty Sponsor

Publications

PUBLICATIONS

- **Prototyping and modelling a photovoltaic-thermal electrochemical stripping system for distributed urine nitrogen recovery** *NATURE WATER*
Coombs, O. Z., Joo, T., Botelho Junior, A., Chalise, D., Tarpeh, W. A.
2025; 3 (8)
- **Microporous polyimine membranes for efficient separation of liquid hydrocarbon mixtures** *SCIENCE*
Lee, T., Balcik, M., Ali, Z., Joo, T., Rivera, M. P., Pinnau, I., Smith, Z. P.
2025; 388 (6749): 839-844
- **Enhancing acid-gas separations using free volume manipulation for microporous poly(arylene ether)s** *JOURNAL OF MATERIALS CHEMISTRY A*
Joo, T., Wu, Y., Lee, T., Dean, P. A., Wu, W., Swager, T. M., Smith, Z. P.
2025
- **High-Selectivity CO₂ Mixture Separations by a Guanlyated Polymer of Intrinsic Microporosity (PIM-G) Membrane** *MACROMOLECULES*
Kaser, S. J., Dean, P., Jean-Baptiste, P., Mattewal, S., Joo, T., Yeo, J., Smith, Z. P.
2024
- **Fine-tuning ultramicroporosity in PIM-1 membranes by aldehyde functionalization for efficient hydrogen separation** *JOURNAL OF MATERIALS CHEMISTRY A*

Lee, T., Joo, T., Jean-Baptiste, P., Dean, P. A., Yeo, J., Smith, Z. P.
2024

- **Single Layer Silk and Cotton Woven Fabrics for Acoustic Emission and Active Sound Suppression.** *Advanced materials (Deerfield Beach, Fla.)*

Yang, G. H., Lin, J., Cheung, H., Rui, G., Zhao, Y., Balachander, L., Joo, T., Lee, H., Smith, Z. P., Zhu, L., Ma, C., Fink, Y.
2024: e2313328

- **Penetrant-induced plasticization in microporous polymer membranes.** *Chemical Society reviews*

Mizrahi Rodriguez, K., Lin, S., Wu, A. X., Storme, K. R., Joo, T., Grosz, A. F., Roy, N., Syar, D., Benedetti, F. M., Smith, Z. P.
2024; 53 (5): 2435-2529

- **Free Volume Manipulation and In Situ Oxidative Crosslinking of Amine-Functionalized Microporous Polymer Membranes** *Chemistry of Materials*

Joo, T., Lee, T., Kaser, S. J., Wu, W., Wi, S., Yeo, J., Smith, Z. P.
2024; 36 (9): 4275-4290

- **The role of free volume, hydrogen bonds, and crosslinks on physical aging in polymers of intrinsic microporosity (PIMs)** *JOURNAL OF MATERIALS CHEMISTRY A*

Joo, T., Rodriguez, K., Lee, H., Acharya, D., Doherty, C. M., Smith, Z. P.
2023; 11 (29): 15943-15957

- **Revisiting group contribution theory for estimating fractional free volume of microporous polymer membranes** *JOURNAL OF MEMBRANE SCIENCE*

Wu, A. X., Lin, S., Rodriguez, K., Benedetti, F. M., Joo, T., Grosz, A. F., Storme, K. R., Roy, N., Syar, D., Smith, Z. P.
2021; 636

- **Free volume manipulation of a 6FDA-HAB polyimide using a solid-state protection/deprotection strategy** *POLYMER*

Lin, S., Joo, T., Benedetti, F. M., Chen, L. C., Wu, A. X., Rodriguez, K., Qian, Q., Doherty, C. M., Smith, Z. P.
2021; 212

- **On the origin of deactivation of reversal-tolerant fuel cell anodes under voltage reversal conditions** *JOURNAL OF POWER SOURCES*

Joo, T., Hu, L., Hong, B., Oh, J., Litster, S.
2020; 472

- **CoO nanoparticles deposited on 3D macroporous ozonized RGO networks for high rate capability and ultralong cyclability of pseudocapacitors** *CERAMICS INTERNATIONAL*

Bhattacharya, P., Joo, T., Kota, M., Park, H.
2018; 44 (1): 980-987