

1. 査読つき論文

(2024)

1. R. Izumi, N. Moriyama, K. Ishizaki, H. Nagasawa, T. Tsuru, M. Kanezashi*: Gas permeation properties of bridged-type organosilica membranes at extremely low temperatures and the application to oxygen separation. *Journal of Membrane Science*, 691: 122228 (p.1-8), 2024.
2. U. Anggarini, T. Doi, N. Moriyama, H. Nagasawa, M. Kanezashi, T. Tsuru*: A highly water-selective carboxymethylated cellulose nanofiber (CNF-CMC) membrane for the separation of binary (water/N₂) and ternary (water/alcohols/N₂) systems in vapor-permeation. *Journal of Membrane Science*, 691: 122229 (p.1-12), 2024.
3. W. Puthai, M. Kanezashi, H. Nagasawa, T. Tsuru*: Enhancement of water permeability in SiO₂-ZrO₂ nanofiltration membranes via adding organic solutes into the SiO₂-ZrO₂ sols. *Separation and Purification Technology*, 333: 125851 (p.1-10), 2024.
4. S. M. Ibrahim*, K. Sawamura*, K. Mishima, X. Yu, F. Salak, S. Miyata, N. Moriyama, H. Nagasawa, M. Kanezashi, T. Tsuru: Bis(triethoxysilyl)ethane (BTESE)-organosilica membranes for H₂O/DMF separation in reverse osmosis (RO): evaluation and correlation of subnanopores via nanoporimetry (NPP), modified gas translation (mGT) and RO performance. *Membranes*, 14: 8 (p.1-22), 2024.
5. S. Lawal, K. Watanabe, R. Uchino, N. Moriyama, H. Nagasawa, T. Tsuru, M. Kanezashi*: Gas-permeable carbon molecular sieve membranes fabricated from a norbornene-functionalized polyimide-polyhedral oligomeric silsesquioxane composite. *Industrial & Engineering Chemistry Research*, 63: 1554-1565, 2024.
6. G. Sushanti, D. Tanabe, K.-T. Hien, N. Moriyama, H. Nagasawa, M. Kanezashi, T. Tsuru*: Permeation properties and hydrothermal stability of Allylhydridopolycarbosilane (AHPCS)-derived Silicon Carbide (SiC) membranes. *Materials Advances*, 5: 2420-2429, 2024.
7. N. Moriyama, R. Takenaka, H. Nagasawa, M. Kanezashi, T. Tsuru*: Physicochemical treatments of graphene oxide to improve water vapor/gas separation performance of supported laminar membranes: sonication and H₂O₂ oxidation. *ACS Applied Materials & Interfaces*, 16: 8086-8097, 2024.
8. W.-W. Yan, K. Wakimoto, N. Moriyama, H. Nagasawa, M. Kanezashi, T. Tsuru*: Development of sulfonated (3-Mercaptopropyl)trimethoxysilane membranes with thermal stability and excellent NH₃ perm-selectivity at 300 °C. *Journal of Membrane Science*, 696: 122535 (p.1-11), 2024.
9. S. M. Ibrahim*, K. Sawamura*, K. Mishina, X. Yu, F. Salak, S. Miyata, N. Moriyama, H. Nagasawa, M. Kanezashi, T. Tsuru: Bis(triethoxysilyl)ethane (BTESE)-organosilica membranes for H₂O/DMF separation in reverse osmosis (RO): evaluation and correlation of subnanopores via nanoporimetry (NPP), modified gas translation (mGT) and RO performance. *Membranes*, 14: 8 (p.1-21), 2024.
10. L. Cheng, M. Guo*, J. Zhong*, X. Ren, R. Xu, G. Li, Y. Ji, M. Qiu, M. Kanezashi: Network engineering of organosilica membranes for efficient pervaporation dehydration. *Separation and Purification Technology*, 127105: 344 (p.1-10), 2024.
11. K. Horata, T. Yoshio, R. Miyazaki, Y. Adachi, M. Kanezashi, T. Tsuru*, J. Ohshita: Preparation of polysilsesquioxane-based CO₂ separation membranes with thermally degradable succinic anhydride and urea units. *Separations*, 11: 110 (p.1-12), 2024.
12. M. Guo, L. Cheng, X. Ren, D. Jin, L. Yu, M. Qiu, R. Xu, J. Zhong*, T. Tsuru, M. Kanezashi*: Rigid-flexible coupled organosilica membranes toward high-efficiency molecules separation. *Journal of Membrane Science*, 701: 122723 (p.1-10), 2024.
13. W.-W. Yan, K. Wakimoto, N. Moriyama, H. Nagasawa, M. Kanezashi, T. Tsuru*: Fabrication of 3-(trihydroxysilyl)-1-propanesulfonic acid membranes with superior affinity and selectivity for NH₃ permeation over H₂ and N₂ at 50-300 °C. *Journal of Membrane Science*, 702: 122798 (p.1-11), 2024.
14. S. Aoyama, H. Nagasawa*, N. Moriyama, M. Kanezashi, T. Tsuru: Improved RO performance in organic aqueous solutions of methyl-functionalized silica membranes modified by atmospheric-pressure plasma. *Journal of Membrane Science*, 705: 122898 (p.1-10), 2024.
15. K. Wakimoto, W.-W. Yan, M. Hattori, M. Hara, N. Moriyama, H. Nagasawa, M. Kanezashi, T. Tsuru*: Green ammonia production via recycle membrane reactor: Experiment and process simulation. *Chemical Engineering Journal*, 496: 153754 (p.1-12), 2024.
16. G. Sushanti, N. Moriyama, H. Nagasawa, M. Kanezashi, T. Tsuru*: Enhanced hydrogen selectivity of allylhydridopolycarbosilane (AHPCS)-derived Silicon Carbide membranes via air curing. *Journal of Membrane Science*, 708: 123053 (p.1-11), 2024.
17. I. Rana, N. Moriyama, H. Nagasawa, T. Tsuru, M. Kanezashi*: Impact of trifluoroacetic acid (TFA) on tetraethoxysilane and amine-functionalized tetraethoxysilane (TEOS) silica membranes for CO₂ separation. *Industrial & Engineering Chemistry Research*, 63: 11602-11612, 2024.

18. Y. Adachi*, T. Yoshio, K. Kajimura, K. Sasaki, K. Hara, M. Kanezashi, T. Tsuru*, J. Ohshita*: Pinacol boronate ester-containing polysilsesquioxane membranes for CO₂ separation. *ACS Applied Polymer Materials*, 6: 9744-9751, 2024.
19. X. Niu, N. Moriyama, H. Nagasawa, T. Tsuru, M. Kanezashi*: Rational design of defect-free carbon-silica-zirconia ceramic membrane derived from crosslinked organic structure for highly efficient gas separation. *Journal of Membrane Science*, 709: 123112 (p.1-12), 2024.
20. K. Soma, N. Moriyama, H. Nagasawa, T. Tsuru, M. Kanezashi*: Design of silica-cobalt composite microporous structure with dispersed carbon particles for highly permselective gas separation membranes. *ACS Applied Materials & Interfaces*, 16: 65233-65244 (p.1-12), 2024.

(2025)

1. S. Lawal, Y. Takahashi, N. Moriyama, H. Nagasawa, T. Tsuru, M. Kanezashi*: Fabricating hydrothermally robust ceramic membranes from amorphous yttrium-doped SiO₂-ZrO₂ composites. *Journal of the European Ceramic Society*, 45: 116826 (p.1-13), 2025.
2. G. Sushanti, N. Moriyama, H. Nagasawa, M. Kanezashi, T. Tsuru*: Surface oxidation via water plasma for increased H₂ permselectivity of Allylhydridopolycarbosilane (AHPCS)-derived SiC membrane. *Journal of Membrane Science*, 716: 123521 (p.1-10), 2025.
3. N. Moriyama, S. Shiozaki, H. Nagasawa, M. Kanezashi, T. Tsuru*: Activity-based permeance for the generalized modeling of reverse osmosis and pervaporation. *AIChE J.*, 71: e18585 (p.1-10), 2025.

2. 著書

1. 金指正言: 膜分離を用いたCN・化学プロセスの実用化技術, 第2章 2.1 シリカ系多孔膜のマイクロポーラス構造制御技術とガス分離への応用. S&T出版, 2024.

3. 総説, 一般記事など

1. 長澤寛規*, 青山舜, 牧原大晟, 森山教洋, 金指正言, 都留稔了: 無機多孔膜を用いた超高压 RO/NF による有機水溶液の高濃度濃縮. 膜 (*MEMBRANE*), 49: 7-12, 2024.
2. 森山教洋: 分離膜を用いた水蒸気回収による水資源・熱資源の有効利用, 膜 (*Membrane*), 4, 188-191, 2023.
3. 森山教洋: Waste to Wealth: 煙道ガスから水とエネルギーを回収する水蒸気/ガス分離膜. 分離技術, 58 (2) 112-118.

4. 学会などからの招待講演, 基調講演

1. 森山 教洋, “低次元材料からなる薄膜の水蒸気/ガス分離への応用”, 第 21 回酸化グラフェンナノシートシンポジウム, 大阪 (2024.6.7), 招待講演
2. M. Kanezashi, “Recent progress and perspective of microporous silica membranes for molecular separation”, Department seminar at Zhengzhou University (2024.7.7), China, Invited lecture
3. M. Kanezashi, “Microstructure engineering of silica-based membranes and application to gas separation at extremely low temperature”, 2nd International Congress on Separation and Purification Technology (ISPT2024), Henan (7/10), Keynote lecture
4. M. Kanezashi, “Pore size controllability and improved stability of microporous silica membranes for H₂ separation”, Hydrogen Power Theoretical & Engineering Solutions International Symposium (HYPOTHESES XIX), Hiroshima (7/17), Keynote lecture
5. 金指正言, “シリカ系多孔膜のマイクロポーラス構造制御技術によるガス分離の開発”, 2024 年度膜工学秋季講演会・膜工学サロン (主催: (一社) 先端膜工学研究推進機構, 神戸大学 (2024.9.24)), 招待講演
6. M. Kanezashi, “Oxygen permeation properties of bridged-type organosilica membranes with different pore size

at extremely low temperatures”, Korea-Japan-Taiwan Joint Symposium on Chemical Engineering, Busan (10/17), Keynote lecture

7. H. Nagasawa, “Facile Synthesis of Microporous Silica Membranes for Gas Separation via Atmospheric-Pressure Plasma-Assisted Processes”, 14th Conference of Aseanian Membrane Society, Nanjing (2024.7.25), Keynote lecture
8. H. Nagasawa, “Atmospheric-Pressure Plasma-Enhanced CVD for the Facile Synthesis of Silica Membranes for Gas Separation”, 11th International Symposium on Inorganic Membranes, Quzhou (2024.7.27), Invited lecture
9. H. Nagasawa, “Plasma-assisted synthesis of silica-based membranes for hydrogen separation”, HYPOTHESIS XIX, Hiroshima (2024.7.16), Keynote lecture
10. 長澤 寛規, “大気圧プラズマを用いたシリカ膜の常温常圧製膜技術の開発”, 分離技術会年会 2024, 松江 (2024.12.19), 招待講演

5. 受賞

1. 脇本 倖太郎, 中国地区化学工学懇話会懇話会長賞 (2024/3)
2. 竹中 里彩, 日本化学会中国四国支部支部長賞 (2024/3)
3. 三木 悠太, 化学工学会中国四国支部支部長賞 (2024/3)
4. Rana Ikram, Bulletin of the Chemical Society of Japan (BCSJ) Poster Award, 20th International Symposium on Silicon Chemistry/9th Asian Silicon Symposium (2024/5)
5. Niu Xinpu, Best Poster Presentation, 2nd International Congress on Separation and Purification Technology (2024/7)
6. 相馬 健人, Best Poster Presentation, 14th Conference of Aseanian Membrane Society (AMS14) (2024/7)
7. 久保卓也, 優秀学生発表賞, 化学工学会第55回秋季大会 (2024/9)
8. 牧原 大晟, エクセレント・スチューデント・スカラーシップ (2024/12)
9. Niu Xinpu, エクセレント・スチューデント・スカラーシップ (2024/12)
10. 相馬 健人, 学生賞, 分離技術会年会 (2024/12)

6. 開催した講演会

1. Prof. Toshinori Tsuru (Hiroshima University), Prof. Jianhua Yang (Dalian University of Technology), Dr. Gang Li (South China University of Technology), Dr. Guanying Dong (Zhengzhou University), Dr. Norihiro Moriyama (Hiroshima University), Dr. Ufafa Anggarini (Hiroshima University, Universitas Internasional Semen Indonesia), Dr. Rana Ikram (Hiroshima University), International Symposium on Inorganic Membranes 中国地区化学工学懇話会第 227 回講演会, 2024/3/1
2. National Taiwan University of Science and Technology, Prof. Chechia Hu, Design of Photocatalytic Membrane Reactor for Wastewater Remediation, 中国地区化学工学懇話会第 232 回講演会, 2024/8/5

7. その他の特記事項

8. 学位取得者

博士 (工学)

1. Yan Weiwei, Development of functionalized organosilica membranes with high NH₃ permselectivity and their application to green NH₃ production (NH₃選択透過性を有するオルガノシリカ膜の開発とグリーンNH₃)

製造への応用)

修士 (工学)

1. 和泉 亮平, 低温下におけるオルガノシリカ膜の気体透過特性とO₂分離への応用
2. 山本 健斗, フッ素含有シリカ多孔膜におけるC₄系炭化水素透過特性
3. 竹中 里彩, 表面特性を制御した酸化グラフェンの薄膜製膜と水蒸気透過特性評価
4. 鴨川 陽輔, 大気圧プラズマCVDの反応制御による多孔性シリカ膜の構造制御と大面積化
5. 波村 龍人, 大気圧プラズマCVDによるシリカ/有機高分子複合膜の作製と有機相を造孔剤としたナノ多孔膜の創成
6. 脇本 倖太郎, フッ素系スルホン酸高分子/セラミック複合膜の開発とNH₃合成反応への応用

学士 (工学)

1. 菅野 有香, イットリウムドーピングによるSiO₂-ZrO₂ナノポーラス構造の形成と水熱安定性評価
2. 横山 礼覇, 架橋型シリコーンを用いた新規分離膜の開発と透過特性評価
3. 三木 悠汰, アミン含有SiO系ポリマーによるCO₂分離膜の作製と透過特性
4. 門脇 歩輝, PEG-金属重合体を用いた新規分離膜の創製: 材料特性と透過特性の評価
5. 三好 俊輔, セルロースナノファイバー膜の製膜最適化および水蒸気透過特性の評価
6. 田島 文貴, 常温でのMethane activationを目的とした大気圧プラズマ膜型反応器の開発

分離工学研究室

広島大学大学院先進理工系科学研究科

化学工学プログラム

〒739-8527 東広島市鏡山 1-4-1

電子メール: membrane-engineering@ml.hiroshima-u.ac.jp

電話: 082-424-2035, 7719, 7845

金指正言 (kanezashi@hiroshima-u.ac.jp, Tel: 082-424-2035)

長澤寛規 (nagasawa@hiroshima-u.ac.jp, Tel: 082-424-7719)

森山教洋 (moriyama-n@hiroshima-u.ac.jp, Tel: 082-424-7845)
