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¹. Institute for Integrated Cell-Material Sciences (iCeMS), Kyoto University
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Professional Careers

- Nov. 2016-present Assistant Professor, iCeMS, Kyoto University, Japan.
- 2013-2016 Research Associate, iCeMS, Kyoto University, Japan.
- 2012-2013 Lecturer, Chemical Engineering, Azad University, Tehran, Iran.
- 2011-2013 Technical Executive Office, Aria Nano Baspar Plast Co. Tehran, Iran.

Education

- 2008-2012 Ph.D., Chemical Engineering, Tarbiat Modares University, Tehran, Iran
- Thesis title: Preparation of Gas Separation Membranes Based on Polyurethane, Polyvinyl acetate and Silica Micro Particles.
 - Advisors: Prof. M.A. Semsarzadeh, Ph.D. and M. Sadeghi, Ph.D.
- 2004-2007 M.Eng., Polymer Engineering, Tarbiat Modares University, Tehran, Iran
- Thesis title: Investigation of Multi-Component Polyurethane and Polyvinyl acetate Systems and Hydrolysis of Polyvinyl acetate Towards Fabrication of Nanoporous Membranes.
 - Advisor: M.A. Semsarzadeh, Ph.D.
- 1999-2003 B.Eng., Polymer Engineering, Amirkabir University of Technology (Tehran Polytechnic), Tehran, Iran.

Research Interests

Membrane separation processes.

Membrane reactors.

Membranes for medical and biological applications, renal dialysis and membrane oxygenators.

Ceramic and MOF membranes.

Design and synthesis of functional polymers and particles.

Polymer blends and nanocomposite.

Ion-containing polymers, polymer batteries and proton exchange membranes.

Grants, awards and scholarships

2018-2020	Grant-in-Aid for Early Career Scientist, Proj. No. 18K14042, JSPS, Japan
2017	Startup grant, iCeMS, Kyoto University
2014	iCeMS overseas visit program for young researches, Kyoto University, (Visiting Cambridge University and Imperial College)
2008-2013	Ph.D. Scholarship, Tarbiat Modares University
2005-2008	M.Sc. Scholarship, Tarbiat Modares University
1999	National Kharazmi award for the research project entitled “A novel method in programming with C and Pascal”
1998	National Kharazmi award for the research project entitled “New software for learning chemistry”

Projects

- Project leader and Principle investigator in Kakenhi Project (Subject: Microporous CO₂ capture membranes promoted by carbonic anhydrase-mimetic catalyst) 2018.04-2020.04 (\$40k) (Number of group members: 2)
- Project leader in JST-Mirai Program: Realization of a low carbon society through game changing technologies (Subject: Generating a cost-feasible polymer membrane technology for CCS) 2017.11-2022.3 (\$1M) (Number of group members: 5)
- Project leader in Incubation project (Subject: Bioseparation membrane using Collective Osmotic Shock method) 2017.8-2020.8 (\$0.9M) (Number of group members: 3)
- Project leader in JST A-Step Program (Subject: development of membrane technology for clean combustion engines) 2015.10 – 2017.3 (\$0.37M) (Number of group members: 3)
- Project leader in JST [START] Collective Osmotic Shock (COS) (Subject: A technology development grant for block copolymer membrane technology) 2014.11-2017.3 (\$1.16M) (Number of group members: 4)
- Project leader in ENEOS Hydrogen Fund (Subject: Nanocomposite polymer membranes for gas separation) 2014.10-2015.9 (\$0.06M) (Number of group members: 3)

Publications

Total number of publications: 30

h-index: 15

Citations: 626

One paper in *Nature Energy* (IF: 46.8)

One paper in *Nature communications* (IF: 12.3)

Two papers in *Journal of Material Chemistry A* (IF: 10)

One paper in *ACS Applied Materials and Interfaces* (IF: 8.1)

One paper in *ChemSusChem* (IF: 7.2)

10 papers in *Journal of Membrane Science* (IF: 6.6)

Google scholar:

https://scholar.google.com/citations?hl=en&user=c0geTzcAAAAJ&view_op=list_works&sort_by=pubdate

Manuscripts under preparation

B. Ghalei, K. Wakimoto, K. Sakuari, M. Higuchi, S. Kitagawa[†], E. Sivaniah[†], Rational tuning of zirconium Metal-Organic Framework membranes for hydrogen purification, to be submitted to JACS.

G. Huang, D. Qin, A.P. Isfahani, E. Sivaniah[†], **B. Ghalei**[†], Ultrafast Molecular Sieving Graphene Oxide Membranes using diamond nanopillars, to be submitted to Science.

D. Qin, G. Huang, E. Sivaniah[†], **B. Ghalei**[†], Nanodiamond templated interfacial polymerization for improving nanofiltration membrane separation performance, to be submitted to Advanced Materials.

A.P. Isfahani, A. Muchtar, Y. Wu Chih, E. Sivaniah[†], B. Ghalei[†], Zirconium based mixed matrix membranes for olefin/paraffin separation, to be submitted to Journal of Material Chemistry A

A.P. Isfahani, S. Nilouyal, E. Sivaniah[†], B. Ghalei[†], Polyurethane gas separation membranes, invited review paper, to be submitted to Journal of Material Chemistry A.

S. Nilouyal, A.P. Isfahani, A. Muchtar, E. Sivaniah[†], B. Ghalei[†], Ionic polyurethanes membranes for efficient CO₂ capture, to be submitted to Journal of Membrane Science.

Published manuscripts

1. G. Huang, A.P. Isfahani, A. Muchtar, K. Sakurai, B.B. Shrestha, D. Qin, D. Yamaguchi, E. Sivaniah[†], B. Ghalei[†], Pebax/Ionic liquid modified graphene oxide mixed matrix membranes for enhanced CO₂ capture, *Journal of Membrane Science*, **2018**, 565, 370-379. **(corresponding author)**.
2. B. Ghalei[†], A.P. Isfahani, S. Nilouyal, E. Vakili, M.K. Salooki, Effect of polyvinyl alcohol modified silica particles on the physical and gas separation properties of the polyurethane mixed matrix membranes, *Silicon*, **2018**, Accepted, <https://doi.org/10.1007/s12633-018-9959-0>. **(corresponding author)**
3. Z. Wang, A.P. Isfahani, K. Wakimoto, B.B. Shrestha, D. Yamaguchi, B. Ghalei[†], E. Sivaniah[†], Tuning the gas selectivity of Tröger's Base polyimide membranes using carboxylic acid and tertiary base interaction, **2018**, *ChemSusChem*, **2018**, 11, 2744-2751. **(corresponding author)**
4. A. Mohammadi[†], M. Barikani, A.H. Doctorsafaei, A. P. Isfahani, E. Shams, B. Ghalei, Aqueous dispersion of polyurethane nanocomposites based on calix[4]arenes modified graphene oxide nanosheets: Preparation, characterization, and anti-corrosion properties, *Chemical Engineering Journal*, **2018**, 349, 466-480.
5. S. Ghalei, H. Asadi, B. Ghalei[†]. Zein nanoparticle-embedded electrospun PVA nanofibers as wound dressing for topical delivery of anti-inflammatory diclofenac, *Journal of Applied Polymer Science*, **2018**, 135, 46643. **(corresponding author)**
6. B. Ghalei, A.P. Isfahani, M. Sadeghi, E. Vakili, A. Jalili, Polyurethane-mesoporous silica gas separation membranes. *Polymers for Advanced Technologies*, **2018**, 29(2), 874-883.
7. A.P. Isfahani, M. Sadeghi, K. Wakimoto, B.B. Shrestha, R. Bagheri, E. Sivaniah[†], B. Ghalei[†], Pentiptycene-based polyurethane with enhanced mechanical properties and CO₂-plasticization resistance for thin film gas separation membranes, *ACS Applied Materials and Interfaces*, **2018**, 10 (20), 17366–17374. **(corresponding author)**
8. B.B. Shrestha, K. Wakimoto, Z. Wang, A.P. Isfahani, T. Suma, E. Sivaniah[†], B. Ghalei[†], A facile synthesis of contorted spirobisindane-diamine and its microporous polyimides for gas separation, *RSC Advances*, **2018**, 8(12), 6326-6330. **(corresponding author)**
9. A.P. Isfahani, M. Sadeghi, K. Wakimoto, A. H. Gibbons, R. Bagheri, E. Sivaniah[†], B. Ghalei[†], Enhancement of CO₂ capture by polyethylene glycol-based polyurethane membranes, *Journal of Membrane Science*, **2017**, 542, 143-149. **(corresponding author)**
10. Y. Kinoshita, K. Wakimoto, A. H. Gibbons, A.P. Isfahani, H. Kusuda, E. Sivaniah[†], B. Ghalei[†], Enhanced PIM-1 membrane gas selectivity through efficient dispersion of POSS fillers, *Journal of Membrane Science*, **2017**, 542, 178-186. **(corresponding author)**
11. B. Ghalei, K. Sakurai, Y. Kinoshita, K. Wakimoto, A.P. Isfahani, Q. Song, K. Doitomi, S. Furukawa, H. Hirao, H. Kusuda, S. Kitagawa, E. Sivaniah[†], Enhanced selectivity in mixed matrix membranes for CO₂ capture through efficient dispersion of amine-functionalized MOF nanoparticles, *Nat. Energy*, **2017**, 2, 17086.
12. B. Ghalei, Y. Kinoshita, K. Sakurai, K. Wakimoto, S. Mathew, Youfeng Yue, H. Imahori, E. Sivaniah[†], Surface functionalization of high free volume polymers toward hydrogen separation materials, *Journal of Materials Chemistry A*, **2017**, 5, 4686-4694.
13. A.P. Isfahani, B. Ghalei, K. Wakimoto, R. Bagheri, E. Sivaniah[†], M. Sadeghi, Crosslinked polyurethane gas separation membranes, *Journal of Materials Chemistry A*, **2016**, 44, 17431-17439.
14. A.P. Isfahani, B. Ghalei, R. Bagheri, Y. Kinoshita, H. Kitagawa, E. Sivaniah[†], Morteza Sadeghi[†], Polyurethane gas separation membranes with etheral bonds in the hard segments, *Journal of Membrane Science*, **2016**, 513, 58-66.

15. M. Laghaei, M. Sadeghi[†], B. Ghalei, M. Shahrooz, The role of compatibility between polymeric matrix and silane coupling agents in the performance of mixed matrix membranes: Polyethersulfone/MCM-41, *Journal of Membrane Science*, **2016**, 513, 20-32.
16. M. Laghaei, M. Sadeghi[†], B. Ghalei, M. Dinari, The effect of various types of post-synthetic modifications on the structure and properties of MCM-41 mesoporous silica, *Progress in organic coatings*, **2016**, 90, 163.
17. E. Vakili, M.A. Semsarzadeh[†], B. Ghalei[†], Characterization and gas permeation properties of synthesized polyurethane-polydimethylsiloxane/polyamide 12-b-polytetramethylene glycol blend membranes, *Silicon*, **2015**, 8, 75-85. (corresponding author).
18. Q. Song, S. Cao, R.H. Pritchard, B. Ghalei, S.A. Al-Muhtaseb, E. M. Terentjev, A. K. Cheetham, E. Sivaniah[†], Controlled thermal oxidative crosslinking of polymers of intrinsic microporosity towards tunable molecular sieve membranes, *Nature Communications*, **2014**, 5, 4813.
19. B. Ghalei, M.A. Semsarzadeh[†], M. Fardi, E. Vakili, Structural and transport properties of polydimethylsiloxane Based polyurethane/silica particles mixed matrix membranes for gas separation, *Korean Journal of Chemical Engineering*, **2014**, 31(5), 841-848.
20. M.A. Semsarzadeh[†], E. Vakili, M. Fardi, B. Ghalei, Sol-gel synthesized nanostructured silica particles for application in gas transport properties of PU-PDMS based mixed-matrix membranes, *Advanced Materials Research*, **2014**, 829, 862-866.
21. V. Goodarzi, S.H. Jafari[†], H.A. Khonakdar[†], B. Ghalei, Mehdi Mortazavi, Assessment of role of morphology in gas Permeability and selectivity of membranes based on PP/EVA/Clay nanocomposite, *Journal of Membrane Science*, **2013**, 445, 76-87.
22. B. Ghalei, M.A. Semsarzadeh[†], Characterization and gas permeation properties of polyurethane-silica/polyvinyl alcohol mixed matrix membranes, *Journal of Membrane Science*, **2013**, 432, 115-125.
23. M. Sadeghi[†], M.M. Talakesh, B. Ghalei, M. Shafiei, Preparation, characterization and gas permeation properties of a polycaprolactone based polyurethane-silica nanocomposite membrane, *Journal of Membrane Science*, **2013**, 427, 21-29.
24. B. Ghalei, M.A. Semsarzadeh[†], Characterization and gas permeability of polyurethane and polyvinyl acetate blend membranes with polyethylene oxide-polypropylene oxide block copolymer, *Journal of Membrane Science*, **2012**, 401-402, 97-108.
25. M. Sadeghi[†], M.A. Semsarzadeh[†], M. Barikani[†], B. Ghalei, Study on morphology and gas permeation properties of polyurethane membranes, *Journal of Membrane Science*, **2011**, 385-386, 76-85.
26. M. Sadeghi[†], M.A. Semsarzadeh[†], M. Barikani[†], B. Ghalei, The effect of urea and urea contents on the gas permeation properties of poly (urethane-urea) membranes, *Journal of Membrane Science*, **2010**, 354, 40-47.
27. M. Sadeghi[†], H. Mouadel[†], B. Ghalei, S. Khatti, Dual mode sorption of inorganic acids in PBI Membranes, *Journal of Macromolecular Science, Part B*. **2010**, 49, 1128-1135.
28. H. Haddadi, E. Nazokdast, B. Ghalei, Chemorheological characterization of thermosetting polyurethane formulations containing different chain extender contents, *Journal of Polymer Engineering and Science*, **2008**, 48, 2446-2453.
29. B. Ghalei, Preparation of a novel microporous membrane by selective dissolution of polyurethane/polyvinyl acetate polymer blend membrane, *Desalination research progress*, Nova Science Publisher, **2008**, 479-488, ISBN: 978-1-60456-567-6 (Book Chapter).
30. B. Ghalei, M.A. Semsarzadeh[†], A novel nanostructured blend membrane for gas separation, *Journal of Macromolecular Symposia*, **2007**, 249-250, 330-335.

[†] Faculty members, whose lab resources were used in this work.

Patents

E. Sivaniah, B. Ghalei, K. Sakurai, Y. Kinoshita, S. Kitagawa, Composite membrane and method of separating gas using the same, Filed by Kyoto University, June 15th **2017**. Assignee: Kyoto University.

E. Sivaniah, B. Ghalei, Y. Yue, Composite membrane and method of fabricating the same, Filed by Sumitomo Chemical Co., July 16th 2015. Assignee: Kyoto University.

M. Laghaei, M. Sadeghi[†], B. Ghalei, M. Shahrooz, High performance gas separation membrane with Mesoporous silica, Iranian Patent, No.86125, 2014.

J. Aghazadeh[†], E. Sadeghi, B. Ghalei, Polymer/sand nanocomposite, Iranian Patent, No.73749, 2012.

B. Ghalei, H. Haddadi, Gas separation membranes based on polyurethane and polyvinyl acetate, Iranian Patent, No.46058, 2008.

H. Haddadi, B. Ghalei, Rubber Molding Polyurethane based on PMDI/PPG, Iranian Patent, No.46057, 2008.

International conferences, proceedings and invited talks

B. Ghalei, Carbon capture capable membranes through tuning of zirconium-MOF mixed matrix membranes, Poster presentation at Euro-membrane, Valencia, Spain, July 2018.

B. Ghalei, Surface functionalization of high free volume polymers towards hydrogen separation materials, Oral presentation at Euro-membrane, Valencia, Spain, July 2018.

B. Ghalei, Carbon capture material challenges, Invited talk at the nanospace science of PCP for molecular control, Kyoto University, Nov. 2017.

B. Ghalei, Membrane separation technology in carbon capture, Invited talk at iCeMS-Taiwan symposium on porous materials for energy and the environment, Taiwan, Taipei, Nov. 2017.

A. Pournaghshband Isfahani, B. Ghalei, E. Sivaniah, M. Sadeghi, K. Wakimoto, Enhancement of CO₂ capture by polyether-based polyurethane membranes, Poster presentation at 11th International congress on membranes and membrane processes (ICOM 2017), San Francisco, US, 2017.

A. Pournaghshband Isfahani, B. Ghalei, E. Sivaniah, M. Sadeghi, K. Wakimoto, Crosslinking of polyurethane membranes for improved plasticization resistance for CO₂ capturing, Poster presentation at 11th International congress on membranes and membrane processes (ICOM 2017), San Francisco, US, 2017.

A.P. Isfahani, B. Ghalei, E. Sivaniah, M. Sadeghi, The effects of ethereal chain extenders on the gas separation properties of the polyurethane membranes, Oral presentation at 12th international conference on membrane science and technology, Tehran, Iran, 2015.

A.P. Isfahani, B. Ghalei, E. Sivaniah, M. Sadeghi, The effects of diol and diamine aromatic chain extenders on the gas permeation properties of the polyurethane membranes, Poster presentation in the 12th international conference on membrane science and technology, Tehran, Iran, 2015.

M. Laghaei, M. Sadeghi, B. Ghalei, Different Gas separation behavior of mixed matrix membranes based on APTMS modified and unmodified MCM-41 mesoporous silica in a polyethersulfone (PES) matrix, Oral presentation at 10th international congress on membrane and membrane processes, Suzhou, China, 2014.

B. Ghalei, K. Sakurai, Q. Song, E. Sivaniah, Design of innovative gas separation membranes through thermally cross-linked polymer of intrinsic microporosity, Oral presentation at IPC 2014, Tsukuba, Japan, 2014.

K. Sakurai, B. Ghalei, H. Kusuda, E. Sivaniah, Polymer of intrinsic microporosity and metal organic frameworks mixed matrix membranes for gas separation, Poster presentation in IPC 2014, Tsukuba, Japan, 2014.

M. Laghaei, M. Sadeghi, B. Ghalei, synthesis and modification of spherical MCM-41 nanoporous silica, Poster presentation at UNGNSM, Tehran University, Tehran, Iran, 2013.

M.A. Semsarzadeh, M. Fardi, E. Vakili, B. Ghalei, Sol-gel synthesized nanostructured silica particles for application in gas transport properties of PU-PDMS based mixed-matrix membranes, Oral presentation at UNGNSM, Tehran University, Tehran, Iran, 2013.

B. Ghalei, M.A. Semsarzadeh, Modeling of gas permeation through polyurethane/polyvinyl acetate/polyethylene oxide-polypropylene oxide blend membranes, Oral presentation at ISPST, Amirkabir University of technology, Tehran, Iran, 2012.

B. Ghalei, M.A. Semsarzadeh, Effect of polyethylene oxide-polypropylene oxide block copolymer on gas permeation properties of polyurethane/polyvinyl acetate blend membranes, Poster presentation at ISPST, Amirkabir University of technology, Tehran, Iran, 2012.

M.A. Semsarzadeh, M. Esteki, B. Ghalei, Preparation of Micro-porous polyurethane membrane, Poster presentation at EPF, Australia, 2009.

H. Haddadi, E. Nazokdast, B. Ghalei, The effect of chain extender content and molecular weight of polyol on the viscoelastic properties of thermosetting polyurethane networks at the gel Point, Poster presentation at Tampere University of Technology, Nordik, Finland, 2007.

M.A. Semsarzadeh, B. Ghalei, A novel nano-structured blend membrane based on polyurethane/poly(vinyl acetate) for gas separation, Poster presentation at IUPAC International symposium on advanced polymers for emerging technologies, Bussan, Korea, 2006.

B. Ghalei, M.A. Semsarzadeh, Preparation of a novel micro-porous membrane by selective dissolution of polyurethane/polyvinyl acetate polymer blends, Oral presentation at UNESCO/IUPAC conference on macromolecules: Polymer for advanced applications, Stellenbosch, South Africa, 2006.

Teaching and Working Experiences

- Molecular porous physical chemistry for master and Ph.D. students, Molecular Engineering Department, Kyoto University, 2017.
- Teaching the undergraduate course “Unit operations of chemical engineering“, Azad University, Shahre Ghods Branch (2012-2013).
- Technical executive officer, Aria Nano Baspar Plast Co. (2011-2013).
- Teaching the graduate course “Thermodynamics for Chemical Engineering”, Imam Hossein University (Fall 2007).
- Internship, Product design engineering, SAPCO (Supplying Automotive Part Company), a subsidiary of Iran Khodro Co. (Summer 2005 - Spring 2006).
- Internship, Polymer processing laboratory, Dorna Aerospace Co. (2003-2004).
- Trainee, Quality Control Lab, MehrKam Pars, one of the largest manufacturers of automotive parts. (Summer 2003).
- Teacher assistant in the course “Thermodynamics for Chemical Engineering”, Amirkabir University of Technology, Tehran, Iran. (2002-2003).

Refereeing for Journals and Editorial activities

- Editorial Board Member of Advances in Polymer Technology
- Journal of Membrane Science
- Korean Journal of Chemical Engineering
- Journal of Separation Science and Technology
- Journal of Separation and Purification Technology
- Journal of Applied Polymer Science
- Journal of Natural Gas Science & Engineering
- Reactive and Functional Polymers
- Journal of CO₂ Utilization
- Chemical Engineering Research & Design
- ACS Applied Materials & Interfaces
- RSC Advances

References

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