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EDUCATION:

- Ph.D. Chemical Engineering - January 1988
University of California, Berkeley
Thesis: "The Effect of Hydrostatic Pressure on Mutual Diffusion Coefficients in Polymer Solutions" Thesis Directors: Morton M. Denn and David S. Soane
- B.S. Chemical Engineering - May 1983 *Summa Cum Laude*
North Carolina State University
Graduate of Engineering Honors Program

PROFESSIONAL EXPERIENCE:

The University of Texas at Austin:

Richard B. Curran Centennial Chair of Engineering, September 2012 – present.
Paul D. and Betty Robertson Meek & American Petrofina Foundation Centennial Professor of Chemical Engineering, September 2007 to September 2012.
Kenneth A. Kobe Professor of Chemical Engineering, September 2005 to September 2012.
Matthew van Winkle Professor of Chemical Engineering, September 2002 to September 2005.
Professor of Chemical Engineering, January 2002 to present.

NC State University:

Professor of Chemical Engineering, November 1997 to January 2002.
Sabbatical Leave, July 2000 to December 2000. University of California, Berkeley.
Associate Department Head, August 1996 to January 2002.
Associate Professor of Chemical Engineering, August 1994 to November 1997.
Assistant Professor of Chemical Engineering, August 1989 to August 1994.

NATO Postdoctoral Fellow, March 1988 to July 1989, Ecole Supérieure de Physique et de Chimie Industrielles de la Ville de Paris (ESPCI), Laboratoire Physico-Chimie Structurale et Macromoléculaire, 10 rue Vauquelin, 75231 Paris, France. Research directed by Professor Lucien Monnerie and Professor Liliane Bokobza.

Graduate Student, August 1983 to January 1988, Univ. of California, Berkeley.

Summer Technical Hire, E.I. duPont, Inc. Brevard, NC, Summers of 1981, 1982, and 1983.

HONORS AND AWARDS:

North American Membrane Society (NAMS) Fellow2017
Fulbright Distinguished Chair 2016-2017
PMSE Distinguished Service Award (from Polymeric Materials: Science and Engineering Division of ACS).....2015
World Premier International (WPI) Professor of International Institute for Carbon-Neutral Energy Research (I²CNER) at Kyushu University, Japan 2014-15
Fellow of the Industrial and Engineering Chemistry Research Division of ACS2014
AIChE Clarence (Larry) G. Gerhold Award2013
Joe J. King Professional Engineering Achievement Award2013

Society of Plastics Engineers (SPE) International Award.....	2013
Roy W. Tess Award in Coatings (from PMSE Division of ACS).....	2012
AAAS Fellow	2011
ACS Fellow	2011
AIChE Fellow	2011
Fellow of the PMSE Division of ACS.....	2010
ACS Award in Applied Polymer Science.....	2009
American Institute of Chemical Engineers (AIChE) Institute Award for Excellence in Industrial Gases Technology.....	2008
IBM Faculty Award	2008, 2012
University CO-OP Research Excellence Award for Best Research Paper in 2006.....	2007
American Chemical Society (ACS) PMSE Cooperative Research Award	2002
National Academy of Engineering Frontiers of Engineering – Japan Symposium.....	2002
Strategic Environmental Research and Development Program Project of the Year	2001
Japan Society for the Promotion of Science Fellowship	1997, 2001
Alcoa Foundation Distinguished Engineering Research Award	2000
National Technological University Outstanding Teaching Certificate.....	2000
Academy of Outstanding Teachers.....	1997
College of Engineering Outstanding Teaching Award.....	1997
United Technologies Excellence in Teaching Award	1997
ALCOA Foundation Research Achievement Award	1996
National Academy of Engineering Frontiers of Engineering Symposium.....	1995
NSF Young Investigator Award	1992-1996
3M Nontenured Faculty Grant Award	1991-1994
NATO Postdoctoral Fellowship	1987
Berkeley Outstanding Graduate Instructor	1986
NSF Graduate Fellowship	1984
Berkeley Fellowship	1983
Phi Kappa Phi Fellowship	1983
P.V. Danckwerts Senior Research Prize in Chemical Engineering	1983
Eastern NC Section AIChE Award	1983
Special Service Award from NC Alpha Chapter of Tau Beta Pi	1983
E.I. duPont Ph.D. Fellowship	1982
Allied Merit Scholarship	1982
SOHIO Merit Scholarship	1981

EXTERNAL PROFESSIONAL ACTIVITIES:

American Chemical Society

Member of Executive Committee, Polymeric Materials: Science and Engineering (PMSE) Division [served as Program Chair, Ford Travel Grant Chair, Member at Large, and Chair of the On-line Preprints Committee]	1994 – present
Vice Chair, PMSE Division	2003 – 2004
Chair, PMSE Division	2005
Past Chair, PMSE Division	2006
Alternate Councilor for PMSE Division	2008 – 2010
Councilor for PMSE Division	2011 – 2014

American Institute of Chemical Engineers

Vice Chair of Membranes Area of Separations Division	2002 – 2003
Chair of Membranes Area of Separations Division	2003 – 2004
Co-organizer of Topical Conference on Membranes	2003

Director of Separations Division	2003 – 2008
Second Vice Chair of the Separations Division	2009
First Vice Chair of the Separations Division	2010
Chair of the Separations Division	2011
Past-Chair of the Separations Division	2012
Co-organizer of Topical Conference on Water Technologies for Developed and Developing Countries	2011
Member, AIChE Fellows Admission Committee	2013 - present
Second Vice Chair, AIChE Fellows Admission Committee	2014-2015

North American Membrane Society

Vice President	2004 – 2005
President	2005 – 2006
Member, Board of Directors	2001 – 2012
Technical Program Chair of Annual Meeting	2004
Co-Chair of International Congress on Membranes (ICOM)	2008

Other

Vice Chair of the Gordon Research Conference on Membranes: Materials & Processes	2002
Chair of the Gordon Research Conference on Membranes: Materials & Processes	2004

JOURNAL EDITORIAL ACTIVITIES:

Member, Editorial Board, <i>Polymer</i>	2011 – present
Member, Editorial Board, <i>Desalination</i>	2009 – 2013
Member, Editorial Board, <i>Polymers</i>	2009 – present
Member, International Editorial Advisory Board, <i>Int. Journal of Polymer Science</i>	2008 – present
Associate Editor, <i>Industrial & Engineering Chemistry Research</i>	2007 – present
Member, Editorial Board, <i>The Open Macromolecules Journal</i>	2007 – present
Member, Editorial Board, <i>Journal of Membrane Science</i>	2005 – present
Member, Editorial Board, <i>Journal of Applied Membrane Science and Technology</i>	2005 – present
Member, International Editorial Advisory Board, <i>Membrane Journal</i>	2003 – present
Member, International Editorial Advisory Board, <i>Korean Membrane Journal</i>	2003 – present

BOOKS:

1. B.D. Freeman and Y. Yampolskii, Membrane Gas Separation, John Wiley & Sons, Ltd., New York (2010).
2. Y.P. Yampolskii, I. Pinnau, and B.D. Freeman, Materials Science of Membranes for Gas and Vapor Separation, John Wiley & Sons, Ltd., New York (2006).
3. I. Pinnau and B.D. Freeman, Editors, Advanced Materials for Membrane Separations, ACS Symposium Series Volume 876, American Chemical Society, Washington, DC (2004).
4. I. Pinnau and B.D. Freeman, Editors, Membrane Formation and Modification, ACS Symposium Series Volume 744, American Chemical Society, Washington, DC (2000).
5. B.D. Freeman and I. Pinnau, Editors, Polymeric Membranes for Gas and Vapor Separations: Chemistry and Materials Science, ACS Symposium Series Volume 733, American Chemical Society, Washington, DC (1999).

PUBLICATIONS: (Researcher ID: G-5405-2016 – Orcid ID: orcid.org/0000-0003-2779-7788)

1. Kirschner, A.Y., C.-C. Chang, S. Kasemset, T. Emrick, B.D. Freeman, “Fouling-Resistant Ultrafiltration Membranes Prepared via Co-Deposition of Dopamine/Zwitterion Composite Coatings,” *Journal of Membrane Science*, **541**, 300-311 (2017). DOI:10.1016/j.memsci.2017.06.055, URL: <http://dx.doi.org/10.1016/j.memsci.2017.06.055> .
2. Park, H.B., J. Kamcev, L.M. Robeson, M. Elimelech, and B.D. Freeman, “Maximizing the Right Stuff: The Tradeoff Between Membrane Permeability and Selectivity,” *Science*, **356**(6343), eaab0530 (2017). DOI:10.1126/science.aab0530, URL: <http://science.sciencemag.org/content/356/6343/eaab0530> .
3. Kushwaha, A., M.E. Dose, S. Luo, B.D. Freeman, and R. Guo, “Polybenzoxazole (PBO)-based Gas Separation Membranes Thermally Derived From Blends of *Ortho*-functional Polyimide and Polyamide Precursors,” *Separation and Purification Technology*, **184**, 384-393 (2017). DOI:10.1016/j.seppur.2017.04.051, URL: <http://dx.doi.org/10.1016/j.seppur.2017.04.051> .
4. Kamcev, J., D.R. Paul, G.S. Manning, and B.D. Freeman, “Accounting for Frame of Reference and Thermodynamic Non-idealities When Calculating Salt Diffusion Coefficients in Ion Exchange Membranes,” *Journal of Membrane Science*, **537**, 396-406 (2017). DOI:10.1016/j.memsci.2017.05.034, URL: <http://dx.doi.org/10.1016/j.memsci.2017.05.034> .
5. Baek, Y., B.D. Freeman, A.L. Zydney, and J. Yoon, “A Facile Surface Modification for Antifouling Reverse Osmosis Membranes using Polydopamine Under UV Irradiation,” *Industrial and Engineering Chemistry Research*, **56**, 5756-5760 (2017). DOI:10.1021/acs.iecr.6b04926, URL: <http://pubs.acs.org/doi/abs/10.1021/acs.iecr.6b04926> .
6. Tiwari, R.R., J. Jin, B.D. Freeman, and D.R. Paul, “Physical Aging, CO₂ Sorption and Plasticization in Thin Films of Polymer with Intrinsic Microporosity (PIM-1),” *Journal of Membrane Science*, **537**, 362-371 (2017). DOI:10.1016/j.memsci.2017.04.069, URL: <http://dx.doi.org/10.1016/j.memsci.2017.04.069> .
7. Galizia, M., F.M. Benedetti, D.R. Paul and B.D. Freeman, “Monovalent and Divalent Ion Sorption in a Cation Exchange Membrane Based on Cross-linked Poly(*p*-styrene sulfonate-co-divinylbenzene),” *Journal of Membrane Science*, **535**, 132-142 (2017). DOI:10.1016/j.memsci.2017.04.007, URL: <https://doi.org/10.1016/j.memsci.2017.04.007> .
8. Nebipasagil, A., J. Park, O.R. Lane, B.J. Sundell, S.J. Mecham, B.D. Freeman, J.S. Riffle, J.E. McGrath, “Polyurethanes Containing Poly(arylene ether sulfone) and Poly(ethylene oxide) Segments for Gas Separation Membranes,” *Polymer*, **118**, 256-267 (2017). DOI:10.1016/j.polymer.2017.03.017, URL: <http://dx.doi.org/10.1016/j.polymer.2017.03.017> .
9. He, Z., S. Kasemset, A.Y. Kirschner, Y.-H. Cheng, D.R. Paul, and B.D. Freeman, “The Effects of Salt Concentration and Foulant Surface Charge on Hydrocarbon Fouling of a Poly(vinylidene fluoride) Microfiltration Membrane,” *Water Research*, **117**, 230-241 (2017). DOI:10.1016/j.watres.2017.03.051, URL: <https://doi.org/10.1016/j.watres.2017.03.051> .
10. Stevens, K.A, Z.P. Smith, K.L. Gleason, M. Galizia, D.R. Paul, and B.D. Freeman, “Influence of Temperature on Gas Solubility in Thermally Rearranged (TR) Polymers,” *Journal of Membrane Science*, **533**, 75-83 (2017). DOI:10.1016/j.memsci.2017.03.005, URL: <http://www.sciencedirect.com/science/article/pii/S0376738816321573> .

11. Kamcev, J., D.R. Paul, and B.D. Freeman, "Effect of Fixed Charge Group Concentration on Equilibrium Ion Sorption in Ion Exchange Membranes," *Journal of Materials Chemistry A*, **5**, 4638-4650 (2017). DOI:10.1039/c6ta07954g, URL: <http://pubs.rsc.org/en/content/articlelanding/2017/ta/c6ta07954g#!divAbstract> .
12. Kamcev, J., D.R. Paul, G.S. Manning, and B.D. Freeman, "Predicting Salt Permeability Coefficients in Highly Swollen, Highly Charged Ion Exchange Membranes," *ACS Applied Materials & Interfaces*, **9**(4), 4044-4056 (2017). DOI:10.1021/acsami.6b14902, URL: <http://pubs.acs.org/doi/abs/10.1021/acsami.6b14902> .
13. He, Z., D.J. Miller, S. Kasemset, D.R. Paul, and B.D. Freeman, "The Effect of Permeate Flux on Membrane Fouling During Microfiltration of Oily Water," *Journal of Membrane Science*, **525**, 25-34 (2017). DOI:10.1016/j.memsci.2016.10.002, URL: <http://www.sciencedirect.com/science/article/pii/S0376738816308018> .
14. Robeson, L.M., M.E. Dose, B.D. Freeman, and D.R. Paul, "Analysis of the Transport Properties of Thermally Rearranged (TR) Polymers and Polymers of Intrinsic Microporosity (PIM) Relative to Upper Bound Performance," *Journal of Membrane Science*, **525**, 18-24 (2017). DOI:10.1016/j.memsci.2016.11.085, URL: <http://www.sciencedirect.com/science/article/pii/S0376738816316878> .
15. Kasemset, S., L. Wang, Z. He, D.J. Miller, A. Kirschner, B.D. Freeman, and M.M. Sharma, "Influence of Polydopamine Deposition Conditions on Hydraulic Permeability, Sieving Coefficients, Pore Size and Pore Size Distribution for a Polysulfone Ultrafiltration Membrane," *Journal of Membrane Science*, **522**, 100-117 (2017). DOI:10.1016/j.memsci.2012.05.050, URL: <http://www.sciencedirect.com/science/article/pii/S0376738816309310> .
16. Miller, D.J., D.R. Dreyer, C.W. Bielawski, D.R. Paul, and B.D. Freeman, "Oberflächenmodifizierung von Wasseraufbereitungsmembranen," *Angewandte Chemie*, **129**, 4734-4788 (2017).
17. Miller, D.J., D.R. Dreyer, C.W. Bielawski, D.R. Paul, and B.D. Freeman, "Surface Modification of Water Purification Membranes: A Review," *Angewandte Chemie International Edition*, **56**, 4662-4711 (2017). DOI:10.1002/ange.201601509, URL: <http://onlinelibrary.wiley.com/doi/10.1002/ange.201601509/abstract>
18. Galizia, M., K.A. Stevens, Z.P. Smith, D.R. Paul, and B.D. Freeman, "Non-equilibrium Lattice Fluid Modeling of Gas Solubility in HAB-6FDA Polyimide and Its Thermally Rearranged Analogs," *Macromolecules*, **49**(22), 8768-8779 (2016). DOI:10.1021/acs.macromol.6b01479, URL: <http://pubs.acs.org/doi/abs/10.1021/acs.macromol.6b01479> .
19. Rowlett, J.R., Q. Liu, W. Zhang, J.D. Moon, M.E. Dose, J.S. Riffle, B.D. Freeman, and J.E. McGrath, "Gas Transport Properties and Characterization of UV Crosslinked Poly(phenylene oxide-co-arylene ether ketone) Copolymers," *Journal of Materials Chemistry A*, **4**, 16047-16056 (2016). DOI:10.1039/C6TA05320C, URL: <http://pubs.rsc.org/en/content/articlelanding/2016/ta/c6ta05320c#!divAbstract> .
20. Galizia, M., D.R. Paul, and B.D. Freeman, "Liquid Methanol Sorption, Diffusion and Permeation in Charged and Uncharged Polymers," *Polymer*, **102**, 281-291 (2016). DOI: 10.1016/j.polymer.2016.09.010, URL: <http://www.sciencedirect.com/science/article/pii/S0032386116307984> .

21. Ha, Heonjoo, J. Park, S. Ando, C.B. Kim, K. Nagai, B.D. Freeman, and C.J. Ellison, "Gas Permeation and Selectivity of Poly(dimethylsiloxane)/Graphene Oxide Composite Elastomer Membranes," *Journal of Membrane Science*, **518**, 131-140 (2016). DOI: 10.1016/j.memsci.2016.06.028, URL: <http://www.sciencedirect.com/science/article/pii/S0376738816307256> .
22. Liu, Q., H. Borjigin, D.R. Paul, J.S. Riffle, J.E. McGrath, and B.D. Freeman, "Gas Permeation Properties of Thermally Rearranged (TR) Isomers and Their Aromatic Polyimide Precursors," *Journal of Membrane Science*, **518**, 88-99 (2016). DOI:10.1016/j.memsci.2016.06.026, URL: <http://www.sciencedirect.com/science/article/pii/S0376738816307232> .
23. He, Z., D.J. Miller, S. Kasemset, L. Wang, D.R. Paul, and B.D. Freeman, "Fouling Propensity of a Poly(vinylidene fluoride) Microfiltration Membrane to Several Model Oil/Water Emulsions," *Journal of Membrane Science*, **514**, 659-670 (2016). DOI:10.1016/j.memsci.2016.04.018, URL: <http://www.sciencedirect.com/science/article/pii/S0376738816302290> .
24. Kamcev, J., and B.D. Freeman, "Charged Polymer Membranes for Environmental/Energy Applications," *Annual Review of Chemical and Biomolecular Engineering*, **7(1)**, 4.1-4.23 (2016). DOI:10.1146/annurev-chembioeng-080615-033533, URL: <http://www.annualreviews.org/doi/abs/10.1146/annurev-chembioeng-080615-033533> .
25. Kasemset, S., Z. He, D.J. Miller, B.D. Freeman, and M.M. Sharma, "Effect of Polydopamine Deposition Conditions on Polysulfone Ultrafiltration Membrane Properties and Threshold Flux during Oil/Water Emulsion Filtration," *Polymer*, **97**, 247-257 (2016). DOI:10.1016/j.polymer.2016.04.064, URL:<http://www.sciencedirect.com/science/article/pii/S0032386116303469> .
26. Kamcev, J., and B.D. Freeman, "Cracks Help Membranes to Stay Hydrated," *Nature*, **532**, 445-6 (2016). DOI:10/1038/532445a, URL:<http://www.nature.com/nature/journal/v532/n7600/full/532445a.html> .
27. Liu, Q., M. Galizia, K.L. Gleason, C.A. Scholes, D.R. Paul, and B.D. Freeman, "Influence of Toluene on CO₂ and CH₄ Gas Transport Properties in Thermally Rearranged (TR) Polymers Based on 3,3'-dihydroxy-4,4'-diamino-biphenyl (HAB) and 2,2'-bis-(3,4-dicarboxyphenyl) hexafluoropropane dianhydride (6FDA)," *Journal of Membrane Science*, **514**, 282-293 (2016). DOI:10.1016/j.memsci.2016.04.043, URL:<http://www.sciencedirect.com/science/article/pii/S037673881630271X> .
28. Ha, H., J. Park, K. Ha, B.D. Freeman, and C.J. Ellison, "Synthesis and Gas Permeability of Highly Elastic Poly(dimethylsiloxane)/Graphene Oxide Composite Elastomers Using Telechelic Polymers," *Polymer*, **93**, 53-60 (2016). DOI:10.1016/j.polymer.2016.04.016, URL: <http://www.sciencedirect.com/science/article/pii/S003238611630283X> .
29. Liu, Q., A.T. Shaver, Y. Chen, G. Miller, D.R. Paul, J.S. Riffle, J.E. McGrath, and B.D. Freeman, "Effect of UV Irradiation and Physical Aging on O₂ and N₂ Transport Properties of Thin Glassy Poly(arylene ether ketone) Copolymer Films Based on Tetramethyl Bisphenol A and 4,4'-Difluorobenzophenone," *Polymer*, **87**, 202-214 (2016). DOI:10.1016/j.polymer.2016.01.075, URL: <http://www.sciencedirect.com/science/article/pii/S0032386116300751> .
30. Kamcev, J., M. Galizia, F.M. Benedetti, E.-S. Jang, D.R. Paul, B.D. Freeman, and G.S. Manning, "Partitioning of Mobile Ions Between Ion Exchange Polymers and Aqueous Salt Solutions:

- Importance of Counter-ion Condensation,” *Physical Chemistry Chemical Physics*, **18**, 6021-6031 (2016). DOI:10.1039/c5cp06747b,
URL:<http://pubs.rsc.org/en/content/articlelanding/2016/cp/c5cp06747b#!divAbstract> .
31. Chang, C.-C., Kolewe, K.W., Li, Y., Kosef, I., B.D. Freeman, Carter, K.R., Schiffman, J.D., and Emrick, T.S., “Underwater Superoleophobic Surfaces Prepared From Polymer Zwitterion/Dopamine Composite Coatings,” *Advanced Materials Interfaces*, **3(6)**, 1500521 (9 pages), (2016). DOI:10.1002/admi.201500521,
URL:<http://onlinelibrary.wiley.com/doi/10.1002/admi.201500521/epdf> .
 32. Sundell, B.J., E-S. Jang, J.R. Cook, B.D. Freeman, J.S. Riffle, and J.E. McGrath, “Cross-linked Disulfonated Poly(arylene ether sulfone) Telechelic Oligomers. 2. Elevated Transport Performance with Increasing Hydrophilicity,” *Industrial and Engineering Chemistry Research*, **55(5)**, 1419-1426 (2016). DOI:10.1021/acs.iecr.5b04050, URL:
<http://pubs.acs.org/doi/abs/10.1021/acs.iecr.5b04050> .
 33. Luo, S., K.A. Stevens, J.S. Park, J.D. Moon, Q. Liu, B.D. Freeman, and R. Guo, “Highly CO₂-Selective Gas Separation Membranes Based on Segmented Copolymers of Poly(Ethylene oxide) Reinforced with Penttiptycene-containing Polyimide Hard Segments,” *ACS Applied Materials and Interfaces*, **8(3)**, 2306-2317, 2016. DOI:10.1021/acsami.5b11355,
URL:<http://pubs.acs.org/doi/abs/10.1021/acsami.5b11355> .
 34. Liu, Q., D.R. Paul, and B.D. Freeman, “Gas Permeation and Mechanical Properties of Thermally Rearranged (TR) Copolyimides,” *Polymer* **82**, 378-391, 2016.
DOI:10.1016/j.polymer.2015.11.051,
URL:<http://www.sciencedirect.com/science/article/pii/S0032386115304080> .
 35. Borjigin, H., Q. Liu, W. Zhang, K. Gaines, J.S. Riffle, D.R. Paul, B.D. Freeman, and J.E. McGrath, “Synthesis and Characterization of Thermally Rearranged (TR) Polybenzoxazoles: Influence of Isomeric Structure on Gas Transport Properties,” *Polymer* **75**, 199-210, 2015.
DOI:10.1016/j.polymer.2015.07.024,
URL:<http://www.sciencedirect.com/science/article/pii/S0032386115301051> .
 36. Kamcev, J., D.R. Paul, and B.D. Freeman, “Ion Activity Coefficients in Ion Exchange Polymers: Applicability of Manning’s Counter-ion Condensation Theory,” *Macromolecules*, **48(21)**, 8011-8024, 2015. DOI:10.1021/acs.macromol.5b01654,
URL:<http://pubs.acs.org/doi/abs/10.1021/acs.macromol.5b01654> .
 37. Kamcev, J., and B.D. Freeman, “Nanofiltration Membranes,” in *Encyclopedia of Polymeric Nanomaterials*, S. Kobayashi and K. Müllen, Eds., Springer-Verlag, pp. 1342-1349 (2015).
DOI:10.1007/978-3-642-36199-9_160-1;
URL:http://link.springer.com/referenceworkentry/10.1007%2F978-3-642-36199-9_160-1 .
 38. Kushwaha, A., M.E. Dose, Z.P. Smith, S. Luo, B.D. Freeman, and R. Guo, “Preparation and Properties of Polybenzoxazole-based Gas Separation Membranes: A Comparative Study Between Thermal Rearrangement (TR) of Poly(hydroxyimide) and Thermal Cyclodehydration of Poly(hydroxyamide),” *Polymer*, **78**, 81-93 (2015). DOI:10.1016/j.polymer.2015.09.045,
URL:<http://www.sciencedirect.com/science/article/pii/S0032386115302500> .
 39. Smith, Z.P., G. Hernández, K.L. Gleason, A. Anand, C.M. Doherty, K. Konstas, C. Alvarez, A.J. Hill, A.E. Lozano, D.R. Paul, and B.D. Freeman, “Effect of Polymer Structure on Gas Transport

- Properties of Selected Aromatic Polyimides, Polyamides and TR Polymers,” *Journal of Membrane Science*, **493**, 766-781 (2015). DOI:10.1016/j.memsci.2015.06.032, URL:<http://www.sciencedirect.com/science/article/pii/S0376738815300090> .
40. Su, N.C., Z.P. Smith, B.D. Freeman, and J.J. Urban, “Size-Dependent Permeability Deviations from Maxwell’s Model in Hybrid Cross-Linked Poly(ethylene glycol)/silica Nanoparticle Membranes,” *Chemistry of Materials*, **27(7)**, 2421-2429 (2015). DOI:10.1021/cm504463c, URL:<http://pubs.acs.org/doi/abs/10.1021/cm504463c> .
41. Borjigin, H, K.A Stevens, R. Liu, J.D. Moon, A.T. Shaver, S. Swinnea, B.D. Freeman, J.S. Riffle, J.E. McGrath, “Synthesis and Characterization of Polybenzimidazoles Derived from Tetraaminodiphenylsulfone for High Temperature Gas Separation Membranes,” *Polymer*, **71**, 135-142 (2015). DOI:10.1016/j.polymer.2015.06.021, URL:<http://www.sciencedirect.com/science/article/pii/S0032386115300422> .
42. Tiwari, R.R., Z.P. Smith, H. Lin, B.D. Freeman, and D.R. Paul, “Gas Permeation in Thin Films of “High Free-Volume” Glassy Perfluoropolymers: Part II. CO₂ Plasticization and Sorption,” *Polymer*, **61**, 1-14 (2015). DOI:10.1016/j.polymer.2014.12.008, URL:<http://www.sciencedirect.com/science/article/pii/S0032386114011070> .
43. Robeson, L.R. Q. Liu, B.D. Freeman, and D.R. Paul, “Comparison of Transport Properties of Rubbery and Glassy Polymers and the Relevance to the Upper Bound Relationship,” *Journal of Membrane Science*, **476**, 421-431 (2015). DOI:10.1016/j.memsci.2014.11.058, URL: <http://www.sciencedirect.com/science/article/pii/S0376738814009028> .
44. Luo, S., Q. Liu, B. Zhang, J.R. Wiegand, B.D. Freeman, and R. Guo, “Pentiptycene-based Polyimides with Hierarchically Controlled Molecular Cavity Architecture for Efficient Membrane Gas Separation,” *Journal of Membrane Science*, **480**, 20-30 (2015). DOI:10.1016/j.memsci.2015.01.043, URL:<http://www.sciencedirect.com/science/article/pii/S0376738815000708> .
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