

## DAFTAR PUSTAKA

- Adjemian, K.T., et al., 2002, *Silicon Oxide Nafion Composite Membranes for Proton-Exchange Membrane Fuel Cell Operation at 80-140[degree]C*. Journal of The Electrochemical Society 149(3): p. A256-A261.
- Adjemian, K.T., et al., 2006, *Function and Characterization of Metal Oxide-Nafion Composite Membranes for Elevated-Temperature H<sub>2</sub>/O<sub>2</sub> PEM Fuel Cells*. Chemistry of Materials 18(9): p. 2238-2248.
- Antonucci, P.L., et al., 1999, *Investigation of a direct methanol fuel cell based on a composite Nafion®-silica electrolyte for high temperature operation*. Solid State Ionics 125(1-4): p. 431-437.
- Arico, A.S., et al., 1998, *Comparison of Ethanol and Methanol Oxidation in a Liquid-Feed Solid Polymer Electrolyte Fuel Cell at High Temperature*. Electrochemical and Solid-State Letters 1(2): p. 66-68.
- Aricò, A.S., et al., 2003, *Influence of the acid-base characteristics of inorganic fillers on the high temperature performance of composite membranes in direct methanol fuel cells*. Solid State Ionics 161(3-4): p. 251-265.
- Casciola, M., et al., 2009, *Conductivity and Methanol Permeability of Nafion-Zirconium Phosphate Composite Membranes Containing High Aspect Ratio Filler Particles*. Fuel Cells 9(4): p. 394-400.
- Chen, L.-C., et al., 2008, *Nafion/PTFE and zirconium phosphate modified Nafion/PTFE composite membranes for direct methanol fuel cells*. Journal of Membrane Science 307(1): p. 10-20.
- Chen, Z., et al., 2006, *Nafion/Zeolite Nanocomposite Membrane by in Situ Crystallization for a Direct Methanol Fuel Cell*. Chemistry of Materials 18(24): p. 5669-5675.
- Crawley, G., 2006, Opening doors to fuel cell commercialisation: Proton Exchange Membrane Fuel Cell, Fuel Cell Today, [www.fuelcelltoday.com](http://www.fuelcelltoday.com).
- Dewi E.L., 2007, *New Materials for Fuel Cell Development*, Proc. 1st Int. Conf. on Chemical Sciences Yogyakarta, (ICCS-2007), 95 (1-8)
- Dewi E.L., dan Handayani, S., 2008, *Karakterisasi komposit hidrokarbon polimer tersulfonasi (sABS-Z) sebagai alternatif polielektrolit untuk fuel cell*. Jurnal Sains Materi Indonesia Edisi Khusus Desember, hal. 1-4.
- Dimitrova, P., et al., 2002, *Modified Nafion®-based membranes for use in direct methanol fuel cells*. Solid State Ionics 150(1-2): p. 115-122.
- DOE., 2009, *Hydrogen and fuel cell activities, progress, and plans: report to congress*; <[http://www.hydrogen.energy.gov/pdfs/epact\\_report\\_sec811.pdf](http://www.hydrogen.energy.gov/pdfs/epact_report_sec811.pdf)>.
- Doğan, H., et al., *Organo montmorillonites and sulfonated PEEK nanocomposite membranes for fuel cell applications*. Applied Clay Science 2011:52: 285–294.
- Elabd, Y.A., and Napadensky, E., 2004, *Sulfonation and characterization of poly(styrene-isobutylene-styrene) triblock copolymers at high ion exchange capacity*. Polymer 45, p. 3037-3043.

- Gnana Kumar, G., et al., 2009, *Nafion membrans modified with silica sulfuric acid for the elevated temperature and lower humidity operation of PEMFC*. International Journal of Hydrogen Energi 34(24): p. 9788-9794.
- Gowariker, VR., et al., 1986, *Polymer Science*, New Delhi: New Age International.
- Handayani, S., et al., *Simple sulphonation method of composite 68% sulfonated polyether ether ketone and its properties as polyelectrolyte in high temperature direct methanol fuel cell*. World Applied Sciences Journal 2010:9(11): 1206-1212.
- Haubold, H.G., et al., 2001 *Nano structure of NAFION: a SAXS study*. Electrochimica Acta 46(10-11): p. 1559-1563.
- Hickner, M.A., et al., 2004, *Alternative polymer systems for Proton Exchange Membranes (PEMs)*. Chemical Review 104, p. 4587-4612.
- Hoffmann, P., 2001, *Tomorrow's Energi: Hydrogen, Fuel Cells, and the Prospects for a Cleaner Planet*, MIT Press, Cambridge, MA.
- Huang, R. Y. M., P. Shao, C. M. Burns, X. Feng, 2001, *Sulfonation of poly(ether ether ketone) (PEEK): kinetic study and characterization*, Journal of Applied Polymer Science, vol 82, pp. 2651-2660.
- Jiang, R., H.R. Kunz, and J.M. Fenton, 2006, *Composite silica/Nafion® membranes prepared by tetraethylorthosilicate sol-gel reaction and solution casting for direct methanol fuel cells*. Journal of Membran Science 272(1-2): p. 116-124.
- Jin, Y., et al., 2008, *Novel Nafion composite membranes with mesoporous silica nanospheres as inorganic fillers*. Journal of Power Sources 185(2): p. 664-669.
- Kementerian Negara Riset dan Teknologi Republik Indonesia, *Indonesia 2005-2025: Buku Putih*, 2006
- Kim, D.J., Ngan Khanh Thi Do, Eun Bum Cho, 2009, *Method for preparing homogeneously sulfonated poly(ether ether ketone) membranes by casting method using organic solvent*. USPatent No. 20090092880.
- Kreuer, K.-D., 1996, *Proton Conductivity: Materials and Applications*. Chemistry of Materials 8(3): p. 610-641.
- Lamy, C., et al., 2002, *Recent advances in the development of direct alcohol fuel cells (DAFC)*. Journal of Power Sources 105(2): p. 283-296.
- Lee JK, Li W., Manthiram A., 2009, *Poly(arylene ether sulfone)s containing pendant sulfonic acid groups as membrane materials for direct methanol fuel cells*. Journal of Membranes Science 330, p. 73-79.
- Li, X., et al., 2007, *Functionalized zeolite A-nafion composite membranes for direct methanol fuel cells*. Solid State Ionics 178(19-20): p. 1248-1255.
- Mahreni, A., et al., 2009, *Nafion/silicon oxide/phosphotungstic acid nanocomposite membrane with enhanced proton conductivity*. Journal of Membrane Science 327(1-2): p. 32-40.
- Mioč, U., et al., 1991, *Equilibrium of the protonic species in hydrates of some heteropolyacids at elevated temperatures*. Solid State Ionics 46: p. 1-2.

- Neburchilov, V., et al., 2007, *A review of polymer electrolyte membranes for direct methanol fuel cells*. Journal of Power Sources 169(2): p. 221-238.
- Nicholas, W.D. and A.E. Yossef, 2006, *Polymer electrolyte membranes for the direct methanol fuel cell: A review*. Journal of Polymer Science Part B: Polymer Physics, 44(16): p. 2201-2225.
- Othman, M.H.D. , A.F. Ismail, A. Mustafa, 2007, *Physico-Chemical Study of Sulfonated Poly(Ether Ether Ketone) Membranes for Direct Methanol Fuel Cell Application*. Malaysian Polimer Journal 2, 10-28.
- Pasupathi S., et al., 2008 *High DMFC performance output using modified acid-base polymer blend*. International Journal of Hydrogen Energy 2008;33:3132-6.
- Peighambaroust, S.J., Rowshanzamir, S., Amjadi, M., 2010, *Review of the proton exchange membranes for fuel cell applications*. International Journal of Hydrogen Energy 35, p. 9349-9384.
- Ren, X., et al., 2000, *Methanol Transport Through Nafion Membranes. Electro-osmotic Drag Effects on Potential Step Measurements*. Journal of The Electrochemical Society, 147(2): p. 466-474.
- Rikukawa, M. and K. Sanui, 2000, *Proton-conducting polymer electrolyte membranes based on hydrocarbon polymers*. Progress in Polymer Science 25(10): p. 1463-1502.
- Rodgers, M.P., Z. Shi, and S. Holdcroft, 2009, *Ex situ Characterisation of Composite Nafion Membranes Containing Zirconium Hydrogen Phosphate*. Fuel Cells 9(5): p. 534-546.
- Saccà, A., et al., 2005, *Nafion-TiO<sub>2</sub> hybrid membranes for medium temperature polymer electrolyte fuel cells (PEFCs)*. Journal of Power Sources 152: p. 16-21.
- Sang, S., Q. Wu, and K. Huang, 2007, *Preparation of zirconium phosphate (ZrP)/Nafion1135 composite membrane and H<sup>+</sup>/VO<sub>2</sub><sup>+</sup> transfer property investigation*. Journal of Membrane Science 305(1-2): p. 118-124.
- Shang, F., et al., 2009, *PWA/silica/PFSA composite membrane for direct methanol fuel cells*. Journal of Materials Science 44(16): p. 4383-4388.
- Shao, Z.-G., et al., 2006, *Hybrid Nafion-inorganic oxides membrane doped with heteropolyacids for high temperature operation of proton exchange membrane fuel cell*. Solid State Ionics 177(7-8): p. 779-785.
- Shao, Z.-G., P. Joghee, and I.M. Hsing, 2004, *Preparation and characterization of hybrid Nafion-silica membrane doped with phosphotungstic acid for high temperature operation of proton exchange membrane fuel cells*. Journal of Membrane Science, 229(1-2): p. 43-51.
- Sheng, W. et al., 2009, *Sulfonated poly(ether sulfones) (sPES)/ boron phosphate (BPO<sub>4</sub>) composite membranes for high temperature proton exchange membrane fuel cells*. International Journal of Hydrogen Energy 34, p. 8982-8991.

- Silva, C.M.D., et al., 2009, *Conductivity and thermal behaviour of sulfonated ABS for fuel cell applications*, ECS Transactions 25, p. 881-889.
- Silva, L.A., et al., 2008, *Poly(styrene-co-acrylonitrile) based proton conductive membranes*. European Polymer Journal 17, p. 1462-1474.
- Smitha, B., S. Sridhar, and A.A. Khan, 2005, *Solid polymer electrolyte membranes for fuel cell applications--a review*. Journal of Membrane Science 259(1-2): p. 10-26.
- Song, S. and P. Tsiakaras, 2006, *Recent progress in direct ethanol proton exchange membrane fuel cells (DE-PEMFCs)*. Applied Catalysis B: Environmental 63(3-4): p. 187-193.
- Staiti, P., et al., 2001, *Hybrid Nafion-silica membranes doped with heteropolyacids for application in direct methanol fuel cells*. Solid State Ionics 145(1-4): p. 101-107.
- Varsha, R., *Cross-linked sulfonated poly (ether ether ketone) (SPEEK)/reactive organoclay nanocomposite proton exchange membranes (PEM)*, Journal of Membrane Science 2011: 372: 40-48.
- Wang, Y., et al., 2008, *Zeolite beta-filled chitosan membrane with low methanol permeability for direct methanol fuel cell*. Journal of Power Sources 183(2): p. 454-463.
- Wang, Y., et al., 2011, *A review of polymer electrolyte membrane fuel cells: technology, applications, and needs on fundamental research*. Applied Energy 88, p. 981-1007.
- Witoelar, R., 2009, Cadangan minyak bumi Indonesia tersisa 23 tahun, Berita Sore, 4 Maret 2009, <http://beritasore.com/2009/03/04/cadangan-minyak-bumi-indonesia-terisa-23-tahun/>
- Xu, W., et al., 2005, *Low methanol permeable composite Nafion/silica/PWA membranes for low temperature direct methanol fuel cells*. Electrochimica Acta 50(16-17): p. 3280-3285.
- Yang, T., 2008, *Preliminary study of SPEEK/PVA blend membranes for DMFC applications*. International Journal of Hydrogen Energy 33:6772-9
- Yatin, P. and A.M. Kenneth, 2009 *Durability enhancement of Nafion® fuel cell membranes via in situ sol-gel-derived titanium dioxide reinforcement*. Journal of Applied Polymer Science 113(5): p. 3269-3278.
- Yee, R. S. L., K. Zhang and B. P. Ladewig, 2003, *The effect of sulfonated Poly(ether ether Ketone) Ion Exchange Preparation Condition on membrane properties*, Membranes, vol 3, pp. 182-195.
- Young, TH., et al., 2008, *Improvement of electrochemical performances of sulfonated poly(arylene ether sulfone) via incorporation of sulfonates poly(arylene ether benzimidazole)*. Journal of Power Source 175, p. 724-731.