

REFERENCES

- Abdelrazek, E.M., Elashmawi, I.S., El-khodary, A., & Yassin, A. (2010). Structural, optical, thermal and electrical studies on PVA/PVP blends filled with lithium bromide. *Current Applied Physics*, 10, 607–613.
- Adebahr, J., Byrne, N., Forsyth, M., MacFarlane, D.R., & Jacobsson, P. (2003). Enhancement of ion dynamics in PMMA-based gels with addition of TiO₂ nanoparticles. *Electrochimica Acta*, 48, 2099–2103.
- Ahmad, S., Ahmad, S., & Agnihotry S.A. (2005). Nanocomposite electrolytes with fumed silica in poly(methyl methacrylate): Thermal, rheological and conductivity studies. *Journal of Power Sources*, 140, 151–156.
- Ahmad, S., Deepa, M., & Agnihotry, S.A. (2008). Effect of salts on the fumed silica-based composite polymer electrolytes. *Solar Energy Materials and Solar Cells*, 92, 184–189.
- Ahn S.K., Ban, T., Sakthivel, P., Lee, J.W., Gal, Y.-S., Lee, J.-K., Kim, M.-R., & Jin, S.-H. (2012). Development of dye-sensitized solar cells composed of liquid crystal embedded, electrospun poly(vinylidene fluoride-co-hexafluoropropylene) nanofibers as polymer gel electrolytes. *American Chemical Society Applied Materials and Interfaces*, 4, 2096–2100.
- Akai, N., Kawai, A., & Shibuya, K. (2010). Ion-pair structure of vaporized ionic liquid studied by matrix-isolation FTIR spectroscopy with DFT Calculations: A case of 1-ethyl-3-methylimidazolium trifluoromethanesulfonate. *The Journal of Physical Chemistry A*, 114, 12662–12666.
- Ali, A.M.M., Yahya, M.Z.A., Bahron, H., Subban, R.H.Y., Harun, M.K., & Atan, I. (2007). Impedance studies on plasticized PMMA-LiX [X: CF₃SO₃⁻, N(CF₃SO₂)²⁻] polymer electrolytes. *Materials Letters*, 61, 2026–2029.
- An, K.H., Jeon, K.K., Heo, J.K., Lim, S.C., Bae, D.J., & Lee, Y.H. (2002). High-capacitance supercapacitor using a nanocomposite electrode of single-walled carbon nanotube and polypyrrole. *Journal of Electrochemical Society*, 149, 1058–1062.
- Amitha, F.E., Reddy, A.L.M., & Ramaprabhu, S. (2009). A non-aqueous electrolyte-based asymmetric supercapacitor with polymer and metal oxide/multiwalled carbon nanotube electrodes. *Journal of Nanoparticle Research*, 11, 725–729.
- Akiyama, Y., Sodaye, H., Shibahara, Y., Honda, Y., Tagawa, S., & Nishijima, S. (2010). Study on gamma-ray-induced degradation of polymer electrolyte by pH titration and solution analysis. *Polymer Degradation and Stability*, 95, 1–5.
- Armand, M.B. (1986). Polymer electrolytes. *Annual Review of Materials Science*, 16, 245–261.

- Arof, A.K., & Ramesh, S. (2000). Electrical conductivity studies of poly(vinylchloride) based electrolytes with double salt system. *Solid State Ionics*, 136–137, 1197–1200.
- Arof A.K., Kufian, M.Z., Syukur, M.F., Aziz, M.F., Abdelrahman, A.E., & Majid, S.R. (2012). Electrical double layer capacitor using poly(methyl methacrylate)–C₄BO₈Li gel polymer electrolyte and carbonaceous material from shells of mata kucing (*Dimocarpus longan*) fruit. *Electrochimica Acta*, 74, 39–45.
- Awadhia A, & Agrawal SL. (2007). Structural, thermal and electrical characterizations of PVA:DMSO:NH₄SCN gel electrolytes. *Solid State Ionics*, 178, 951–958.
- Baskaran, R., Selvasekarapandian, S., Kuwata, N., Kawamura, J., & Hattori, T. (2006a). Conductivity and thermal studies of blend polymer electrolytes based on PVAc–PMMA. *Solid State Ionics*, 177, 2679–2682.
- Baskaran, R., Selvasekarapandian, S., Kuwata, N., Kawamura, J., & Hattori T. (2006b). Ac impedance, DSC and FT–IR investigations on (x)PVAc–(1-x)PVdF blends with LiClO₄. *Materials Chemistry and Physics*, 98, 55–61.
- Baskaran, R., Selvasekarapandian, S., Kuwata, N., Kawamura, J., & Hattori, T. (2007). Structure, thermal and transport properties of PVAc–LiClO₄ solid polymer electrolytes. *Journal of Physics and Chemistry of Solids*, 68, 407–412.
- Bazito, F.F.C., Silveira, L.T., Torresi, R.M., & Torresi, S.I.C. (2007). Spectroelectrochemical study of a soluble derivative of poly(aniline) in a room temperature ionic liquid. *Electrochimica Acta*, 53, 1217–1224.
- Bhargav, P.B., Mohan, V.M., Sharma, A.K., & Rao, V.V.R.N. (2007). Structural and electrical properties of pure and NaBr doped poly(vinyl alcohol) (PVA) polymer electrolyte films for solid state battery applications. *Ionics*, 13, 441–446.
- Bhide, A., & Hariharan, K. (2007). Ionic transport studies on (PEO)₆:NaPO₃ polymer electrolyte plasticized with PEG₄₀₀. *European Polymer Journal*, 43, 4253–4270.
- Bouridah, A., Dalard, F., Deroo, D., Cheradame, H., & LeNest, J.F. (1985). Poly(dimethylsiloxane)–poly(ethylene oxide) based polyurethane networks used as electrolytes in lithium electrochemical solid state batteries. *Solid State Ionics*, 15, 233–240.
- Bruce, P.G., & Vincent, C.A. (1993). Polymer electrolytes. *Journal of the Chemical Society, Faraday Transactions*, 89, 3187–3203.
- Buraidah, M.H., & Arof, A.K. (2011). Characterization of chitosan/PVA blended electrolyte doped with NH₄I. *Journal of Non-crystalline Solids*, 357, 3261–3266.
- Braun, D., Cherdron, H., Rehahn, M., Ritter, H., & Voit, B. (2005). *Polymer Synthesis: Theory and Practice*. Berlin, Germany: Springer.
- Canal, J.P., Ramnial, T., Dickie, D.A., & Clyburne, J.A.C. (2006). From the reactivity of N-heterocyclic carbenes to new chemistry in ionic liquids. *Chemical Communications*, 17, 1809–1818.

- Cheng, H., Zhu, C., Huang, B., Lu, M., & Yang, Y. (2007) Synthesis and electrochemical characterization of PEO-based polymer electrolytes with room temperature ionic liquids. *Electrochimica Acta*, 52, 5789–5794.
- Choi, N.S., & Park, J.K. (2001). New polymer electrolytes based on PVC/PMMA blend for plastic lithium-ion batteries. *Electrochimica Acta*, 46, 1453–1459.
- Chowdhury, A., & Thynell, S.T. (2006). Confined rapid thermolysis/FTIR/ToF studies of imidazolium-based ionic liquids. *Thermochimica Acta*, 443, 159–172.
- Choudhury, N.A., Sampath, S., & Shukla, A.K. (2009). Hydrogel-polymer electrolytes for electrochemical capacitors: An overview. *Energy and Environmental Science*, 2, 55–67.
- Cowie, J.M.G., & Spence, G.H. (1999). Novel single ion, comb-branched polymer electrolytes. *Solid State Ionics*, 123, 233–242.
- Cui, Z.Y., Xu, Y.Y., Zhu, L.P., Wei, X.Z., Zhang, C.F., & Zhu, B.K. (2008). Preparation of PVDF/PMMA blend microporous membranes for lithium ion batteries via thermally induced phase separation process. *Materials Letter*, 62, 3809–3811.
- Damle, R., Kulkarni, P.N., & Bhat, S.V. (2008). Study of effect of composition, irradiation and quenching on ionic conductivity in $(\text{PEG})_x:\text{NH}_4\text{NO}_3$ solid polymer electrolyte. *Bulletin of Materials Science*, 31, 869–876.
- Deng, L., Zhang, G., Kang, L., Lei, Z., Liu, C., & Liu, Z.-H. (2013). Graphene/VO₂ hybrid material for high performance electrochemical capacitor. *Electrochimica Acta*, 112, 448–457.
- Ding, J., Chuy, C., & Holdcroft, S. (2002). Enhanced conductivity in morphologically controlled proton exchange membranes: Synthesis of macromonomers by SFRP and their incorporation into graft polymers. *Macromolecules*, 35, 1348–1355.
- Dasenbrock, C.O., Ridgway, T.H., Seliskar, C.J., & Heineman, W.R. (1998). Evaluation of the electrochemical characteristics of a poly(vinyl alcohol)/poly(acrylic acid) polymer blend. *Electrochimica Acta*, 43, 3497–3502.
- Eliasson, H., Albinsson, I., & Mellander, B.E. (2000). Conductivity and dielectric properties of AgCF_3SO_3 -PPG. *Materials Research Bulletin*, 35, 1053–1065.
- Emmenegger, C., Mauron, P., Sudan, P., Wenger, P., Hermann, V., Gallay, R., & Züttel, A. (2003). Investigation of electrochemical double-layer (EDLC) capacitors electrodes based on carbon nanotubes and activated carbon materials. *Journal of Power Sources*, 124, 321–329.
- Endo, M., Takeda, T., Kim, Y.J., Koshiba, K., & Ishii, K. (2001). High power electric double layer capacitor (EDLC's); from operating principle to pore size control in advanced activated carbons. *Carbon Science*, 1, 117–128.
- Fan, L., Nan, C.-W., & Zhao S. (2003). Effect of modified SiO_2 on the properties of PEO-based polymer electrolytes. *Solid State Ionics*, 164, 81–86.

- Fang, B., & Binder, L. (2006). A novel carbon electrode material for highly improved EDLC performance. *Journal of Physical Chemistry B*, 110, 7877–7882.
- Felipe, A. M. (2009). Preparation and characterisation of new materials for electrolytes used in Direct Methanol Fuel Cells (Doctoral dissertation, University of Aberdeen and Universitat Politècnica de València). Retrieved from <https://riunet.upv.es/bitstream/handle/10251/8327/tesisUPV3183.pdf?>
- Fenton, D.E., Parker, J.M., & Wright P.V. (1973). Complexes of alkali metal ions with poly(ethylene oxide). *Polymer*, 14, 589.
- Fish, D., Khan, I.M., & Smid, J. (1988). Conductivity of solid complexes of lithium perchlorate with poly{[ω -methoxyhexa(oxyethylene)ethoxy]methylsiloxane}. *Makromolekulare Chemie, Rapid Communications*, 7, 115–120.
- Frackowiak, E. (2007). Carbon materials for supercapacitor application. *Physical Chemistry Chemical Physics*, 9, 1774–1785.
- Frackowiak, E., & Béguin, F. (2001). Carbon materials for the electrochemical storage of energy in capacitors. *Carbon*, 39, 937–950.
- Galinski, M., Lewandowski, A., & Stepniaik, I. (2006). Ionic liquids as electrolytes. *Electrochimica Acta*, 51, 5567–5580.
- Ganesan, S., Muthuraaman, B., Mathew, V., Madhavan, J., Maruthamuthu, P., & Suthanthiraraj, S.A. (2008). Performance of a new polymer electrolyte incorporated with diphenylamine in nanocrystalline dye-sensitized solar cell. *Solar Energy Materials and Solar Cells*, 92, 1718–1722.
- Gray, F.M. (1991). Solid polymer electrolytes: Fundamentals of technological applications. United Kingdom: Wiley–VCH.
- Gray, F.M. (1997). Polymer electrolytes. United Kingdom: The Royal Society of Chemistry.
- Gedam, S.K., & Bhoga, S.S. (2010). Preparation and Characterization of Proton Conducting Polymer Electrolyte. *Integrated Ferroelectrics*, 119, 74–81.
- Ghosal, S., Ray, R., Ballabh, T.K., & Tarafdar, S. (2013). Study of diffusion and conduction in gamma irradiated solid polymer electrolytes by fractal model structure. *Indian Journal of Pure and Applied Physics*, 51, 324–327.
- Giffin, G.A., Piga, M., Lavina, S., Navarra, M.A., D'Epifanio, A., Scrosati, B., & Noto, V.D. (2012). Characterization of sulfated-zirconia/Nafion composite membranes for proton exchange membrane fuel cells. *Journal of Power Sources*, 198, 66–75.
- Gilman, J.W., VanderHart, D.L., & Kashiwagi, T. (1995). Thermal decomposition chemistry of poly(vinyl alcohol). In: G.L. Nelson (Ed.), *Fire and Polymers II: Materials and Test for Hazard Prevention* (pp. 161–184), Washington: American Chemical Society, ACS Symposium Series 599.

- Gu, H.-B., Kim, J.-U., Song, H.-W., Park, G.-C., & Park, B.-K. (2000). Electrochemical properties of carbon composite electrode with polymer electrolyte for electric double-layer capacitor. *Electrochimica Acta*, 45, 1533–1536.
- Guilherme, L.A., Borges, R.S., Moraes, E.M.S., Silva, G.G., Pimenta, M.A., Marletta, A., & Silva, R.A. (2007). Ionic conductivity in polyethylene-*b*-poly(ethylene oxide)/lithium perchlorate solid polymer electrolytes. *Electrochimica Acta*, 53, 1503–1511.
- Guirguis OW, Moselhey MTH. (2012). Thermal and structural studies of poly(vinyl alcohol) and hydroxypropyl cellulose blends. *Natural Science*; 4: 57–67.
- Hammami, R., Ahamed, Z., Charradi, K. Beji, Z., Assaker, I.B., Naceur, J.B., Auvity, B., Squadrito G., & Chtourou, R. (2013). Elaboration and characterization of hybrid polymer electrolytes Nafion–TiO₂ for PEMFCs. *International Journal of Hydrogen Energy*, 38, 11583–11590.
- Han, H.S., Kang, H.R., Kim, S.W., & Kim, H.T. (2002). Phase separated polymer electrolyte based on poly(vinyl chloride)/poly(ethyl methacrylate) blend. *Journal of Power Sources*, 112, 461–468.
- Hashmi, S.A., Latham, R.J., Linford, R.G., & Schlindwein, W.S. (1997a). Studies on all solid state electric double layer capacitors using proton and lithium ion conducting polymer electrolytes. *Journal of the Chemical Society, Faraday Transactions*, 93, 4177– 4182.
- Hashmi, S.A., Latham, R.J., Linford, R.G., & Schlindwein, W.S. (1997b). Polymer electrolyte based solid state redox supercapacitors with poly(3-methyl thiophene) and polypyrrole conducting polymer electrodes. *Ionics*, 3, 177–183.
- Hashmi, S.A., & Upadhyaya, H.M. (2002). Polypyrrole and poly(3-methyl thiophene)-based solid state redox supercapcitors using ion conducting polymer electrolyte. *Solid State Ionics*, 152–153, 883–889.
- Hema, M., Selvasekarapandian, S., Arunkumar, D., Sakunthala, A., & Nithya, H. (2009). FTIR, XRD and ac impedance spectroscopic study on PVA based polymer electrolyte doped with NH₄X (X=Cl, Br, I). *Journal of Non-Crystalline Solids*, 355, 84–90.
- Hirankumar, G., Selvasekarapandian, S., Bhuvaneswari, M.S., Baskaran, R., & Vijayakumar, M. (2004). AC Impedance Studies on Proton Conducting Polymer Electrolyte Complexes (PVA+CH₃COONH₄). *Ionics*, 10, 135–138.
- Hirankumar, G., Selvasekarapandian, S., Kuwata, N., Kawamura, J., & Hattori T. (2005). Thermal, electrical and optical studies on the poly(vinyl alcohol) based polymer electrolytes. *Journal of Power Sources*, 144, 262–267.
- Hu, Y., Wang, Z., Huang, X., & Chen, L. (2004). Physical and electrochemical properties of new binary room–temperature molten salt electrolyte based on LiBETI and acetamide. *Solid State Ionics*, 175, 277–280.

- Ibrahim, S., Yasin, S.M.M., Ahmad, R., & Johan, M.R. (2012). Conductivity, thermal and morphology studies of PEO based salted polymer electrolytes. *Solid State Science*, 14, 1111–1116.
- Imrie, C.T., & Ingram, M. (2000). Bridging the gap between polymer electrolytes and inorganic glasses: side group liquid crystal polymer electrolytes. *Molecular Crystals and Liquid Crystals*, 347, 199–210.
- Imrie, C.T., Inkster, R.T., Lu, Z., & Ingram, M. (2004). Discotic side group liquid crystal polymer electrolytes. *Molecular Crystals and Liquid Crystals*, 408, 33–43.
- Ishkov, A.V., & Sagalakov A.M. (2005). Effect of active fillers on properties of heat-resistant composites. *Russian Journal of Applied Chemistry*, 78, 1512–1516.
- Jain, N., Kumar, A., Chauhan, S., & Chauhan, S.M.S. (2005). Chemical and biochemical transformations in ionic liquids. *Tetrahedron*, 61, 1015–1060.
- Jannasch, P. (2000). Synthesis of novel aggregating comb-shaped polyethers for use as polymer electrolytes. *Macromolecules*, 33, 8604–8610.
- Jeon, J.-D., Kim, M.-J., & Kwak, S.-Y. (2006). Effect of addition of TiO₂ nanoparticles on mechanical properties and ionic conductivity of solvent-free polymer electrolytes based on porous P(VdF-HFP)/P(EO-EC) membranes. *Journal of Power Sources*, 162, 1304–1311.
- Jian-hua, T., Peng-fei, Gao, Zhi-yuan, Zhang, Wen-hui, Luo, & Zhong-qiang, Shan. (2008). Preparation and performance evaluation of a Nafion-TiO₂ composite membrane for PEMFCs. *International Journal of Hydrogen Energy*, 33, 5686–5690.
- Jiang, J., Gao, H., Li, Z., & Su, G. (2006). Gel polymer electrolytes prepared by in situ polymerization of vinyl monomers in room-temperature ionic liquid. *Reactive and Functional Polymers*, 66, 1141–1148.
- Jiang, J., Tan, G., Peng, S., Qian, D., Liu, J., Luo, D., & Liu, Y. (2013). Electrochemical performance of carbon-coated Li₃V₂(PO₄)₃ as a cathode material for asymmetric hybrid capacitors. *Electrochimica Acta*, 107, pp. 59–65.
- Johan, M.R., & Ting, L.M. (2011). Structural, thermal and electrical properties of nano manganese-composite polymer electrolytes. *International Journal of Electrochemical Science*, 6, 4737–4748.
- Johan, M.R., & Ibrahim, S. (2012). Optimization of neural network for ionic conductivity of nanocomposite solid polymer electrolyte system (PEO-LiPF₆-EC-CNT). *Communications of Nonlinear Science and Numerical Simulation*, 17, 329–340.
- Jung, S., Kim, D.W., Lee, S.D., Cheong, M., Nguyen, D.Q., Cho, B.W., & Kim, H.S. (2009). Fillers for solid-state polymer electrolytes: Highlight. *Bulletin Korean Chemical Society*, 30, 2355–2361.
- Karim, M.A., Song, M., Park, J.S., Kim, Y.H., Lee, M.J., Lee, J.W., Lee, C.W., Cho, Y.-R., Gal, Y.-S., Lee, J.H., & Jin, S.-H. (2010). Development of liquid crystal

- embedded in polymer electrolytes composed of click polymers for dye–sensitized solar cell applications. *Dyes and Pigments*, 86, 259–265.
- Ketabi, S., & Lian, K. (2013). Effect of SiO₂ on conductivity and structural properties of PEO–EMIHSO₄ polymer electrolyte and enabled solid electrochemical capacitors. *Electrochimica Acta*, 103, 174–178.
- Kim, B.C., Kim, S.J., Chung, J.K., Chen, J., Park, S.Y., & Wallace G.G. (2012). Charge storage in carbon nanotube–TiO₂ hybrid nanoparticles. *Synthetic Metal*, 162, 650–654.
- Kim, K.M., Park, N.–G, Ryu, K.S., & Chang, K.S. (2002). Characterization of poly(vinylidenefluoride–co–hexafluoropropylene)–based polymer electrolytes filled with TiO₂ nanoparticles. *Polymer*, 43, 3951–3957.
- Kim, K.S., Park, S.Y., Choi, S., & Lee, H. (2006). Ionic liquid–polymer gel electrolytes based on morpholinium salt and PVdF(HFP) copolymer. *Journal of Power Sources*, 155, 385–390.
- Kim, H.–K., Hur, S.–Y., Kang, W.–S., & Lee, G.–D. (2010). Homeotropic aligned liquid crystal molecules in dye–sensitized solar cells for high efficiency. *Journal of the Korean Physical Society*, 56, 1519–1522.
- Kim, S.H., Kim, J.Y., Kim, H.S., & Cho, H.N. (1999). Ionic conductivity of polymer electrolytes based on phosphate and polyether copolymers. *Solid State Ionics*, 116, 63–71.
- Kono, M., Furuta, K., Mori, S., Watanabe, M., & Ogata, N. (1993). Synthesis of polymer electrolytes based on poly[2–(2–methoxyethoxy)ethyl glycidyl ether] and their high ionic conductivity. *Polymers for Advanced Technologies*, 4, 85–91.
- Krawiec, W., Jr. Scanlon, L.G., Fellner, J.P., Vaia R.A., Vasudevan S., & Giannelis E.P. (1995). Polymer nanocomposites: A new strategy for synthesizing solid electrolytes for rechargeable lithium batteries. *Journal of Power Sources*, 54, 310–315.
- Kudo, T., & Fueki K. (1990). Solid State Ionics. Tokyo, Japan: Kodansha Ltd.
- Kuila, T., Acharya, H., Srivastava, S.K., Samantaray, B.K., & Kureti, S. (2007). Enhancing the ionic conductivity of PEO based plasticized composite polymer electrolyte by LaMnO₃ nanofiller. *Materials Science and Engineering B*, 137, 217–224.
- Kumar, M.S., & Bhat, D.K. (2009). Polyvinyl alcohol–polystyrene sulphonic acid blend electrolyte for supercapacitor application. *Physica B*, 404, 1143–1147.
- Kumar, Y., Hashmi, S.A., & Pandey, G.P. (2011). Lithium ion transport and ion–polymer interaction in PEO based polymer electrolyte plasticized with ionic liquid. *Solid State Ionics*, 201, 73–80.
- Kumar, Y., Pandey, G.P., & Hashmi, S.A. (2012). Gel polymer electrolyte based electrical double layer capacitors: Comparative study with multiwalled carbon

- nanotubes and activated carbon electrodes. *The Journal of Physical Chemistry C*, 116, 26118–26127.
- Lee, K.Y., Kim, C.S., Kim, H., Cheong, M., Mukherjee, D.K., & Jung, K.-D. (2010). Effects of halide anions to absorb SO₂ in ionic liquids. *Bulletin of Korean Chemical Society*; 31, 1937–1940.
- Lei, C., Wilson, P., & Lekakou, C. (2011). Effect of poly(3,4-ethylenedioxythiophene) (PEDOT) in carbon-based composite electrodes for electrochemical supercapacitors. *Journal of Power Sources*, 196, 7823–7827.
- Lewandowski, A., & Swiderska, A. (2003). Electrochemical capacitors with polymer electrolytes based on ionic liquid. *Solid State Ionics*, 161, 243–249.
- Liew, C.-W., Ong, Y.S., Lim, J.Y., Lim, C.S., Teoh, K.H., & Ramesh, S. (2013). Effect of ionic liquid on semi-crystalline poly(vinylidene fluoride-co-hexafluoropropylene) solid copolymer electrolytes. *International Journal of Electrochemical Science*, 8, 7779–7794.
- Liew, C.-W., & Ramesh, S. (2013). Studies on ionic liquid-based corn starch biopolymer electrolytes coupling with high ionic transport number. *Cellulose*, 20, 3227–3237.
- Liew, C.-W., & Ramesh, S. (2014). Comparing triflate and hexafluorophosphate anions of ionic liquids in polymer electrolytes for supercapacitor applications. *Materials*, 7, 4019–4033.
- Liew, C.-W., Ramesh, S., & Arof, A.K. (2014a). A novel approach on ionic liquid-based poly(vinyl alcohol) proton conductive polymer electrolytes for fuel cell applications. *International Journal of Hydrogen Energy*, 39, 2917–2928.
- Liew, C.-W., Ramesh, S., & Arof, A.K. (2014b). Good prospect of ionic liquid based-poly(vinyl alcohol) proton conducting polymer electrolytes for supercapacitors with excellent electrical, electrochemical and thermal properties. *International Journal of Hydrogen Energy*, 39, 2953–2963.
- Lu, Y., Wang, D.F., Li, T., Zhao, X.Q., Cao, Y.L., Yang, H.X., & Duan, Y.Y. (2009). Poly(vinyl alcohol)/poly(acrylic acid) hydrogel coatings for improving electrode–neural tissue interface. *Biomaterials*, 30, 4143–4151.
- Lue S. J., Lee, D.-T., Chen, J.-Y., Chiu, C.-H., Hu, C.-C., Jean, Y.C., & Lai, J.-Y. (2008). Diffusivity enhancement of water vapor in poly(vinyl alcohol)-fumed silica nano-composite membranes: Correlation with polymer crystallinity and free-volume properties. *Journal of Membrane Science*, 325, 831–839.
- Lyons, L.J., Southworth, B.A., Stam, D., Yuan, C. -H., & West, R. (1996). Polymer electrolytes based on polysilane comb polymers. *Solid State Ionics*, 91, 169–173.
- Marcilla, R., Alcaide, F., Sardon, H., Pomposo, J.A., Pozo-Gonzalo, C., & Mecerreyes, D. (2006). Tailor-made polymer electrolytes based upon ionic liquids and their application in all-plastic electrochromic devices. *Electrochemistry Communications*, 8, 482–488.

- McHattie, G.S., Imrie, C.T., & Ingram, M.D. (1998). Ionically conducting side chain liquid crystal polymer electrolytes. *Electrochimica Acta*, 43, 1151–1154.
- Mei, A., Wang, X.-L., Feng, Y.-C., Zhao, S.-J., Li, G.-J., Geng, H.-X., Lin, Y.-H., & Nan, C.-W. (2008). Enhanced ionic transport in lithium lanthanum titanium oxide solid state electrolyte by introducing silica. *Solid State Ionics*, 179, 2255–2259.
- Michael, M.S., Jacob, M.M.E., Prabaharan, S.R.S., & Radhakrishana, S. (1997). Enhanced lithium ion transport in PEO-based solid polymer electrolytes employing a novel class of plasticizers. *Solid State Ionics*, 98, 167–174.
- Mitra, S., Shukla, A.K., & Sampath, S. (2001). Electrochemical capacitors with plasticized gel-polymer electrolytes. *Journal of Power Sources*, 101, 213–219.
- Nanda, P., De, S.K., Manna, S., De, U., & Tarafdar, S. (2010). Effect of gamma irradiation on a polymer electrolyte: Variation in crystallinity, viscosity and ion-conductivity with dose. *Nuclear Instruments and Methods in Physics Research B*, 268, 73–78.
- Nicotera, I., Ranieri, G.A., Terenzi, M., Chadwick, A.V., & Webster, Mark I. (2002). A study of stability of plasticized PEO electrolytes. *Solid State Ionics*, 146, 143–150.
- Ning, W., Xingxiang, Z., Haihui, L., & Benqiao, H. (2009). 1-Allyl-3-methylimidazolium chloride plasticized-corn starch as solid biopolymer electrolytes. *Carbohydrate Polymers*, 76, 482–484.
- Nishimoto, A., Agehara, K., Furuya, N., Watanabe, T., & Watanabe, M. (1999). High ionic conductivity of polyether-based network polymer electrolytes with hyperbranched side chains. *Macromolecules*, 32, 1541–1548.
- Noto, V. D., Bettoli, M., Bassetto, F., Boaretto, N., Negro, E., Lavina, S., & Bertasi, F. (2012). Hybrid inorganic–organic nanocomposite polymer electrolytes based on Nafion and fluorinated TiO₂ for PEMFCs. *International Journal of Hydrogen Energy*, 37, 6169–6181.
- Osinska, M., Walkowiak, M., Zalewska, A., & Jesionowski, T. (2009). Study of the role of ceramic filler in composite gel electrolytes based on microporous polymer membranes. *Journal of Membrane Science*, 326, 582–588.
- Pahune, & Bharadwaj, S. (2011). Synthesis and Characterization of Proton Exchange Membrane for Fuel Cell Technology. *Archives of Applied Science Research*, 3, 78–82.
- Pandey, G. P., & Hashmi, S. A. (2009). Experimental investigations of an ionic–liquid–based, magnesium ion conducting, polymer gel electrolyte. *Journal of Power Sources*, 187, 627–634.
- Pandey, G.P., Hashmi, S.A., & Kumar, Y. (2010a). Performance studies of activated charcoal based electrical double layer capacitors with ionic liquid gel polymer electrolytes. *Energy Fuels*, 24, 6644–6652.

- Pandey, G.P., Kumar, Y., & Hashmi, S.A. (2010b). Ionic liquid incorporated polymer electrolytes for supercapacitor application. *Indian Journal of Chemistry B*, *49*, 743–751.
- Pandey, G.P., Kumar, Y., & Hashmi, S.A. (2011). Ionic liquid incorporated PEO based polymer electrolyte for electrical double layer capacitors: A comparative study with lithium and magnesium systems. *Solid State Ionics*, *190*, 93–98.
- Pandey, G.P., & Hashmi, S.A. (2013). Ionic liquid 1-ethyl-3-methylimidazolium tetracyanoborate-based gel polymer electrolyte for electrochemical capacitors. *Journal of Materials Chemistry A*, *1*, 3372–3378.
- Patel, M., Gnanavel, M., & Bhattacharyya, A.J. (2011). Utilizing an ionic liquid for synthesizing a soft matter polymer “gel” electrolyte for high rate capability lithium-ion batteries. *Journal of Materials Chemistry*, *21*, 17419–17424.
- Park, J.S., Kim, Y.H., Song, M., Kim, C.-H., Karim, M.A., Lee, J.W., Gal, Y.-S., Kumar, P., Kang, S.-W., & Jin, S.-H. (2010). Synthesis and photovoltaic properties of side-chain liquid-crystal click polymers for dye-sensitized solar-cells Application. *Macromolecular Chemistry and Physics*, *211*, 2464–2473.
- Peng, C., Zhang, S., Jewell, D., & Chen, G.Z. (2008). Carbon nanotube and conducting polymer composites for supercapacitors. *Progress in Natural Science*, *18*, 777–788.
- Pradhan, D.K., Samantaray, B.K., Choudhary, R.N.P., & Thakur, A.K. (2005). Effect of plasticizer on structure–property relationship in composite polymer electrolytes. *Journal of Power Sources*, *139*, 384–393.
- Polu, A.R., & Kumar, R. (2013). Effect of Al₂O₃ ceramic filler on PEG-based composite polymer electrolytes for magnesium batteries. *Advanced Materials Letter*, *4*, 543–547.
- Portet, C., Taberna, P.L., Simon, P., & Flahaut, E. (2005). Influence of carbon nanotubes addition on carbon–carbon supercapacitor performances in organic electrolyte. *Journal of Power Sources*, *139*, 371–378.
- Qiao, J., Okada, T., & Ono, H. (2009). High molecular weight PVA-modified PVA/PAMPS proton-conducting membranes with increased stability and their application in DMFCs. *Solid State Ionics*, *180*, 1318–1323.
- Quartarone, E., Mustarelli, P., & Magistris, A. (1998). PEO-based composite polymer electrolytes. *Solid State Ionics*, *110*, 1–14.
- Quartarone, E., and Mustarelli P. (2011). Electrolytes for solid-state lithium rechargeable batteries: Recent advances and perspectives. *Chemical Society Review*, *40*, 2525–2540.
- Raghava, P., Zhao, X., Kim, J.-K., Manuel, J., Chauhan, G.S., Ahn, J.-H., & Nah, C. (2008). Ionic conductivity and electrochemical properties of nanocomposite polymer electrolytes based on electrospun poly(vinylidenefluoride)-co-

- hexafluoropropylene) with nano-sized ceramic fillers. *Electrochimica Acta*, 54, 228–234.
- Raghavan, P., Zhao, X., Manuel, J., Chauhan, G.S., Ahn, J.H., Ryub, H.S., Ahn, H.J., Kim, K.W., Nah, C. (2010). Electrochemical performance of electrospun poly(vinylidene fluoride–co–hexafluoropropylene)–based nanocomposite polymer electrolytes incorporating ceramic fillers and room temperature ionic liquid. *Electrochimica Acta*, 55, 1347–1354.
- Raghavan, V. (2004). Materials Science and Engineering: A First Course (5th ed.). New Delhi, India: Prentice Hall of India Private Limited.
- Rahaman, M.H.A., Khandaker, M.U., Khan, Z.R., Kufian, M.Z., Noor I.S.M., & Arof , A.K. (2014). Effect of gamma irradiation on poly(vinyledene difluoride)–lithium bis(oxalato)borate electrolyte. *Physical Chemistry Chemical Physics*, 16, 11527–11537.
- Rajendran, S., Uma, T., & Mahalingam T. (2000). Conductivity studies on PVC±PMMA±LiAsF₆±DBP polymer blend electrolyte. *European Polymer Journal*, 36, 2617–2620.
- Rajendran, S., Mahendran, O., & Kannan, R. (2002). Characterisation of [(1-x) PMMA–x PVdF] polymer blend electrolyte with Li⁺ ion. *Fuel*, 81, 1077–1081.
- Rajendran, S., Sivakumar, M., & Subadevi, R. (2004a). Investigations on the effect of the various plasticizers in PVA–PMMA solid polymer blend electrolytes. *Materials Letter*, 58, 641–649.
- Rajendran, S., Sivakumar, M., & Subadevi, R. (2004b). Li–ion conduction of plasticized PVA solid polymer electrolytes complexed with various lithium salts. *Solid State Ionics*, 167, 335–339.
- Rajendran, S., Sivakumar, M., Subadevi, R., & Nirmala, M. (2004c). Characterization of PVA–PVdF based solid polymer blend electrolytes. *Physica B: Condensed Matter*, 348, 73–78.
- Rajendran, S., & Sivakumar, P. (2008). An investigation of PVdF/PVC–based blend electrolytes with EC/PC as plasticizers in lithium battery applications. *Physica B: Condensed Matter*, 403, 509–516.
- Rajendran, S., Prabhu, M.R., & Rani, M.U. (2008). Ionic conduction in poly(vinyl chloride)/poly(ethyl methacrylate)–based polymer blend electrolytes complexed with different lithium salts. *Journal of Power Sources*, 180, 880–883.
- Ramesh, S., & Arof, A.K. (2001). Ionic conductivity studies of plasticized poly(vinyl chloride) polymer electrolytes. *Materials Science and Engeneering B*, 85, 11–15.
- Ramesh, S., Liew, C.–W., Morris, E., & Durairaj, R. (2010). Effect of PVC on ionic conductivity, crystallographic structural, morphological and thermal characterizations in PMMA–PVC blend–based polymer electrolytes, *Thermochimica Acta*, 511, 140–146.

- Ramesh, S., & Chao, L.Z. (2011). Investigation of dibutyl phthalate as plasticizer on poly(methyl methacrylate)–lithium tetraborate based polymer electrolytes. *Ionics*, 17, 29–34.
- Ramesh, S., Liew, C.-W., & Ramesh, K. (2011a). Evaluation and investigation on the effect of ionic liquid onto PMMA–PVC gel polymer blend electrolytes. *Journal of Non-Crystalline Solids*, 357, 2132–2138.
- Ramesh, S., Liew, C.-W., & Arof, A.K. (2011b). Ion conducting corn starch biopolymer electrolytes doped with ionic liquid 1-butyl-3-methylimidazolium hexafluorophosphate. *Journal of Non-Crystalline Solids*, 357, 3654–3660.
- Ramesh, S., Liew, C.-W., Lau, P.Y., & Ezra, M. (2012). Characterization of High Molecular Weight Poly (vinyl chloride)–Lithium Tetraborate Electrolyte Plasticized by Propylene Carbonate. In Mohammad Luqman (Ed.), Recent Advances in Plasticizers (pp. 165–190). Crotia, Rijeka: In Tech.
- Ramesh, S., Liew, C.-W., & Ramesh, K. (2013). Ionic conductivity, Dielectric behavior and HATR–FTIR analysis onto PMMA–PVC binary solid polymer blend electrolytes. *Journal of Applied Polymer Science*, 127, 2380–2388.
- Ramesh, S., & Liew, C.-W. (2013). Development and investigation on PMMA–PVC blend–based solid polymer electrolytes with LiTFSI as dopant salt. *Polymer Bulletin*, 70, 1277–1288.
- Reiter, J., Vondrak, J. Michalek, J., & Micka, Z. (2006). Ternary polymer electrolytes with 1-methylimidazole based ionic liquids and aprotic solvents. *Electrochimica Acta*, 52, 1398–1408.
- Saikia, D., Chen-Yang, Y.W., Chen, Y.T., Li, Y.K., & Lin, S.I. (2009). ^7Li NMR spectroscopy and ion conduction mechanism of composite gel polymer electrolyte: A comparative study with variation of salt and plasticizer with filler. *Electrochimica Acta*, 54, 1218–1227.
- Samir, M. A. S. A., Alloin, F., Sanchez, J.-Y., & Dufresne, A. (2005). Nanocomposite polymer electrolytes based on poly(oxyethylene) and cellulose whiskers. *Polímeros: Ciência e Tecnologia*, 15, 109–113.
- Sekhon, S.S., Krishnan, P., Singh, B., Yamada, K., & Kim, C.S. (2006). Proton conducting membrane containing room temperature ionic liquid. *Electrochimica Acta*, 52, 1639–1644.
- Seki, S., Susan, M.A.H., Kaneko, T., Tokuda, H., Noda, A., & Watanabe, M. (2005). Distinct difference in ionic transport behavior in polymer electrolytes depending on the matrix polymers and incorporated salts. *The Journal of Physical Chemistry B*, 109, 3886–3892.
- Selvasekarapandian, S., Hirankumar, G., Kawamura, J., Kuwata, N., & Hattori, T. (2005). ^1H solid state NMR studies on the proton conducting polymer electrolytes. *Materials Letter*, 59, 2741–2745.

- Shao, Y., Yi, Z., Lu, F., Deng, F., & Li, B. (2012). Poorly crystalline Ru_{0.4}Sn_{0.6}O₂ nanocomposites coated on Ti substrate with high pseudocapacitance for electrochemical supercapacitors. *Advances in Chemical Engineering and Science*, 2, 118–122.
- Shi, F., & Deng, Y. (2005). Abnormal FT-IR and FT-Raman spectra of ionic liquids confined in nano-porous silica gel. *Spectrochimica Acta Part A*, 62, 239–244.
- Singh, P.K., Bhattacharya, B., Nagarale, R.K., Kim, K.W., & Rhee, H.W. (2010). Synthesis, characterization and application of biopolymer-ionic liquid composite membranes. *Synthetic Metals*, 160, 139–142.
- Singh, P.K., Kim, K.-W., & Rhee, H.-W. (2009). Development and characterization of ionic liquid doped solid polymer electrolyte membranes for better efficiency. *Synthetic Metals*, 159, 1538–1541.
- Sinha, M., Goswami, M.M., Mal, D., Middya, T.R., Tarafdar, S., De, U., Chaudhuri, S.K., & Das D. (2008). Effect of gamma irradiation on the polymer electrolyte PEO-NH₄ClO₄. *Ionics*, 14, 323–327.
- Sirisopanaporn, C., Fernicola, A., & Scrosati, B. (2009). New, ionic liquid-based membranes for lithium battery application. *Journal of Power Sources*, 186, 490–495.
- Sivakumar, M., Subadevi, R., Rajendran, S., Wu, H.-C., & Wu N.-L. (2007). Compositional effect of PVdF-PEMA blend gel polymer electrolytes for lithium polymer batteries. *European Polymer Journal*, 43, 4466–4473.
- Smart, L. & Moore, E. A. (2005). Solid State Chemistry: An introduction. New York: Taylor & Francis.
- Song, Y., Wu, S., Jing, X., Sun, J., & Chen D. (1997). Thermal, mechanical and ionic conductive behaviour of gamma-radiation induced PEO/PVDF(SIN)-LiClO₄ polymer electrolyte system. *Radiation Physics and Chemistry*, 49, 541–546.
- Soo, P.P., Huang, B., Jang, Y., Chiang, Y.-M., Sadoway, D.R., & Mayes, A.M. (1999). Rubbery block copolymer electrolytes for solid-state rechargeable lithium batteries. *Journal of the Electrochemical Society*, 146, 32–37.
- Souquet, J-L., Nascimento, M.L.F., & Rodrigues, A.C.M. (2010). Charge carrier concentration and mobility in alkali silicates. *The Journal of Chemical Physics*, 132, 034704-1–034704-7.
- Sriupayo, J., Supaphol, P., Blackwell, J., & Rujiravanit, R. (2005). Preparation and characterization of α -chitin whisker-reinforced poly(vinyl alcohol) nanocomposite films with or without heat treatment. *Polymer*, 46, 5637–5644.
- Steven, M.P. (1999). Polymer Chemistry: An Introduction. New York: Oxford University Press, Inc.
- Stephan, A.M. (2006). Review on gel polymer electrolytes for lithium batteries. *European*

- Stephan, A.M., Kumar, T.P., Renganathan, N.G., Pitchumani, S., Thirunakaran, R., & Muniyandi, N. (2000). Ionic conductivity and FT-IR studies on plasticized PVC/PMMA blend polymer electrolytes. *Journal of Power Sources*, 89, 80–87.
- Stephan, A.M. & Nahm, K.S. (2006). Review on composite polymer electrolytes for lithium batteries. *Polymer*, 47, 5952–5964.
- Stephan, A.M., Saito, Y., Muniyandi, N., Renganathan, N.G., Kalyanasundaram, S., & Elizabeth, R.N. (2002). Preparation and characterization of PVC/PMMA blend polymer electrolytes complexed with LiN(CF₃SO₂)₂. *Solid State Ionics*, 148, 467–473.
- Sukeshini, A.M., Kulkarni, A.R., & Sharma, A. (1998). PEO based solid polymer electrolyte plasticized by dibutyl phthalate. *Solid State Ionics*, 113–115, 179–186.
- Sun, Z., & Yuan, A. (2009). Electrochemical performance of nickel hydroxide/activated carbon supercapacitors using a modified polyvinyl alcohol based alkaline polymer electrolyte. *Chinese Journal of Chemical Engineering*, 17, 150–155.
- Suthanthiraraj, S.A., Sheeba, D.J., & Paul, B.J. (2009). Impact of ethylene carbonate on ion transport characteristics of PVdF–AgCF₃SO₃ polymer electrolyte system. *Materials Research Bulletin*, 44, 1534–1539.
- Takahashi, T. (1989). Recent trends in high conductivity solid electrolytes and their applications: An overview. In A.L. Laskar & S. Chandra (Eds.), Superionic solids and solid electrolytes recent trends (pp.1–36). United State, San Diego: Academic Press Inc.
- Tarafdar, S., De, S.K., Manna S., De, U., & Nanda P. (2010). Variation in viscosity and ion conductivity of a polymer–salt complex exposed to gamma irradiation. *Pramana–Journal of Physics*, 74, 271–279.
- Tong, Y., Chen, L., Chen, Y., & He, X. (2012). Enhanced conductivity of novel star branched liquid crystalline copolymer based on poly(ethylene oxide) for solid polymer electrolytes. *Applied Surface Science*, 258, 10095–10103.
- Vijayakumar, G., Lee, M.J., Song, M., & Jin, S.-H. (2009). New liquid crystal–embedded PVdF–co–HFP–based polymer electrolytes for dye–sensitized solar cell applications. *Macromolecular Research*, 17, 963–968.
- Vioux, A., Viau, L., Volland, S., & Bideau J.L. (2010). Use of ionic liquid in sol–gel; ionogels and applications., *Comptes Rendus Chimie*, 13, 242–255.
- Wang, G.–X., Zhang, B.–L., Yu, Z.–L., & Qu, M.–Z. (2005). Manganese oxide/MWNTs composite electrodes for supercapacitors. *Solid State Ionics*, 176, 1169–1174.
- Wang, L., Yang, W., Wang. J., & Evans. D.G. (2009). New nanocomposite polymer electrolyte comprising nanosized ZnAl₂O₄ with a mesopore network and PEO–LiClO₄. *Solid State Ionics*, 180, 392–397.

- Wang, W., Guo, S., Lee, I., Ahmed, K., Zhong, J., Favors, Z., Zaera, F., Ozkan, M. & Ozkan, C.S. (2014). Hydrous ruthenium oxide nanoparticles anchored to graphene and carbon nanotube hybrid foam for supercapacitors. *Scientific Reports*, *4*, 4452–4460.
- Watanabe, M., Nagano, S., Sanui, K., & Ogata, N. (1986). Ion conduction mechanism in network polymers from poly(ethylene oxide) and poly(propylene oxide) containing lithium perchlorate. *Solid State Ionics*, *18&19*, 338–342.
- West, A.R. (1999). Basic Solid State Chemistry. West Sussex: John Wiley & Sons.
- Wright, V.P. (1975). Electrical conductivity in ionic complexes of poly(ethylene oxide). *British Polymer Journal*, *7*, 319–327.
- Wright, V.P. (1998). Polymer electrolytes—the early days. *Electrochimica Acta*, *43*, 1137–1143.
- Wu, F., Feng, T., Bai, Y., Wu, C., Ye, L., & Feng, Z. (2009). Preparation and characterization of solid polymer electrolytes based on PHEMO and PVDF–HFP. *Solid State Ionics*, *180*, 677–680.
- Wu, Z.–S., Parvez, K., Feng, X., & Müllen, K. (2013). Graphene–based in–plane micro–supercapacitors with high power and energy densities. *Nature Communications*, *4*, 1–8.
- Xi, J., Qiu, X., Zheng, S., & Tang X. (2005). Nanocomposite polymer electrolyte comprising PEO/LiClO₄ and solid super acid: Effect of sulphated–zirconia on the crystallization kinetics of PEO. *Polymer*, *46*, 5702–5706.
- Yang, C.–C., Lin, C. –T., & Chiu, S.–J. (2008). Preparation of the PVA/HAP composite polymer membrane for alkaline DMFC application. *Desalination*, *233*, 137–146.
- Yang, C.C., & Wu, G.M. (2009). Study of microporous PVA/PVC composite polymer membrane and its application to MnO₂ capacitors. *Materials Chemistry and Physics*, *114*, 948–955.
- Yang, C.–C., Chien, W.–C., & Li, Y.J. (2010). Direct methanol fuel cell based on poly(vinyl alcohol)/titanium oxide nanotubes/poly(styrene sulfonic acid) (PVA/nt–TiO₂/PSSA) composite polymer membrane. *Journal of Power Sources*, *195*, 3407–3415.
- Yang, C.–M., Kim, H.–S., Na, B.–K., Kum, K.–S., & Cho, B.W. (2006). Gel–type polymer electrolytes with different types of ceramic fillers and lithium salts for lithium–ion batteries. *Journal of Power Sources*, *156*, 574–580.
- Yang, J.M., Chiang, C.Y., Wang, H.Z., & Yang, C.C. (2009). Two step modification of poly(vinyl alcohol) by UV radiation with 2–hydroxyl ethyl methacrylate and sol–gel process for the application of polymer electrolyte membrane. *Journal of Membrane Science*, *341*, 186–194.

- Yang, Y., Zhou, C.H., Xu, S., Hu, H., Chen, B. L., Zhang, J., Wu, S.J., Liu, W., & Zhao, X. Z., et al. (2008). Improved stability of quasi-solid-state dye sensitized solar cell based on poly(ethylene oxide)–poly(vinylidene fluoride) polymer-blend electrolytes. *Journal of Power Sources*, 185, 1492–1498.
- Yang, Y., Guo, X.-Y., & Zhao, X.-Z. (2012). A novel composite polysaccharide/inorganic oxide electrolyte for high efficiency quasi-solid-state dye-sensitized solar cell. *Procedia Engineering*, 36, 13–18.
- Ye, Y.-S., Rick, J., & Hwang, B.-J. (2013). Ionic liquid polymer electrolytes. *Journal of Materials Chemistry A*, 1, 2719–2743.
- Yu, H., Wu, J., Fan, L., Lin, Y., Xu, K., Tang, Z., Cheng, C., Tang, S., Lin, J., Huang, M., & Lan, Z. (2012). A novel redox-mediated gel polymer electrolyte for high-performance supercapacitor. *Journal of Power Sources*, 198, 402–407.
- Yuan, F., Chen, H.-Z., Yang, H.-Y., Li, H.-Y., & Wang, M. (2005). PAN–PEO solid polymer electrolytes with high ionic conductivity. *Materials Chemistry and Physics*, 89, 390–394.
- Zapata, P., Lee, J.-H., & Meredith, J.C. (2012). Composite proton exchange membranes from zirconium-based solid acids and PVDF/acrylic polyelectrolyte blends. *Journal of Applied Polymer Science*, 124, E241–E 250.
- Zhang, J., Huang, X., Wei, H., Fu, J., Huang, Y., & Tang, X. (2010). Novel PEO-based solid composite polymer electrolytes with inorganic–organic hybrid polyphosphazene microspheres as fillers. *Journal of Applied Electrochemistry*, 40, 1475–1481.
- Zhang, P., Yang, L.C., Li, L.L., Ding, M.L., Wu, Y.P., & Holze, R. (2011a). Enhanced electrochemical and mechanical properties of P(VDF–HFP)-based composite polymer electrolytes with SiO₂ nanowires. *Journal of Membrane Science*, 379, 80–85.
- Zhang, Z., Liu, W., Xie, H., & Zhao, Z.K. (2011b). An unexpected reaction between 5-hydroxymethylfurfural and imidazolium-based ionic liquids at high temperatures. *Molecules*, 16, 8463–8474.
- Zhao, X., Xiong, H.-M., Xu, Wei, Chen, J.-S. (2003). 12-Tungstosilicic acid doped polyethylene oxide as a proton conducting polymer electrolyte. *Materials Chemistry and Physics*, 80, 537–540.