

## LIST OF PUBLICATIONS AND PAPERS PRESENTED

### Publications

#### Academic Journals

1. **Chiam–Wen Liew**, S. Ramesh, & A. K. Arof. (2014). Characterization of Ionic Liquid Added Poly(vinyl alcohol)–based Proton Conducting Polymer Electrolytes and Electrochemical Studies on the Supercapacitors. *International Journal of Hydrogen Energy*, 40, 852–862.
2. **Chiam–Wen Liew**, S. Ramesh, & A.K. Arof. (2014). Investigation of Ionic Liquid–based Poly(vinyl alcohol) Proton Conductor for Electrochemical Double Layer Capacitor. *High Performance Polymers*, 26, 637–640.
3. **Chiam–Wen Liew**, & S. Ramesh. (2014). Comparing Triflate and Hexafluorophosphate anions of Ionic Liquid in Polymer Electrolytes for Supercapacitor Applications. *Materials*, 7, 4019–4033.
4. **Chiam–Wen Liew**, S. Ramesh, & A.K. Arof. (2014). 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 (*ISI–Cited Publication*).
5. **Chiam–Wen Liew**, S. Ramesh, & A.K. Arof. (2014). Good prospect of ionic liquid based–poly(vinyl alcohol) polymer electrolytes for supercapacitors with excellent electrical, electrochemical and thermal properties. *International Journal of Hydrogen Energy*, 39, 2953–2963.
6. **Chiam–Wen Liew**, & S. Ramesh. (2013). Studies on ionic liquid–based corn starch biopolymer electrolytes coupling with high ionic transport number. *Cellulose*, 20, 3227–3237.
7. S. Ramesh, & Chiam–Wen Liew. (2013). Dielectric and FTIR studies on blending of [xPMMA–(1–x)PVC] with LiTFSI. *Measurement: Journal of the International Measurement Confederation*, 46, 1650–1656.
8. S. Ramesh, **Chiam–Wen Liew**, & K. Ramesh. (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.
9. S. Ramesh, & **Chiam–Wen Liew**. (2013). Development and investigation on PMMA–PVC blend-based solid polymer electrolytes with LiTFSI as dopant salt, *Polymer Bulletin*, 70, 1277–1288.
10. **Chiam–Wen Liew**, S. Ramesh, & R. Durairaj. (2012). Impact of Low Viscosity Ionic Liquid on PMMA–PVC–LiTFSI Polymer Electrolytes Based on Ac–impedance, Dielectric Behavior and HATR–FTIR Characteristics, *Journal of Materials Research*, 27, 2996–3004.
11. S. Ramesh, & **Chiam–Wen Liew**. (2012). Tailor–made fumed silica-based nano-composite polymer electrolytes consisting of BmImTFSI ionic liquid. *Iranian Polymer Journal*, 21, 273–281.
12. S. Ramesh, & **Chiam–Wen Liew**. (2012). Exploration on nano–composite fumed silica–based composite polymer electrolytes with doping of ionic liquid. *Journal of Non–Crystalline Solids*, 358, 931–940.
13. **Chiam–Wen Liew**, S. Ramesh, K. Ramesh, & A.K. Arof. (2012). Preparation and characterization of lithium ion conducting ionic liquid–based biodegradable corn starch polymer electrolytes. *Journal of Solid State Electrochemistry*, 16, 1869–1875.

14. S. Ramesh, & **Chiam–Wen Liew**. (2012). Rheological characterizations of ionic liquid–based gel polymer electrolytes and fumed silica–based composite polymer electrolytes. *Ceramics International*, 38, 3411–3417.
15. S. Ramesh, **Chiam–Wen Liew**, & A. K. Arof. (2011). Ion conducting corn starch biopolymer electrolytes doped with ionic liquid 1–butyl–3–methylimidazolium hexafluorophosphate. *Journal of Non–Crystalline Solids*, 357, 3654–3660.
16. S. Ramesh, **Chiam–Wen Liew**, & K. Ramesh. (2011). Evaluation and investigation on the effect of ionic liquid onto PMMA–PVC gel polymer blend electrolytes. *Journal of Non–Crystalline Solids*, 357, 2132–2138.
17. S. Ramesh, Tang Sze Yin, & **Chiam–Wen Liew**. (2011). Effect of Dibutyl Phthalate as Plasticizer on High Molecular Weight Poly (vinyl chloride) Lithium Tetraborate Based Solid Polymer Electrolytes. *Ionics*, 17, 705–713.
18. S. Ramesh, **Chiam–Wen Liew**, Ezra Morris, & R. Durairaj. (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.
19. S. Ramesh, & **Liew Chiam Wen**. (2010). Investigation on the effects of addition of SiO<sub>2</sub> nanoparticles on ionic conductivity, FTIR, and thermal properties of nanocomposite PMMA–LiCF<sub>3</sub>SO<sub>3</sub>–SiO<sub>2</sub>. *Ionics*, 16, 255–262.

#### Chapter in Book

Ramesh T. Subramaniam, **Chiam–Wen Liew**, Pui Yee Lau, Morris Ezra (2012), Characterization of High Molecular Weight Poly (vinyl chloride)–Lithium Tetraborate Electrolyte Plasticized by Propylene Carbonate, Recent Advances in Plasticizers, Mohammad Luqman (Ed.) pp. 165–190, ISBN 979–953–307–488–6.

#### **PAPERS PRESENTED**

##### Conferences

1. **Chiam–Wen Liew**, S. Ramesh and A. K. Arof. Investigation of Ionic Liquid–based Poly(vinyl alcohol) Proton Conductor for Electrochemical Double Layer Capacitor. International Conference on Science and Engineering (ICSEM), Sharda University, Greater Noida, India, 6–8<sup>th</sup> January 2014.
2. **Chiam–Wen Liew**, S. Ramesh and A. K. Arof. Characterization of Ionic Liquid–based PVA Proton Conducting Polymer Electrolytes and Electrochemical Studies on the Supercapacitors using Activated Carbon–Super P–Carbon Nanotubes Electrodes. International Conference on Materials for Advanced Technologies (ICMAT), Suntec, Singapore, 30<sup>th</sup> June –5<sup>th</sup> July 2013.
3. **Chiam–Wen Liew**, S. Ramesh and A. K. Arof. Investigation of Ionic Liquid–doped Proton Conducting Polymer Electrolytes for Carbon–based Supercapacitors. International Conference on Materials for Advanced Technologies (ICMAT), Suntec, Singapore, 30<sup>th</sup> June –5<sup>th</sup> July 2013.
4. **Chiam–Wen Liew**, S. Ramesh and A. K. Arof. Comparing Triflate and Hexafluorophosphate Anions of Ionic Liquid in Polymer Electrolytes for Supercapacitor Applications. 19<sup>th</sup> Conference on Solid State Ionics, Kyoto, Japan, 2<sup>nd</sup> – 7<sup>th</sup> June 2013.

5. **Chiam–Wen Liew**, S. Ramesh and A. K. Arof. Ionic Liquid–based Poly(vinyl alcohol) (PVA) Proton Conductors for Supercapacitors Application, Physics Colloquium 2013, University of Malaya (UM), Malaysia, 4<sup>th</sup>–5<sup>th</sup> June 2013.
6. **Chiam–Wen Liew**, S. Ramesh and A. K. Arof. Preparation and Characterization of Poly(vinyl alcohol)–based Proton Conductors in Supercapacitor Application, 4<sup>th</sup> International Conference on Functional Materials and Devices (ICFMD), Penang, Malaysia, 8<sup>th</sup>–11<sup>th</sup> April 2013.
7. **Chiam–Wen Liew**, S. Ramesh and A. K. Arof. Electrical, Electrochemical and Thermal Properties of Corn Starch–Based Biopolymer Electrolytes with Doping of Environmentally Friendly Ionic Liquid for Supercapacitor, 8th Mathematics and Physical Sciences Graduate Congress, Chulalongkorn University, Bangkok, Thailand, 8<sup>th</sup>–10<sup>th</sup> December 2012.
8. S.Ramesh, **Chiam–Wen Liew**, A. K. Arof. Good Prospect of Ionic Liquid based–Poly(vinyl alcohol) Proton Conducting Polymer Electrolytes, XIII International Symposium on Polymer Electrolytes (ISPE–13), Selfoss, Iceland, 26<sup>th</sup>–31<sup>st</sup> August 2012.
9. S.Ramesh, **Chiam–Wen Liew**, A. K. Arof. Electrochemical and Thermal Properties of Corn Starch–Based Biopolymer Electrolytes with Doping of Environmentally Friendly Ionic Liquid, 63rd Annual Meeting of the International Society of Electrochemistry (Electrochemistry for Advanced Materials, Technologies and Instrumentation), Prague, Czech Republic, 19<sup>th</sup>–24<sup>th</sup> August 2012.
10. **Chiam–Wen Liew**, S. Ramesh, A. K. Arof. The Effect of Room Temperature Ionic Liquid on Corn Starch Based Polymer Electrolytes, University of Malaya Researchers Conference 2012, University of Malaya, 23<sup>rd</sup>–24<sup>th</sup> April 2012.
11. **Chiam–Wen Liew**, S. Ramesh and A. K. Arof. Rheological properties of ionic liquid based gel polymer electrolytes and nanosized composite polymer electrolytes, 7th Mathematics and Physical Sciences Graduate Congress, Singapore, 12<sup>th</sup>–14<sup>th</sup> December 2011.
12. S. Ramesh and **Chiam–Wen Liew**. Tailor–made fumed silica based nano–composite gel polymer electrolytes consisting of environmentally friendly 1–butyl–3–methylimidazolium bis(trifluoromethylsulfonyl imide) ionic liquid, 43rd IUPAC World Chemistry Congress, Puerto Rico, USA, 30<sup>th</sup> July–7<sup>th</sup> August 2011.
13. S. Ramesh, **Chiam–Wen Liew**, K. Ramesh and A. K. Arof. Electrical, Structural and Morphological Studies on Thermoplastic Corn Starch based Polymer Electrolytes Doped with Low Viscosity Ionic Liquid, 18th Conference on Solid State Ionics, Warsaw, Poland, 3<sup>rd</sup>–8<sup>th</sup> July 2011.
14. **Chiam–Wen Liew**, S. Ramesh, K. Ramesh and A. K. Arof. Preparation and Characterization of Lithium Ion Conducting Ionic Liquid–based Biodegradable Corn Starch Polymer Electrolytes, International Conference on Materials for Advanced Technologies (ICMAT), Suntec, Singapore, 26<sup>th</sup> June – 1<sup>st</sup> July 2011.
15. **Chiam–Wen Liew**, S. Ramesh and R. Durairaj. Impact of Low Viscosity Ionic Liquid on PMMA–PVC–LiTFSI Polymer Electrolytes Based on Ac–impedance, Dielectric Behavior and HATR–FTIR Characteristics, International Conference on Materials for Advanced Technologies (ICMAT), Suntec, Singapore, 26<sup>th</sup> June – 1<sup>st</sup> July 2011.

## APPENDIX

The ionic conductivity of polymer electrolytes is determined from Nyquist EIS plot using Equation 3.1. Figure A shows the typical impedance plot of polymer electrolyte. The series resistance ( $R_s$ ) arising from the connector is present in the figure as the semicircle does not start from origin at high frequency end. The intercept of spike and semicircle gives rise to total resistance of  $R_s$  and bulk resistance ( $R_b$ ). The  $R_b$  is calculated by minus the total resistance of  $R_s$  and bulk resistance ( $R_b$ ) with  $R_s$ .

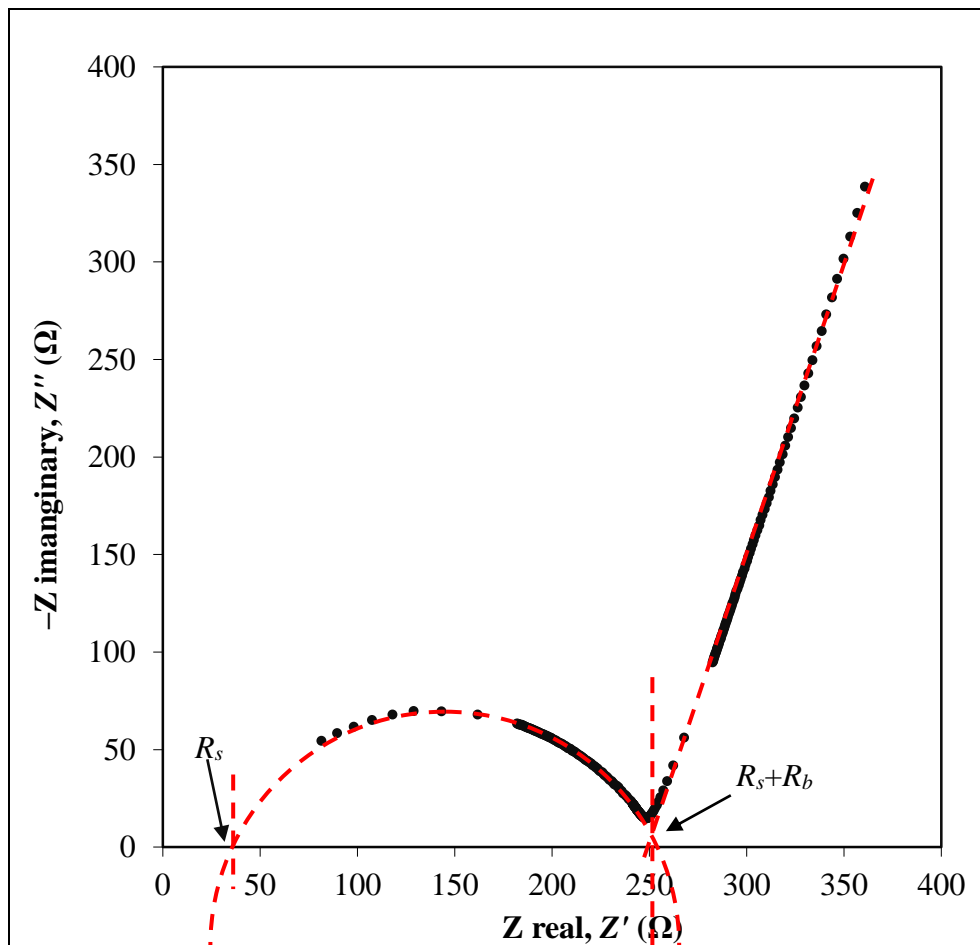


Figure A: Nyquist impedance plot of VH 0 at room temperature.

$$R_b = 253.8 \Omega - 38.5 \Omega$$

$$= 215.3 \Omega$$