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Comparative study of PBI Cross Linked Utilizing Agents of Varying Steric Configurations

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The high thermal and chemical stability of poly[2,2'-(*m*-phenylene)-5,5' bibenzimidazole] (PBI) accounts for its wide spread use in high temperature polymer electrolyte membrane fuel cells (HT-PEMFC). By doping the membrane with phosphoric acid (PA) ionic conductivity is obtained. Thus conductivity is dependent on the amount of PA present within the membrane. However mechanical properties are significantly reduced due to the plasticizing effect shown by PA [1]. This effect is due to PBI chain displacement. This effect can be lessened by use of cross linking [2-4]. This can be obtained using ionic or covalent cross linking. When considering such, little attention is devoted to explore the effect of the sterical configuration of the cross linking agent.

In this contribution three different cross linking agents are utilized to evaluate how these affects final membrane properties.

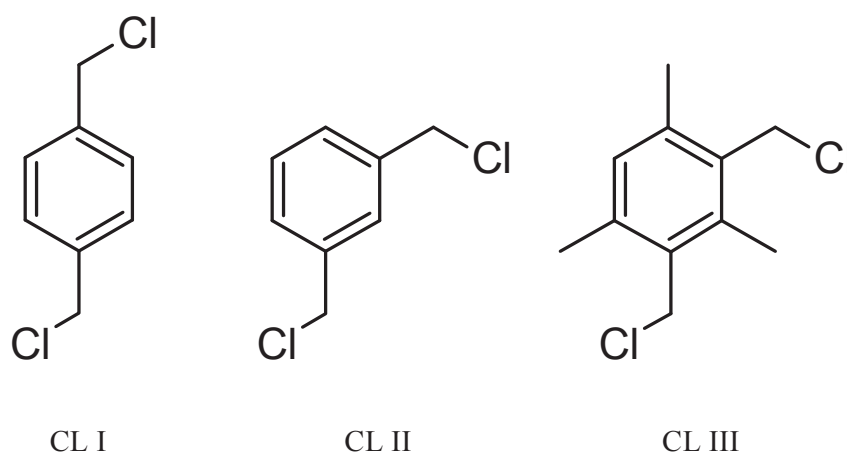


Figure 1. Different cross linkers utilized in this work.

References

- [1] Q. Li, J. O. Jensen, R. F. Savinell, and N. J. Bjerrum, *Prog. Polym. Sci.* 34 (2009) 449–477.
- [2] J. Yang, Y. Xu, P. Liu, L. Gao, Q. Che, and R. He, *Electrochim. Acta* 160 (2015) 281–287.
- [3] L. Wu, D. Zhou, H. Wang, Q. Pan, J. Ran, and T. Xu, *Fuel Cells* 15 (2015) 189–195.
- [4] J. Kerres and V. Atanasov, *Int. J. Hydrogen Energy* 40 (2015) 14723–14735.