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Fundamentals and Developments in Polymer processing Science and Technology

INNOVATIVE MEMBRANES DEVELOPMENT FOR FUEL CELLS APPLICATION

Miriam Biasizzo, Francesco Trotta

Università degli Studi di Torino, Dipartimento di Chimica I.F.M., Via Pietro Giuria 7, 10125 Torino – Italy
e-mail: miriam.biasizzo@unito.it; francesco.trotta@unito.it

Abstract

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Based on the interesting results obtained with sulfonated PEEK-WC, further syntheses were carried out in order to obtain new kind of polyetherether-ketone and polyetherether-sulfone with high chemical and thermal stability as a possible alternative to Nafion membranes. A particular attention was focused on an interesting type of polyetherether-ketones and sulfones containing phosphonic acid groups which has been already synthesised in our laboratories[1]. In this case the defined position of the phosphonic acid groups could have a positive effect on the proton conductivity of the membrane. PEEKs possess good thermal stability, appropriate mechanical strength and high proton conductivity, depending on their degree of sulfonation (DS), but PEEK with high DS are water soluble so they cannot be used in fuel cells. Sulfonated PEEK can be conveniently partially cross-linked through bridging links to the reactive sulfonic acid functions[2]. The purpose was to decrease the methanol crossover, improve the mechanical properties and proton conductivity.

References

- [1] F. Trotta, S. Ceresa Mio, K. Martina, E. Drioli, P. Finocchiaro Asia-Pacific Journal of Chemical Engineering, Vol.5 Issue1 (2010), p 249
- [2] J. Kerres, A. Ullrich, F. Meier, T. Häring, Solid State Ionics; 125 (1999), 243