Cross-Linked PEEK Proton Exchange Membranes for Fuel Cell

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Abstract

The low-cost cross-linked Polyetheretherketone (PEEK) proton exchange membranes were prepared via the simple route. The membranes exhibited similar electrochemical properties as compared with commercial Nafion®. The membranes were highly proton conductive, mechanically and chemically stable. They showed reduced water uptake and reduced methanol crossover.

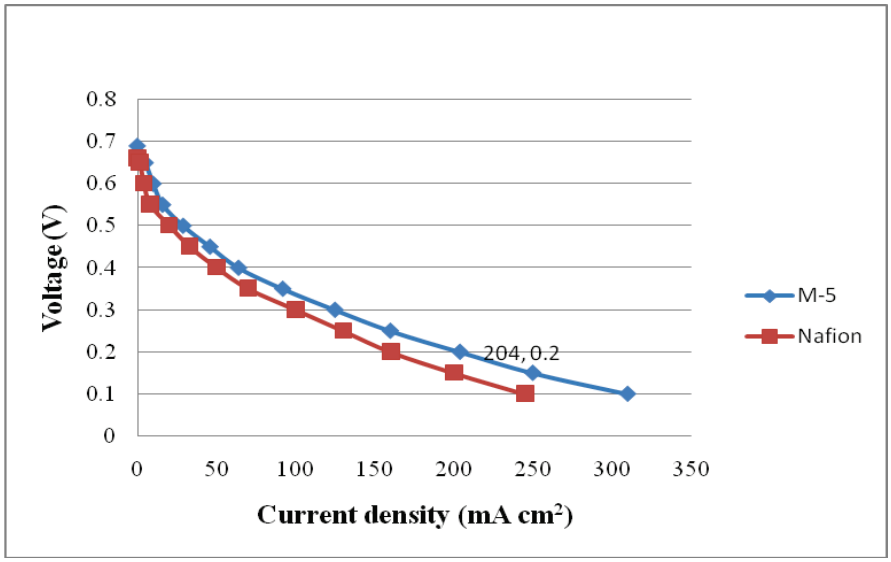

Figure 1: The single DMFC performance of a cross-linked membrane vs. Nafion® 117

The membrane was applied in a direct methanol fuel cell (DMFC) and a considerable performance improvement was found as compared to commercial Nafion® 117 membrane. These results suggested that the prepared cross-linked membrane is a suitable candidate for the polymer electrolyte membrane fuel cell (PEMFC) application.

Keywords: cross-linked; proton conductivity; proton exchange membrane; chlorosulfonation; swelling; fuel cell.