

Study of Methanol Permeation on modified Nafion - Pt Membranes for its use in DMFC.

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ABSTRACT

Direct Methanol Fuel Cells (DMFC) has been noticed nowadays in order to replace the conventional batteries to portable electronic devices. However the main problem of DMFC is the crossover of methanol fuel through the typical proton-exchange membranes from the anode to the cathode. In recent years, a great effort has been made in order to develop new membranes or modify the Nafion membrane to reduce the methanol crossover. In this work, Platinum nanoparticles has been synthesized inside of the Nafion structure, in order to have better distribution of the metal in the membrane. The methanol permeation was studied in a two chambers cell. On one side was introduced the electrochemical system conformed of a platinum electrode (work electrode), saturated Calomel electrode (SCE, reference electrode) and platinum wire (auxiliary electrode) on sulfuric acid 0.5 M. On the other side was filled with a Methanol solution (1M). Between the chambers was placed the composite membrane. The methanol permeation was followed by DC Amperometric method. The methanol permeation on the composite membranes was different compared with the Nafion membranes. It is related with the incorporation of Platinum nanoparticles than oxidize the methanol before the transport to the other side.