ECS Transactions, 5 (1) 69-78 (2007) © The Electrochemical Society

Evaluation of Methanol Crossover through SPEEK/TPA/Y-zeolite Composite Membranes by Electrochemical Method

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Abstract

This research work reports the evaluation of methanol crossover through newly developed composite membranes prepared from inorganic proton conducting material (tungstophosphoric acid (TPA)/Y-zeolite) with sulfonated polyether ether ketone (SPEEK) polymer. The composite membranes were prepared by embedding different proportions (10-40 wt %) of conducting material (TPA/Yzeolite) into SPEEK polymer matrix. Methanol crossover through these membranes was studied using potentiometric technique. It was found that membranes with low loading of inorganic conducting material show better reduction in methanol crossover. The membranes are thermally stable up to around 160 ºC. These membranes have potential to be considered for use in low power methanol fuel cells due to their low methanol crossover, adequate stability and low cost.