

POWER GENERATION AND WASTEWATER TREATMENT USING NAFION AND SPEEK / SGO MEMBRANES IN MICROBIAL FUEL CELLS

*M. Shabani¹,
H. Younesi*¹,
A. Rahimpour²,
M. Rahimnejad²*

*¹Department of Environmental Science, Faculty of Natural Resources, Tarbiat
Modares University, P.O. Box: 46414-356, Noor, Iran*

*²Faculty of Chemical Engineering, BabolNoshirvani University of Technology,
Babol, Iran*

ABSTRACT

Microbial fuel cells are systems which can directly convert chemical energy to electrical energy using microbial biocatalysts while treating wastewater and they are important systems for sustainable and clean energy production. A lot of research on MFCs is under way to improve the conditions and to increase the power and energy produced. Also, many studies have focused on synthesizing new membranes which have low cost, high energy recovery and proton conductivity. In the present study two different membranes including commercial Nafion 117 and synthesized SPEEK/SGO have been compared in a two-compartment MFC in order to measure the power density and their ability to remove the COD of the wastewater. The maximum power density of 43.8 and 61.3 mw/m^2 has been observed in the system working with Nafion and SPEEK/SGO, respectively which shows that sulfonation of the membrane has a great effect on its efficiency to produce electricity.

Keywords: wastewater treatment; Microbial fuel cell; Nafion 117, SPEEK/SGO; Power density