

Microstructural Analysis and Electrochemical Performance of a PEMFC Electrode

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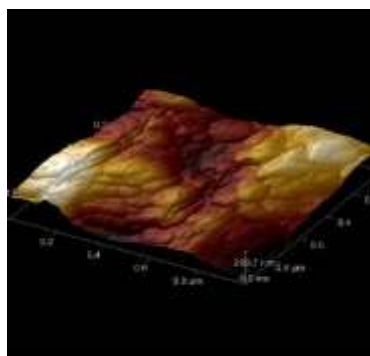
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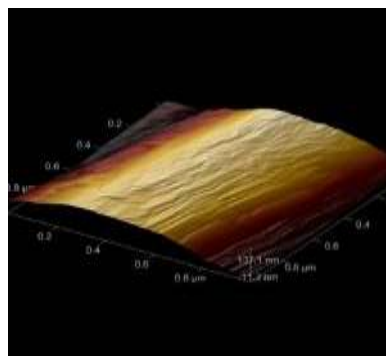
ABSTRACT

In Proton Exchange Membrane Fuel Cell (PEMFC) there are many factors which may affect the global performance of the cell itself such as the manufacturing technique, composition and structure of the elements that constituting the catalytic layer (CL) of a PEMFC. This work summarizes the results of a morphological and electrochemical studies made with manufactured electrodes using the electro-spray method. The analysis includes the determination of the microstructure influence related to the electrochemical response through statistical characterization techniques. Also, three different manufacturing techniques were performed: electrocatalyst deposited on the membrane, electrocatalyst deposited on the diffuser and electrocatalyst deposited both on the electrode and the membrane. The assemblies were characterized by SEM at different magnifications and AFM to determine the morphology and distribution of the CL over the diffuse layer among and their relation with electrochemical performance of the three different manufacturing electrodes techniques. Electrochemical characterizations were performed by electrochemical impedance spectroscopy and polarization curves.

Keyword: Microstructural, electrocatalytic layer, PEMFC.



a) with electrocatalyst deposited



b) without electrocatalyst deposited

Figure 1: AFM images corresponding to diffuser (1μm of carbon paper) with and without electrocatalyst deposited