Electrodeposited Mesoporous Pt for Direct Ethanol Fuel Cells Anodes

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In this study mesoporous Pt was electrodeposited from liquid crystal templates with different amount of Pt (0.60 mg/cm^2 , 1.0 mg/cm^2 and 1.5 mg/cm^2) directly on a carbon cloth using a potentiostatic method. These mesoporous Pt electrocatalysts were used as anodes for a direct ethanol fuel cell and the activity of ethanol oxidation reaction was studied. The electrochemical active surface area of the electrodes was measured using cyclic voltammetry under fuel cell conditions. Polarization and power curves for both commercial Pt and electrodeposited mesoporous Pt at different temperatures (30°C , 50°C and 70°C) were studied, showing an increase of the performance with the temperature as expected. Despite lower Pt loading, all the mesoporous samples showed similar or better performances in the direct ethanol fuel cell when compared with the commercial Pt sample (4.0 mg/cm^2). These results show that this catalyst preparation method can be a new route for the development of more efficient Pt based materials for direct alcohol fuel cells applications.

Keywords: mesoporous Pt, electrodeposition, catalysts, direct ethanol fuel cell

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