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Generation of Hydrogen Peroxide in DMFC

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Abstract

The novel process of H2O2 generation in the direct methanol fuel cell (DMFC) composed from the "Black Pearls 2000" gas-diffusion cathode (GDE), washed by sodium chloride brine or sea water for O2 electro-reduction and the half-membrane-electrode assembly (MEA) with the Nafion 115® cation-exchange membrane (CEM), hot pressed on one side with the carbonic gas-diffusion anode impregnated by Pt/Ru catalyst for methanol oxidation, has been developed. The effect of NaCl concentration in the catholyte, methanol and the KOH concentration in the anolyte, electrolyte temperature and circulation flow rate on the generated cell voltage, current and H2O2 current efficiency have been studied in 2 hour trials. 87-95 % current efficiency for H2O2 generation with a 5.286 -9.44 mg h-1 cm-2 rate and at 15 mA cm-2 current density was achieved in the DMFC with 1 M CH3OH +7M KOH in the anolyte and 30 g L-1 NaCl in the catholyte.

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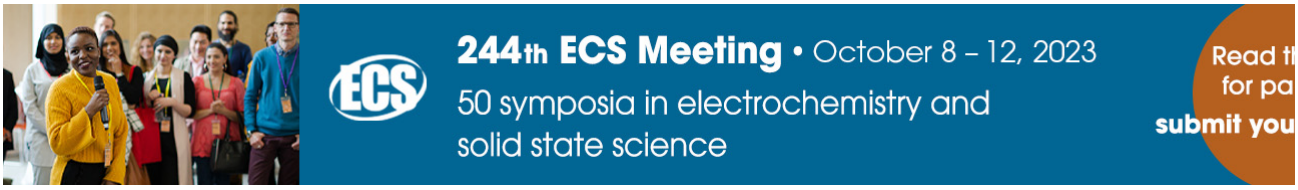

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