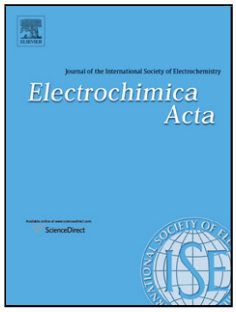

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Electrocatalytic glucose oxidation at binary catalyst of nickel and manganese oxides nanoparticles modified glassy carbon electrode: optimization of the loading level and order of deposition

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Abstract

This work addresses the electrocatalytic activity of a new catalyst composed of nickel and manganese binary oxides, prepared by electrodeposition, towards glucose electro-oxidation in alkaline medium. Cyclic voltammetry, scanning electron microscopy (SEM) and energy-dispersive X-ray spectroscopy (EDX) were used to characterize those electrocatalysts. It has been found that the electrocatalytic activity critically depends on the loading level and the order of deposition of the two oxides; the NiO_x/MnO_x/GC electrode (MnO_x deposited first) showed an excellent electrocatalytic activity and stability towards glucose oxidation compared to NiO_x/GC, MnO_x/GC or MnO_x/NiO_x/GC electrodes (NiO_x deposited first). At the present work conditions, it has found that, the optimum loading level is 60 cycles of MnO_x followed by 10 minutes deposition of nickel. At this loading level, it has been found that, the relation between $I_p/v^{1/2}$ function and scan rate gives the characteristic feature of a catalytic process.

Keywords: Glucose, Manganese oxide, Nickel oxide, Fuel Cell, Nanoparticles

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