Effect of dodecylbenzenesulphonate on Electrocatalytic Activity of NiO_x Nanoparticles for glucose oxidation

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The impacts of addition of organic compound (anionic surfactant) dodecylbenzenesulphonate (DBS) on the electrodeposition of nickel oxide (NiO_x) nanoparticles and on the electrocatalytic oxidation of glucose from alkaline solution are studied. NiO_x nanoparticles are electrodeposited on the surface of a glassy carbon (GC) electrode in the presence and absence of the DBS. Cyclic voltammetry (CV), field emission-scanning electron microscopy (SEM) and energy dispersive X-ray spectroscopy (EDX) are used for characterization of the above electrodes. The peak current of the redox couple Ni(II)/Ni(III) increases with the [DBS] before it decreases at [DBS] > 1×10⁻⁴ M. The electrocatalytic activity of the NiO_x/GC electrode towards the electrochemical oxidation of glucose is affected by the same manner. An attempt to correlate this electrocatalytic enhancement with the addition of the DBS is introduced. Optimum concentration of the DBS is obtained that gives the best enhancement in the electrochemical and electrocatalytic properties.

Keywords: Surfactant, Nickel, Nanoparticles, Electrocatalysis, Glucose

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