

A Sensitive Uric Acid Electrochemical Sensing in Biofluids Based on Ni/Zn Hydroxide Nanocatalyst

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Abstract : This work demonstrates the electroanalysis of uric acid (UA) at very low working potential (0 V vs Ag/AgCl) directly in body fluids such as saliva and sweat using electrodes modified with mixed \square -Ni_{0.75}Zn_{0.25}(OH)₂ nanoparticles exhibiting stable electrocatalytic responses from alkaline down to weakly acidic media (pH 14 to 3 range). These materials were prepared for the first time and fully characterized by TEM, XRD, and spectroscopic techniques. The electrochemical properties of the modified electrodes were evaluated in a fast and simple procedure for uric acid analyses based on cyclic voltammetry and chronoamperometry, pushing down the detection and quantification limits (respectively of 2.3×10^{-8} and 7.6×10^{-8} mol L⁻¹) with good repeatability (RSD = 3.2% for 30 successive analyses pH 14). Finally, the possibility of real application was demonstrated upon realization of unexpectedly robust and sensitive modified FTO (fluorine doped tin oxide) glass and screen-printed sensors for measurement of uric acid directly in real saliva and sweat samples, with no significant interference of usual concentrations of ascorbic acid, acetaminophen, lactate and glucose present in those body fluids (Fig. 1).

Keywords : nickel hydroxide, mixed catalyist, uric acid sensors, biofluids

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