

Processing of electrochemical sensors by matrix-assisted pulsed laser evaporation (MAPLE) for nitrites detection in water

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In this work laser-based deposition technique, i.e., matrix-assisted pulsed laser evaporation (MAPLE) is used in order to fabricate electrochemical sensors capable to detect nitrites from water.

Innovative sensors are obtained from commercial carbon-based screen-printed electrodes coated with a newly developed composite by MAPLE technique. These composites contain different concentrations of carbon nanotubes (CNTs), chitosan, and iron (II) phthalocyanine (C₃₂H₁₆FeN₈).

In order to evaluate the performances of the composite coated electrode, morphological and surface chemistry investigations are performed, together with the study of nitrites electro-catalytic oxidation properties for the bare and modified electrodes. The electro-chemical response towards the oxidation of nitrite is significantly improved by the combined effect of CNTs with chitosan and C₃₂H₁₆FeN₈. The performance of the MAPLE modified electrode include a limit of detection of 0.12 μM in Britton Robinson buffer solution containing nitrites and the ability to detect small quantities of nitrites in real water samples.

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