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DOCTORAL THESIS

-abstract-

Stochastic sensors for analysis of drinking and waste water

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Water quality is essential for public health. Therefore, in this thesis we developed new electrochemical sensors: amperometric and stochastic, very sensitive and selective, which can be utilized for water analysis. Two stochastic microsensors based on graphite nanopowder and reduced graphite oxide modified with protoporfirine IX were used for the recognition of nitrites and nitrates in water samples. Two stochastic microsensors based on graphene nanopowder and reduced graphene oxide modified with protoporphyline IX complex with cobalt were used for the determination of biphenols A, F and Z in water samples. Platforms used for the screening of wastewater samples have been proposed and validated. The platforms have integrated the combined microsensors (stochastic microsensor, Pt and Ag/AgCl sensor). For the platforms were considered two stochastic microsensors: one based on diamond paste and another based on nanodiamond paste, both pastes being modified with a solution of 2, 2-diphenyl-1-picrililhydrasylum. Two stochastic microsensors were proposed based on immobilization of the complex between protoporfirine IX and zinc on the nanocarbon paste and on the nanodiamond paste for the recognition and analysis of antibiotics: amoxicillin, ampicillin and biotin in water samples. All sensors have been characterized and validated. The advantages of using these sensors in water analysis are: the low cost, the analysis with the same sensor of several pollutants of interest, the possibility of determining very low concentrations of pollutants; it was not necessary to process the water samples before the measurements.