



Degradation of organic pollutants using nanomaterials and electrochemical advanced oxidative processes

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Abstract:

This work describes the use of both carbon modified with nanostructures (nanoparticles, nanowires and nanospheres) containing metal and metals oxides and boron doped diamond electrodes for degradation of ciprofloxacin, phenol, dypirone, blue – Evans dye. The main materials prepared are related to: Carbon materials modified with functional groups by acidic and alkaline treatment and nanomaterials modifying carbon support. The effects of increasing H₂O₂ electrogeneration are associated to the surface properties of the two materials which are completely different from those ones of pure carbon for further production of hydroxyl radicals. For this reason, we have been developing changes of the carbon materials with acidic and alkaline treatment and using nanostructures of different oxides

and metals with very small amounts on carbon and base materials for H₂O₂ electrogeneration. The main surface chemistry phenomena of this work is to discuss the modification of the carbon properties such as hydrophilicity, conductivity, structure and composition of the surface species when we use both different carbon treatments and different proportions of nanostructures with several oxides and metals on carbon. In the case of the use of Boron-Doped Diamond Surfaces using Solar Photo-Electron-Fenton Processes is same as in the case of ciprofloxacin in synthetic urine. At the latter case we are capable to promote the electrochemical incineration of the molecule yielding 96% ciprofloxacin removal and 98% mineralization after 360 min of electrolysis at optimum values of pH 3.0 and current density of 66.6 mA cm⁻². The evolution of released inorganic ions was followed by ion chromatography.

Biography:

Mauro Coelho dos Santos has completed his PhD from São Paulo University, Brazil and Post-doctoral studies from Federal University of São Carlos, Brazil. He is the Coordinator of the Laboratory of Electrochemistry and Nanostructured Materials of ABC Federal University, Brazil. He has published more than 86 papers in reputed journals and has been serving as an Editorial Member of Electroanalysis. He serves as the Editor of Journal of Nanomaterials (2012). He has received Academic Excellence Prize from Federal University of ABC (2015) in the area of Chemistry. He has 1,300 citations in ISI and H-Index of 23.