

## NANO-ENHANCED ELECTROCHEMICAL GREEN TECHNOLOGY FOR ADVANCED INTEGRATED WATER TREATMENT AND QUALITY CONTROL

### Goal of the project:

The main goal of the project is to develop the electrochemistry application field in water treatment and quality control, by creating the right framework for achieving the high research level.

This project aims to explore potential use of nano-enhanced electrochemical dual green technology to improve access to clean water.

### Short description of the project

Based on the results obtained in our previous studies for the oxidation of pollutants in aqueous solutions for their degradation and/or their detection on the carbon-based electrodes, specific objectives have been set in this project:

1. Elaboration and manufacturing of some new electrodes types based on nanostructured carbon and Ag/Cu/TiO<sub>2</sub> modified zeolite with enhanced electro(photo)-catalytic activity;
2. Manufacturing, design and geometry conditions of electrodes for degradation and monitoring applications;
3. Setting-up the optimal conditions for the degradation and mineralization of priority organic pollutants (POPs) from water;
4. Elaboration of the electrochemical detection scheme;
5. Integration of the electrochemical detection methods within the control of the degradation and mineralization of POPs in aqueous solutions.
6. Development of a new nano-enhanced electrochemical green dual technology for integrated water treatment and control.

### Project implemented by

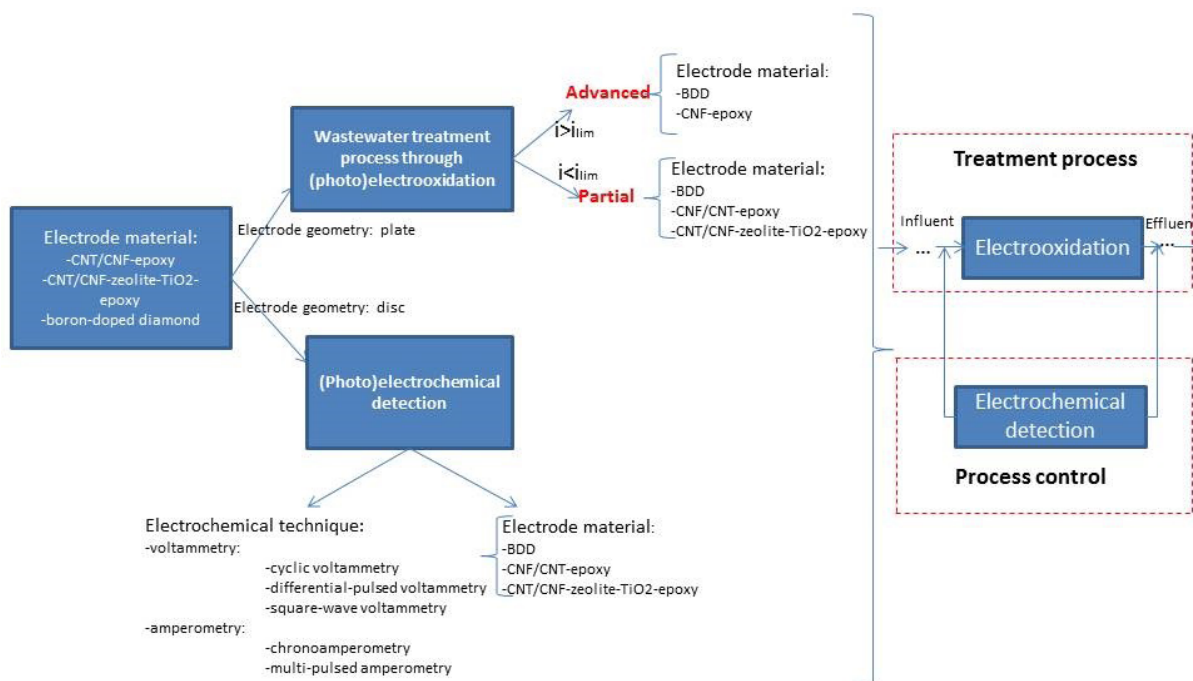
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### Implementation period

2011 - 2016

### Main activities

1. Elaboration of new composite materials based on carbon nanotubes (CNT)/carbon nanofibers (CNF) in epoxy matrix as electrode materials for oxidation of POPs from water;
2. Characterization of new composite materials based on CNT/CNF in epoxy matrix and electrode design;
3. Composite electrode obtaining and selection for application in degradation and/or detection of POPs from water;
4. Assessment of electro(photo)catalytic performance of the selected electrodes in advanced degradation/mineralization of POPs;
5. Assessment of the electroanalytical performance of the electrode in detection of POPs from water. Optimization of the electroanalytical method;
6. Integration and optimization of the electrode materials and electrochemical techniques in advanced wastewater treatment and process control.



## Results

- Comparative monitoring of optimized electrochemical treatment of priority organic pollutants from water using the electrochemical detection and conventional methods;
- Optimization of the composition of the electrode material and the electrochemical technique for integrative electrochemical degradation and process control;
- Published papers;
- Patent application "Electrode and method for fast electrochemical detection of arsenic (III) from aqueous solution"

## Applicability and transferability of the results

The nano-enhanced electrochemical green dual technology could be scaled and tested for application at pilot level in water treatment.

## Financed through/by

Executive Unit for Financing Higher Education, Research, Development and Innovation - UEFISCDI

## Research team

Florica Manea - director  
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