cost TD1102
PHOTOTECH: BIOSENSORS & BIOCHIPS

Short Term Scientific Mission TD1102-24758

Project: Modification of SPE with bacterial photosynthetic material by laser printing technology for energy conversion and biosensing

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Period of STMS: 23 March - 2 April 2015
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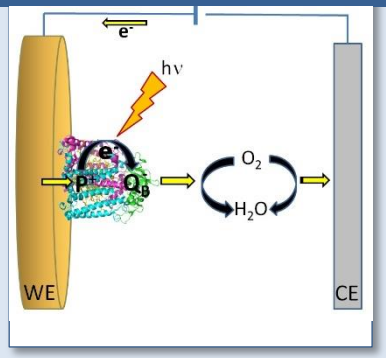

Aims & subject of work:

The aim of the work performed during the present STSM was the modification of screen-printed electrodes by depositing an ordered film of photoactive biological material, the photosynthetic Reaction Centers (RC), by using the laser induced forward electron transfer (LIFT) technique in order to fabricate a biohybrid device for energy conversion and/or biosensing. LIFT is an advanced tool for achieving the direct immobilization of biosystems with high spatial resolution and high impact pressure thus enabling a better interface with the target surface.

Argumentation of necessity of STSM:

The Bari research group has the skills and facilities for purification and handling of the photoactive RC; the Athens research group has the know-how for the surface deposotion of biological material with the LIFT technique.

Workplan/timeschedule followed:

- Preparation and characterization of the RC in Bari
- LIFT deposition of the RC on screen printed elecrtodes (SPE) and preliminary characterization of the devices
- Further characterization of the device in Lecce (Italy) and genearion of mediatorless photocurrents
- Exploiting of the RC-functionalized SPEs as terbutryn biosensor

Main results and outcome:

The technique of deposition employed (LIFT) allowed to attain the direct electron transfer between RC and electrode surface, leading to a highly functional amperometric biosensor to detect terbutryn herbicide by a photocurrent inhibition approach. The mediatorless system showed suitable analytical performances in terms of linear dynamical range, IC50, LOD and sensibility.