I3S 2019

7th International Symposium on Sensor Science

09 – 11 May 2019, Napoli, Italy

Program and Abstract Book

Abstract

29. Bio-Functionalization of Graphene with a Laccase Hydrophobin Chimera

Ilaria Sorrentino [1,*], Ilaria Stanzione [1], Alessandra Piscitelli [1], Alan Le Goff [2] and Paola Giardina [1]

[1] Department of Chemical Sciences, University Federico II, Naples, Italy
[2] University Grenoble Alpes, CNRS, DCM, 38000 Grenoble, France
* Correspondence: ilaria.sorrentino@unina.it

The immobilization of enzymes on the nanomaterial surface is a challenge task in the development of novel biosensing platforms. A process of production of biofunctionalized graphene has been previously set out, using ultrasonic waves to exfoliate graphite in synergy with a fungal self-assembling adhesive protein, the class I hydrophobin Vmh2.

The properties of Vmh2 were also exploited to immobilize the laccase PoxA1b on graphene. This enzyme from *Pleurotus ostreatus* displays a high redox potential and is endowed with a remarkable stability at high temperature and at alkaline pH, thus it can be used to detect phenolic compounds in different matrices. Its genetic fusion with Vmh2 allowed the one-pot enzyme immobilization on graphene without additional purification steps. The bio-functionalization of graphene with PoxA1b-Vmh2 was achieved with the addition of the chimeric enzyme in the last step of graphite exfoliation in the presence of Vmh2. The stability and the specific activity of PoxA1b-Vmh2 on graphene confirmed that the fusion with Vmh2 improved the enzyme performances with respect to those of the enzyme alone.

The biofunctionalized graphene with the fused enzyme was deposited on Glassy Carbon Electrode (GCE) and used as working electrode for a chronoamperometric test for the revelation of catechol.

Acknowledgements
This project is funded by Italian Education, University and Research Ministry (MIUR), French National Research Agency (ANR) and co-funded by European Union's Horizon 2020 research and innovation program under the framework of ERA-NET Cofund MarTERA (Maritime and Marine Technologies for a new Era).