

Modeling Bio-Sensing Functionalized Graphene Building Blocks Under Environmental Stimuli

E. Lacatus¹

¹Polytechnic University of Bucharest, Bucharest, Romania

Abstract

This study continues [1] to investigate the main properties of different graphene (G/RGO/GO), and other C based nanostructures for biosensors design, using COMSOL Multiphysics® products.

The interdisciplinary approach requested on these studies are well addressed through the use of the extended capabilities of COMSOL modules: exporting geometry and properties obtained with ChemBio3D® on Electrochemistry Module, the electrical properties of C based nanostructures through LiveLink™ for MATLAB® and the thermal and electrical properties on dedicated modules, as well.

The successive studies on graphene, reactive-edge graphene, and pore functionalized graphene were conducted throughout these modules and the activation of the basic structures (building-blocks) through other C nanostructures or with biostructures (protein) was successfully described (Figure 1, Figure 2).

Reference

[1] E. Lacatus et al., Models for Simulation Based Selection of 3D Multilayered Graphene Biosensors, COMSOL Conference at Grenoble, 2015

Figures used in the abstract

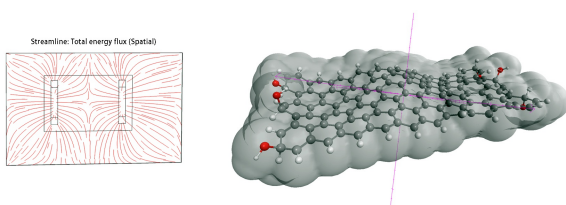


Figure 1: Spatial distribution of Total Energy Flux (COMSOL) related to Total Charge Density.

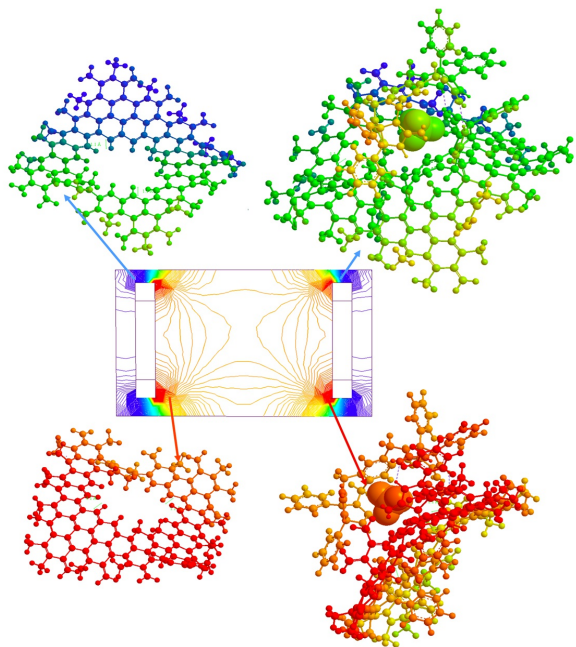


Figure 2: Tangential Electric Field (COMSOL) related to functionalized structures morphology.