

Accepted Manuscript

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Ranvijay Kumar, Rupinder Singh, David Hui, Luciano Feo, Fernando Fraternali



PII: S1359-8368(17)33165-7

DOI: [10.1016/j.compositesb.2017.09.049](https://doi.org/10.1016/j.compositesb.2017.09.049)

Reference: JCOMB 5296

To appear in: *Composites Part B*

Received Date: 13 September 2017

Accepted Date: 21 September 2017

Please cite this article as: Kumar R, Singh R, Hui D, Feo L, Fraternali F, Graphene as biomedical sensing element: State of art review and potential engineering applications, *Composites Part B* (2017), doi: 10.1016/j.compositesb.2017.09.049.

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Graphene as biomedical sensing element: State of art review and potential engineering applications

¹Ranvijay Kumar, ¹Rupinder Singh, ²David Hui, ³Luciano Feo, ³Fernando Fraternali

¹Dept. of Production Engineering, Guru Nanak Dev Engineering College, Ludhiana (India)

²Dept. of Mechanical Engineering, University of New Orleans, Louisiana (USA)

³Dept. of Civil Engineering, University of Salerno (Italy)

¹ranvijayk12@gmail.com, ¹rupindersingh78@yahoo.com

²DHui@uno.edu

³l.feo@unisa.it, ³f.fraternali@unisa.it

Abstract

Nano graphene (Gr) particles are of abundant methodical and scientific interest as having the astonishing prospective to usage as the sensors element in the miniaturized and biomedical sensor device. The nano Gr particles have been appeared on the life science and health platform due to their interesting material performance like; excellent biocompatibility, conductivity, super para magnetism, thermal, chemical, mechanical and metallurgical properties to use as a sensor component. In recent years, Gr as nanoparticles has acquired powerful technological and scientific attention and having potential applications like; for fabrication of super-capacitors, batteries, solar or fuel cells, miniaturized and biomedical sensors. Gr is one of the most influential nano composites with endowment of use in the sensing mechanism like; bio-sensing, bio-imaging and diagnostic of diseases due to stimulating material behavior like; biocompatibility, cell growing properties, excellent surface behavior thermally and chemically etc. The present discussion explores the state of art review and prospective of the Gr in the miniaturized and biomedical sensors. The sensing mechanism for each of the sensors has been discussed for betters understanding of the functionality and prospective of the Gr in the sensors.

Keywords: biomedical sensors, additive manufacturing, physical sensor, biosensors, bio-potential electrode, sensing mechanism

1 Introduction

The broad term sensors is an electronic module, component, subsystem or an element based on the certain detection mechanism to measure the changes in the environmental activities, [1-5]. The biomedical sensors are broadly differentiated upon the basis of sensing mechanism like the gas sensors senses the gaseous particles, optical sensors measure the light changes and similarly various physical, bio-potential electrode and biosensors measures different physical and chemical quantities. There are some of the previous studies which have lightened the prospective and application of different classified sensors in the different areas of applications, [6-12]. A sensor observed the changes in the environment components such as movement, light,

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