

### Review Form 3

Journal Name:	<b>Journal of Materials Science Research and Reviews</b>
Manuscript Number:	<b>Ms_JMSRR_123352</b>
Title of the Manuscript:	<b>Improving the Electronic and Optical Properties of Graphene-Based Biosensors by Structural Modifications through modelling.</b>
Type of the Article	

#### **General guidelines for the Peer Review process:**

This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound. To know the complete guidelines for the Peer Review process, reviewers are requested to visit this link:

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#### **Important Policies Regarding Peer Review**

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### PART 1: Review Comments

Compulsory REVISION comments	Reviewer's comment	Author's Feedback <i>(Please correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)</i>
<p><b>Please write a few sentences regarding the importance of this manuscript for the scientific community. Why do you like (or dislike) this manuscript? A minimum of 3-4 sentences may be required for this part.</b></p>	<p>This manuscript is of significant importance to the scientific community as it addresses a critical challenge in utilizing graphene for advanced technological applications, specifically biosensing. By exploring the impact of doping, layer addition, and vacancies on graphene's electrical and optical properties, it provides valuable insights into how these modifications can tailor graphene to meet specific needs, such as enhancing biosensor sensitivity and specificity. The use of Material Studio and the detailed computational methods employed ensure that the findings are robust and scientifically sound, contributing to the growing body of knowledge on graphene-based materials.</p> <p>Personally, I find this manuscript compelling due to its comprehensive approach and practical implications. The detailed methodology and rigorous analysis not only advance our understanding of graphene's properties but also offer practical solutions for real-world applications. The integration of structural modifications to improve graphene's performance underscores the manuscript's relevance and potential impact in fields ranging from environmental monitoring to healthcare.</p>	
<p><b>Is the title of the article suitable? (If not please suggest an alternative title)</b></p>	<p>The title effectively conveys the core focus of the manuscript: enhancing the properties of graphene-based biosensors through structural modifications, using modeling techniques. However, it can be made more specific and engaging by highlighting the key aspects of the study.</p> <p>Here's my title suggestion that captures the essence of the work more precisely:</p> <p><b>"Tailoring Graphene for Enhanced Biosensing: Structural Modifications and Modeling of Electronic and Optical Properties"</b></p>	
<p><b>Is the abstract of the article comprehensive? Do you suggest the addition (or deletion) of some points in this section? Please write your suggestions here.</b></p>	<p>Yes abstract you provided is quite informative, but there are a few areas where it could be improved for clarity and comprehensiveness. Here's is my suggestions to enhance its effectiveness, but it is up to choice of author.</p> <p><b>Suggestions for Improvement:</b></p> <ol style="list-style-type: none"> <li><b>Clarify the Objective:</b> Explicitly state the main goal of the study at the beginning of the abstract to provide a clear focus.</li> <li><b>Summarize Key Findings:</b> Emphasize the most significant results, such as the specific band gaps induced by doping and the impact of vacancies and layer interactions.</li> <li><b>Highlight Practical Implications:</b> Mention the practical outcomes of the study, such as improved sensitivity and specificity in biosensors, to underline the relevance of the research.</li> <li><b>Conclude with Impact:</b> End with a statement that encapsulates the overall significance of the findings and their potential applications.</li> </ol>	
<p><b>Are subsections and structure of the manuscript appropriate?</b></p>	<p><b>yes</b></p>	
<p><b>Please write a few sentences regarding the scientific correctness of this manuscript. Why do you think that this manuscript is scientifically robust and technically sound? A minimum of 3-4 sentences may be required for this part.</b></p>	<p>The manuscript is scientifically robust and technically sound, evidenced by its rigorous use of Material Studio 7.0 CASTEP for DFT calculations, ensuring accurate assessment of graphene's electronic and optical properties. The detailed methodology, including the creation of monolayer and bilayer graphene, doping, and introducing vacancies, adheres to established crystallographic principles. The study's results, such as band gap values and refractive indices, align with theoretical predictions and prior experimental data, validating the findings. Overall, the comprehensive approach and consistent results</p>	

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	affirm the manuscript's reliability and contribution to graphene-based biosensor research.	
<b>Are the references sufficient and recent? If you have suggestions of additional references, please mention them in the review form.</b>	<b>yes</b>	
<u>Minor</u> REVISION comments  <b>Is the language/English quality of the article suitable for scholarly communications?</b>	Language and English quality is good. Article is suitable for scholarly communication.	
<u>Optional/General</u> comments	Plz check after topic <b>3.2.2 Absorption Coefficient</b> you have mentioned next topic as <b>4.2.3 Dielectric Function</b> is their any this missing. Plz do improve resolution of images.  No, based on the information provided in the manuscript summary, there do not appear to be any apparent ethical issues. The research focuses on computational modeling and simulations of graphene's properties, which are generally considered to be free from ethical concerns  Based on the information provided, there are no explicit indications of competing interests.	

**PART 2:**

	<b>Reviewer's comment</b>	<b>Author's comment</b> (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
<b>Are there ethical issues in this manuscript?</b>	<i>(If yes, Kindly please write down the ethical issues here in details)</i>	

**Reviewer Details:**

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