Modelling and TCAD Analysis of Plasma-Assisted Graphene Field Effect Transistor

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Numerous work on Carbon Nanotubes (CNTs) and Graphene aided semiconductor devices have been performed for the last two decades. This research aims to follow up on the recent advancements in the development of Graphene Field Effect Transistor (g-FET) produced using PECVD process. Similar analysis has been done by Kansal et al[2] focusing on CNT as the channel in the FET, underlying various relationships between the FET characteristics and the plasma parameters affecting theproduction of these FETs using PECVD. A device has been proposed, that'll be consisting of a 2D graphene sheet as the channel in a FET. Our goal is to illustrate the impact of plasma parameters on the performance of the designed device. Systematically analyzing the several properties of the proposed device. Lower plasma parameter values are crucial for achieving higher drain current, increased output conductance, and a lower cutoff frequency. Finding the optimal balance in plasma parameters is essential for peak device performance and efficiency. By adjusting these parameters, we can enhance the device's performance, making it well-suited for real-life applications, particularly in biosensing. Our simulated results are well alignedwith the existing experimental observations, validating the device's potential for practical use.

References

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