Modeling and Simulation of Plasma-Assisted Graphene Field Effect Transistor for Biosensing Applications

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Graphene field-effect transistors (g-FETs) have shown great potential for highly sensitive biosensing applications due to their outstanding electrical characteristics. This research focuses on the modeling and simulation of a plasma-assisted g-FET fabricated through the plasma-enhanced chemical vapor deposition (PECVD) process. A detailed analysis is conducted to evaluate how different plasma parameters influence the device's electrical behaviour and overall performance.

The simulation results indicate that optimizing plasma power and pressure enhances the transistor's functionality by increasing drain current, improving output conductance, and lowering the cutoff frequency. These results emphasize the importance of precise plasma control in maximizing device efficiency. The proposed g-FET design aligns strongly with experimental observations, confirming its feasibility for real-world biosensing applications. This study provides critical insights into the role of plasma-assisted fabrication in advancing g-FET technology for next-generation biosensors.

References

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