Effect of thermally oxidized SiO2 Films on the directly grown graphene via Plasma enhanced Chemical vapor deposition

Muhammad Adnan Saeed

Šarunas Meškinis, Asta Guobiene, Rimantas Gudaitis

Institute of Materials Science, Kaunas University of Technology, K.Baršausko 59, LT-51423 Kaunas, Lithuania

Contact: Muhammad.saeed@ktu.lt

Abstract

The development of high-performance biosensors is critical for advancing medical diagnostics and point-of-care testing. This study explores direct graphene growth via Plasma-Enhanced Chemical Vapor Deposition (PECVD) on desired substrates, eliminating transfer steps and preserving material integrity and effect of thermally oxidized SiO2 films on graphene growth. PECVD enables low-temperature, catalyst-free synthesis directly on dielectric and polymer substrates, enhancing integration with flexible biosensing platforms. By optimizing plasma power, precursor flow, and temperature on 100nm and 300nm SiO_2 films, we produced high-quality monolayer and few-layer graphene. Raman spectroscopy, SEM, and electrical measurements confirm structural quality and conductivity. This direct PECVD-grown graphene platform enables real-time, label-free detection with improved stability, offering significant potential for next-generation biosensors and point-of-care diagnostics.

References

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Figures

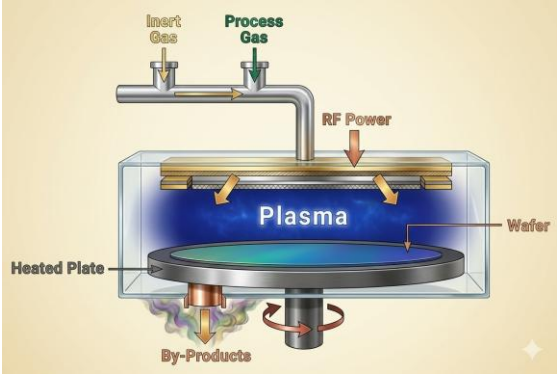

Figure 1 PECVD setup for Graphene growth