

Biosensor based on graphene nanoribbons/silver nanoparticle/polyphenol oxidase composite matrix on graphite electrode: Application in the analysis of catechol in green tea samples

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Figure S1

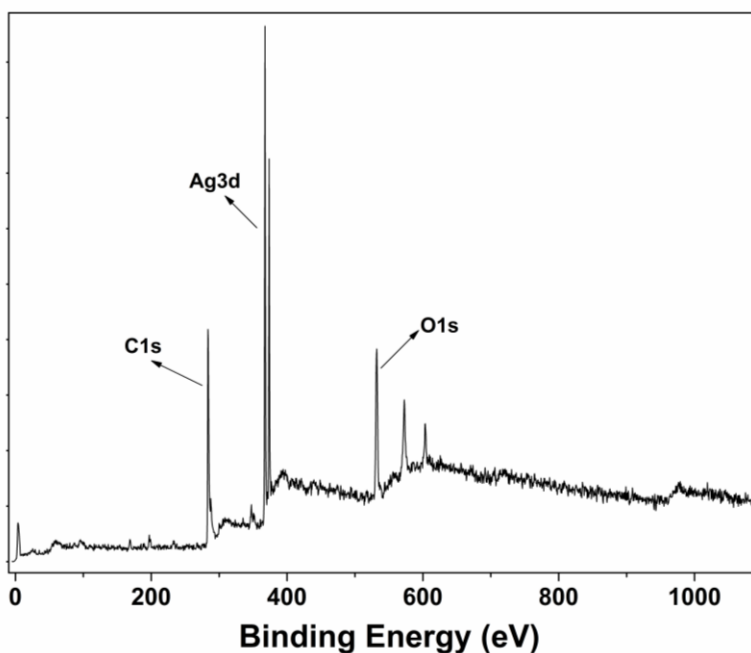


Fig S1 XPS spectra of GNRs-AgNPs

Optimization of electrode matrix materials

The current response and the sensitivity of the developed Gr/GNRs/AgNPs/PPO biosensor depends on the loading of the matrix materials on the electrode surface. Hence the optimization of loading level of GNRs, AgNPs and PPO on Gr electrode surface plays a very crucial role on the electrochemical response. The different amount of GNRs, AgNPs and PPO suspensions were drop casted on the Gr electrode and their electrochemical responses of catechol is shown in Fig S1. From Fig S1 (A) it can be

seen that the reduction peak current increased gradually as the loading increases from 0.5 to 2 μL of GNRs on Gr electrode surface. On further increase of concentration the reduction peak current did not show any change in response. Further to enhance the sensitivity and conductivity of the matrix biosynthesized AgNPs were drop casted on to the Gr/GNRs modified electrode surface. Fig S1 (B) shows that as the loading of AgNPs increased up to 5 μL and further loading resulted in the decrease of the peak current. Finally, different amount of PPO enzyme was immobilized and the corresponding peak current is depicted in the figure S1 (C). The reduction peak current obtained for 10 μL of PPO enzyme immobilized on the Gr/GNR/AgNPs were found to be the highest. Further loading of PPO enzyme resulted in the decrease in response. Notably, the higher amounts on electrode surface may form agglomeration of composites which may block the active area on the electrode surface.

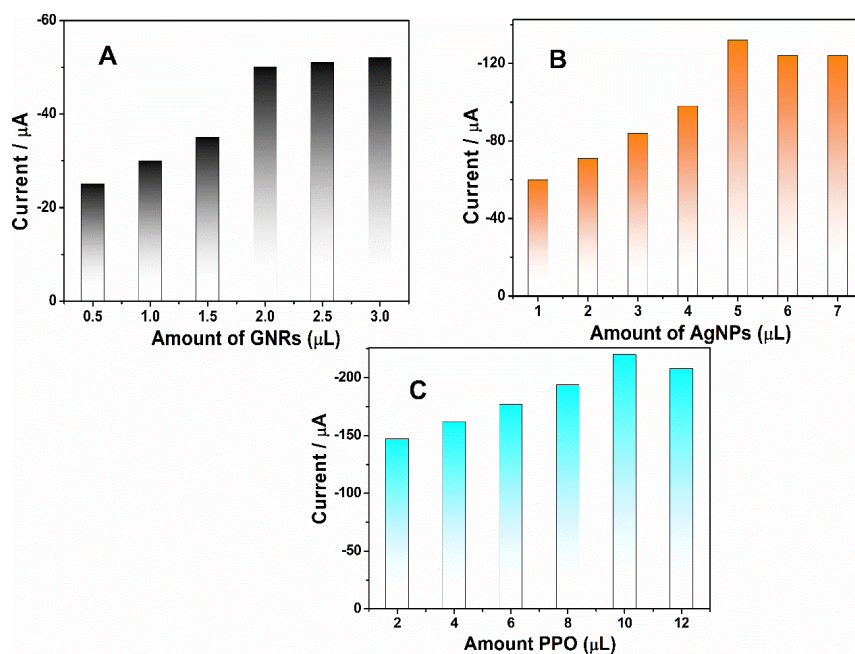


Fig S2 Optimization of electrode matrix materials **(A)** Gr/GNRs **(B)** Gr/GNRs(2 μL)/AgNPs, **(C)** Gr/GNRs(2 μL)/AgNPs(5 μL)/PPO enzyme