*biosensors*

MDPI

*Supplementary Materials*

# Effect of Graphene vs. Reduced Graphene Oxide in Gold Nanoparticles for Optical Biosensors—A Comparative Study

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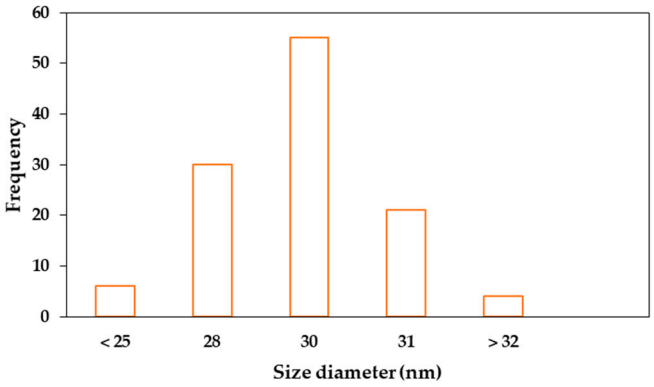
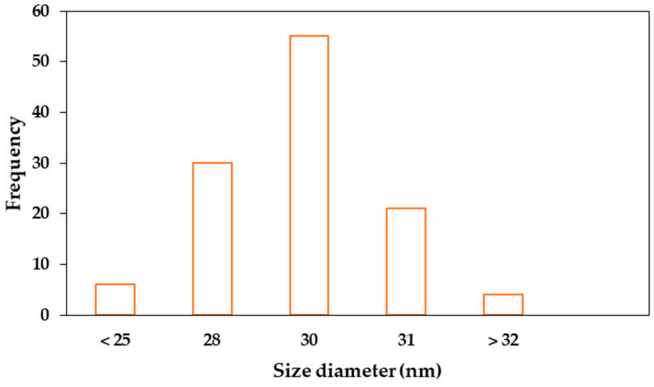





**(a)**

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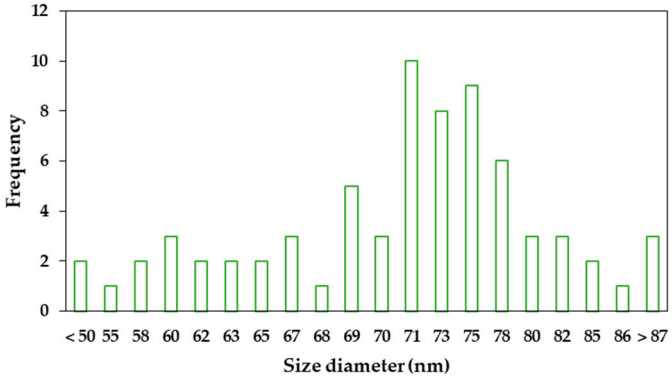



**(c)**

**Figure S1.** Frequency vs. size distribution: **a**) for Figure 3a; **b**) for Figure 3b and **c**) for Figure 5.

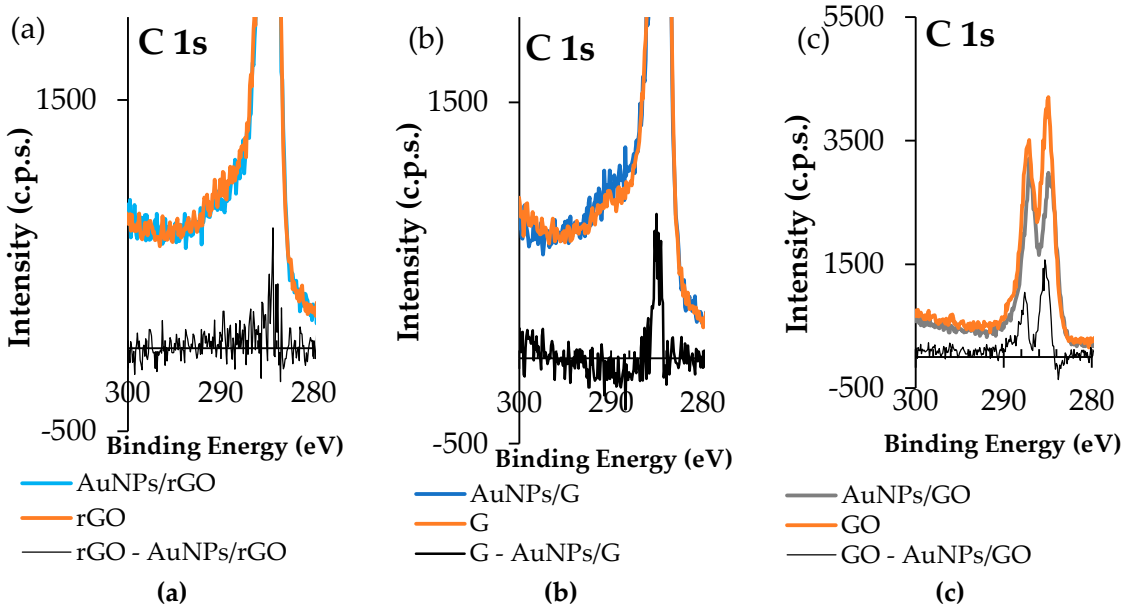
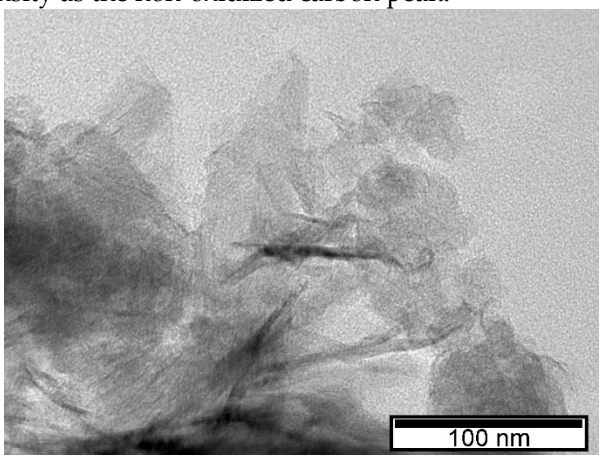



**Figure S2.** C 1s spectral differences between(**a**) AuNPs/rGO and rGO; (**b**) AuNPs/G and G and (**c**) AuNPs/GO and GO.

Figure S2 shows that: rGO has slightly more $sp^2$ carbon than AuNPs/rGO; G has a larger amount of aliphatic carbon than AuNPs/G. In AuNPs/GO versus GO, one can see that the C 1s signal for GO is stronger than for AuNPs/GO, which leads to a spectrum "difference" showing more aliphatic carbon and more oxidized carbonaceous moieties in GO. However, it is clear from the C 1s profiles that in GO, the main peak, centred at lower BE (which includes peaks at 284.4 eV and 285 eV, attributed to non-oxidized carbon atoms), is larger than the peak at higher BE, which includes carbon atoms bonded to oxygen (Figure 6 (d)). In AuNPs/GO, the oxidized carbon features have nearly the same intensity as the non-oxidized carbon peak.




**(a)**

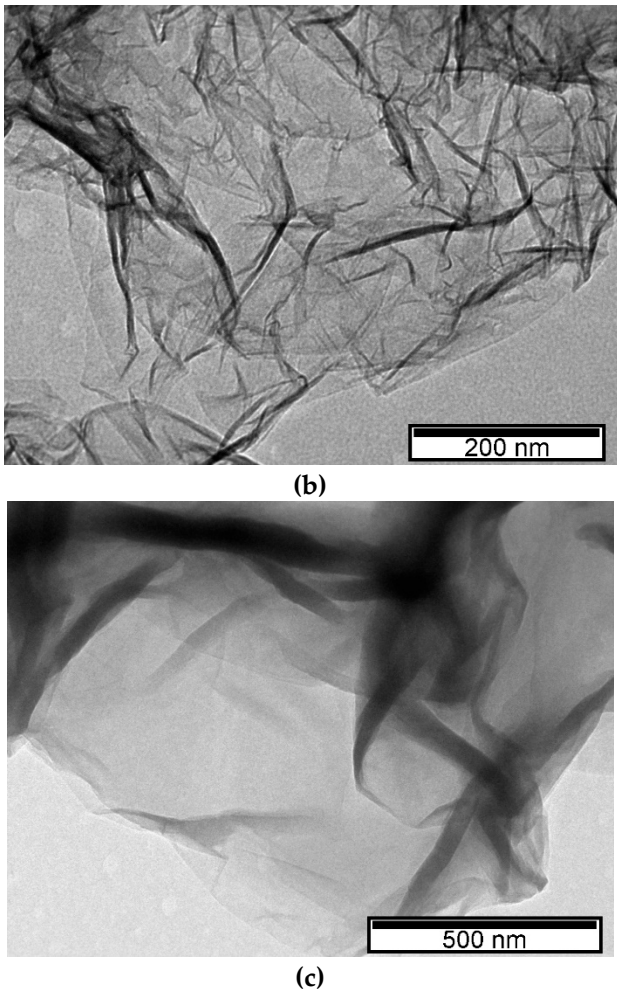



**Figure S3.** TEM image for (**a**) – G; (**b**) – rGO and (**c**) – GO.

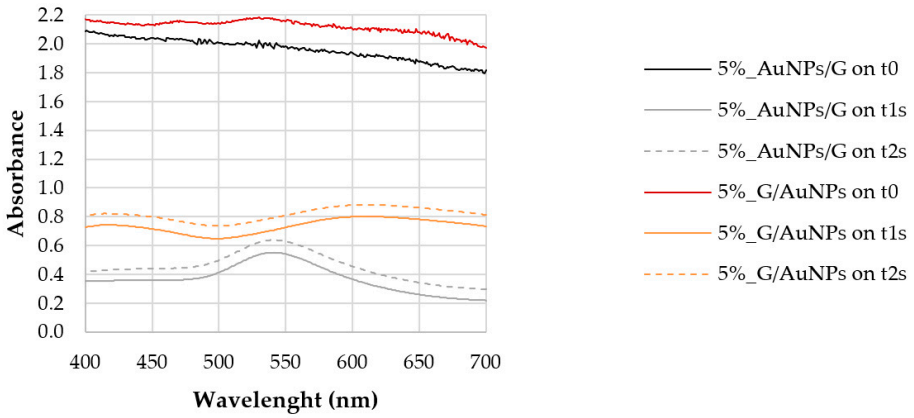



**Figure S4.** LSPR of AuNPs and G composite (SQ1 and SQ2) at $t_0$, $t_{1w}$ and $t_{2w}$.

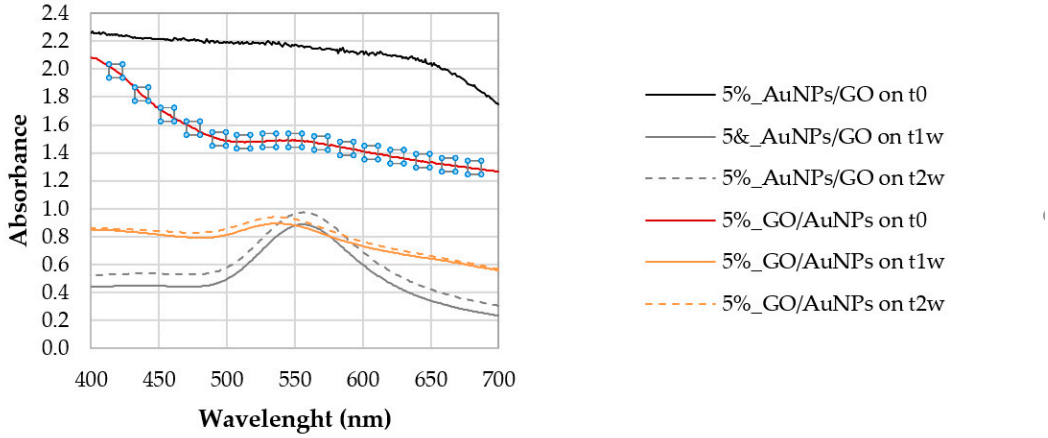



**Figure S5.** LSPR of AuNPs and GO composite (SQ1 and SQ2) at $t_0$, $t_{1w}$ and $t_{2w}$.

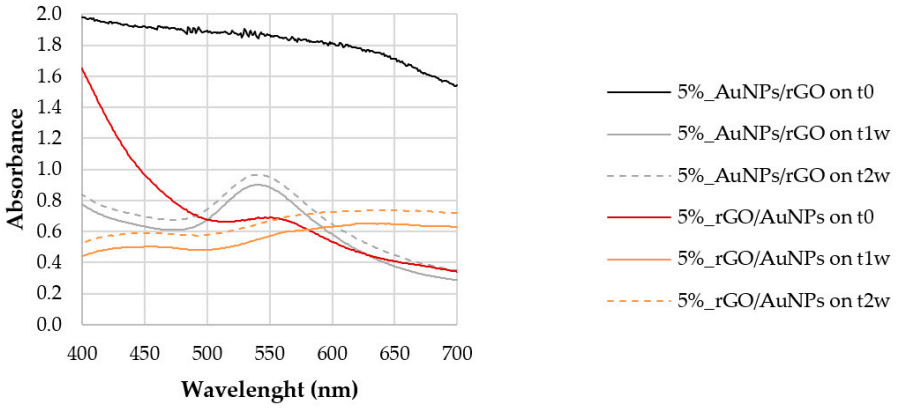



**Figure S6.** LSPR of AuNPs and rGO composite (SQ1 and SQ2) at $t_0$, $t_{1w}$ and $t_{2w}$.