

Supplementary material

Can r-graphene oxide replace the noble metals in SERS studies: the detection of acrylamide

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SERS substrate preparation with acrylamide (probe molecule) on it

The prepared Si-rGO substrates were coated with different concentrations of acrylamide by dropping 100 μL of acrylamide aq. solutions of different concentrations on the Si-rGO wafers. The wafers were dried under vacuum at ambient temperature. After drying, the wafers were analysed by SERS.

Table S1. D and G intensities along with the calculated ratios of I_D/I_G

| Sample | I_D/I_G | D band intensity | G band intensity |
|--------|-----------|------------------|------------------|
| GO | 0.88 | 1208 | 1371 |
| rGO | 1.29 | 2064 | 1595 |

Table S2. Enhancement factors and standard deviation for 10^{-7} M acrylamide on Si-rGO wafers

| Sample | Calculated EF ($\times 10^4$) | Standard deviation ($\times 10^4$) | Peak position (cm^{-1}) |
|--------|---------------------------------|--------------------------------------|------------------------------------|
| 1 | 4.31 | 0.21 | 2881 |
| 2 | 4.69 | | 2881 |
| 3 | 4.34 | | 2881 |

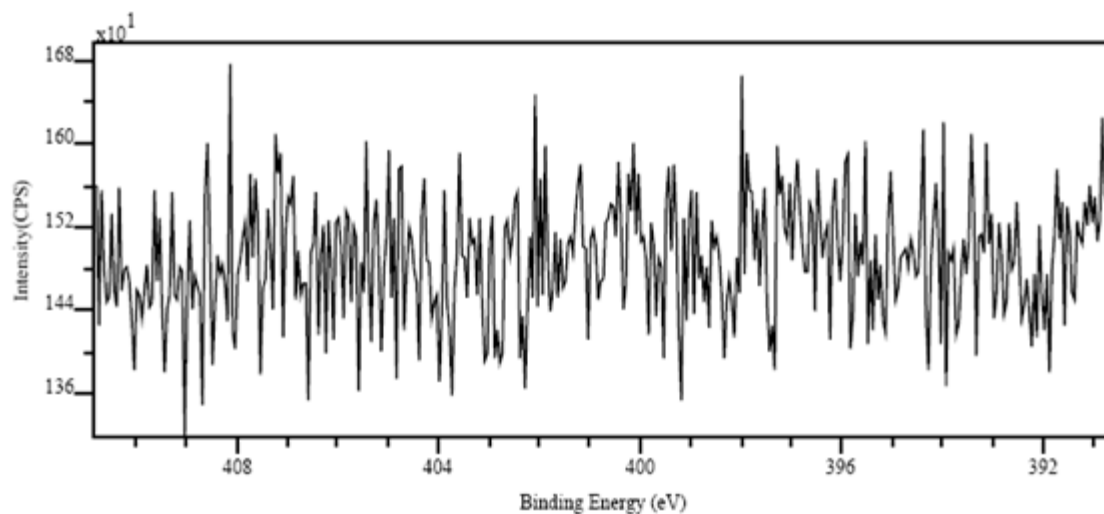


Fig. S1. HR-XPS of N 1s region to assure no nitrogen was found.

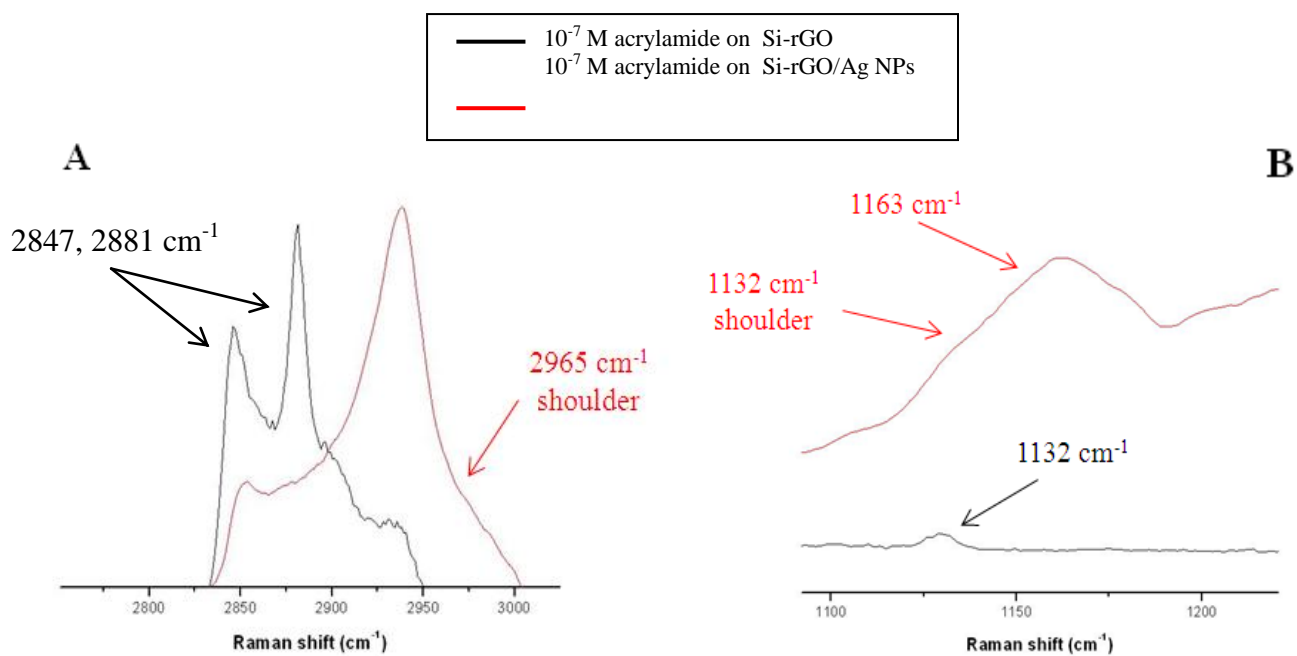


Fig. S2. (a) and (b) are magnified SERS spectra of Fig. 11 in different regions, showing the possible polymerisation of acrylamide to polyacrylamide indicated by the observed changes, which are absent in the GERS spectrum (without silver NPs).

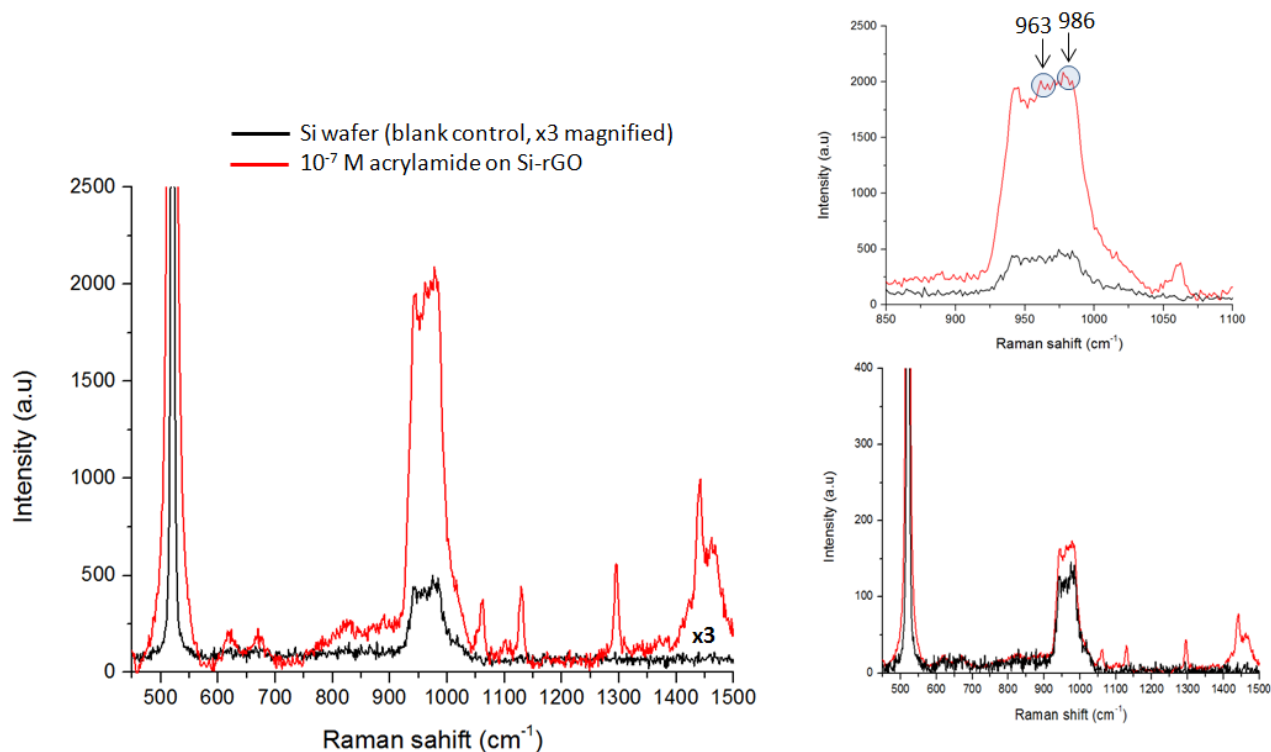


Fig. S3. An enlarged spectral region of the Raman curves of a control silicon wafer and Si/rGO wafer with 10^{-7} M acrylamide aq. solution. The upper inset highlights the 963 and 986 cm^{-1} peaks, and their resolved nature in acrylamide. The bottom inset is a normalised spectrum to emphasise the comparison of the overtone region. One can also see the 520-cm^{-1} wide peak in the acrylamide spectrum, and its shoulder starting at 490 cm^{-1} . The broad peak results from both Si as well as the O=C–N bending vibration of acrylamide.