Supporting information

For

Surface-enhanced Raman scattering from AgNP-graphene-AgNP sandwiched nanostructures

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A

S-4800 5.0kV 8.5mm x30 SE(M)   1.00mm

B

S-4800 5.0kV 8.5mm x25.0k SE(M)   2.00um

C

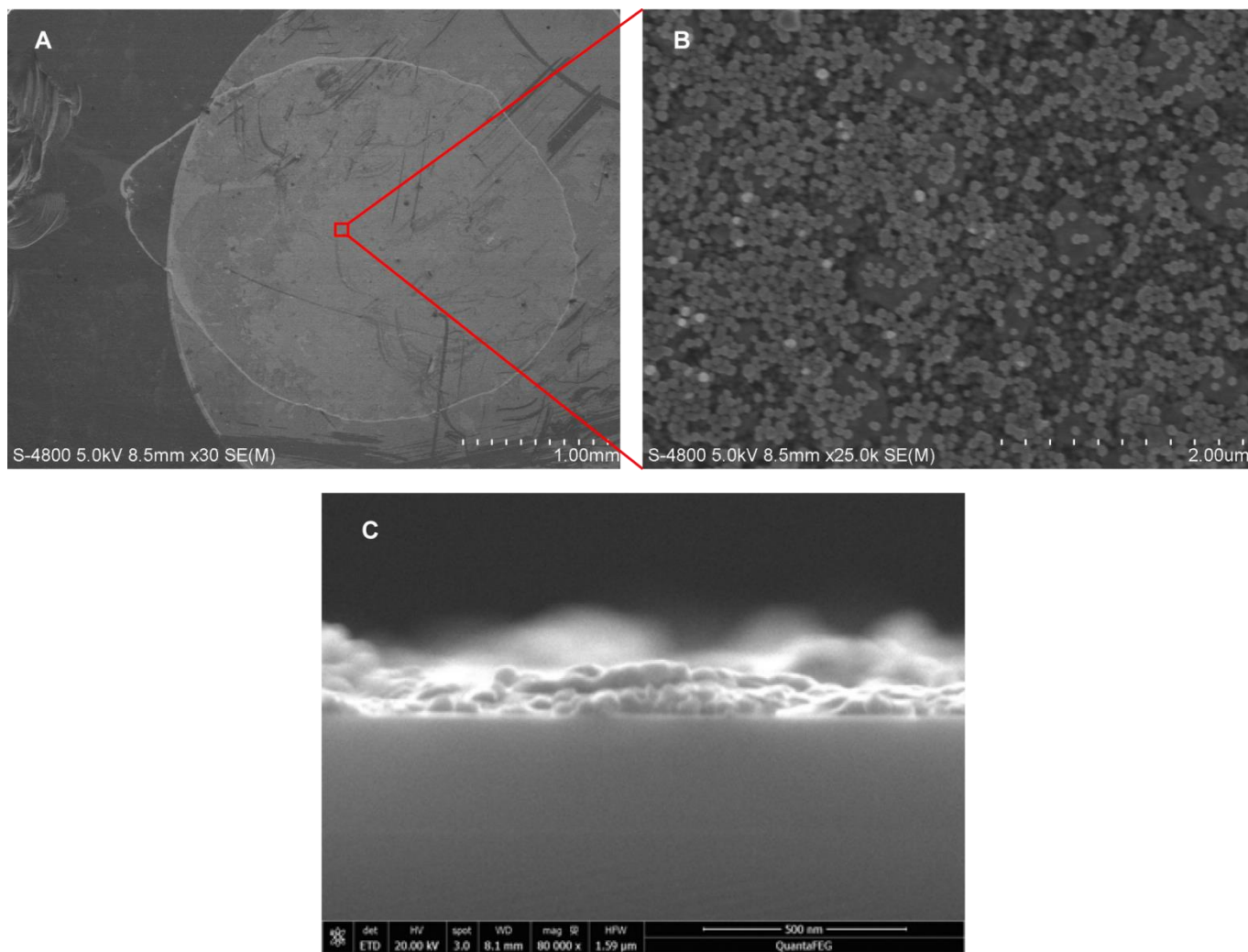| det | HV | spot | WD | mag ☒ | HFW | ⸺ 500 nm ⸺ |
| ETD | 20.00 kV | 3.0 | 8.1 mm | 80 000 x | 1.59 µm | QuantaFEG |

Figure S1. (A) SEM images of AgNP-graphene-AgNP structure. The edge of the two droplets and the overlapped area are visible in the images. (B) Zoomed-in image of (A). (C) Cross-sectional SEM image of the AgNP-graphene-AgNP structure.
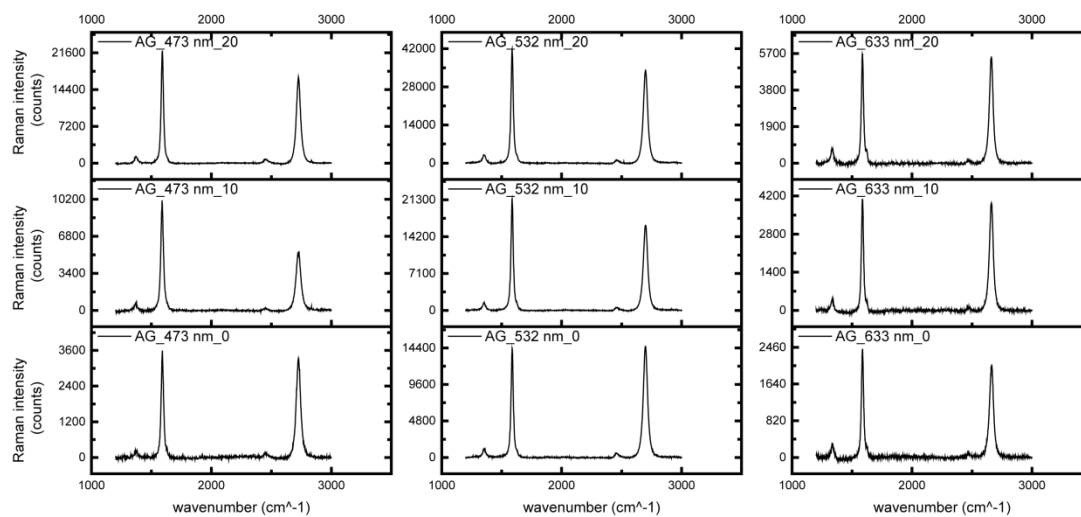
Figure S2. AgNP-graphene samples measured at various excitation wavelength and incident angle.
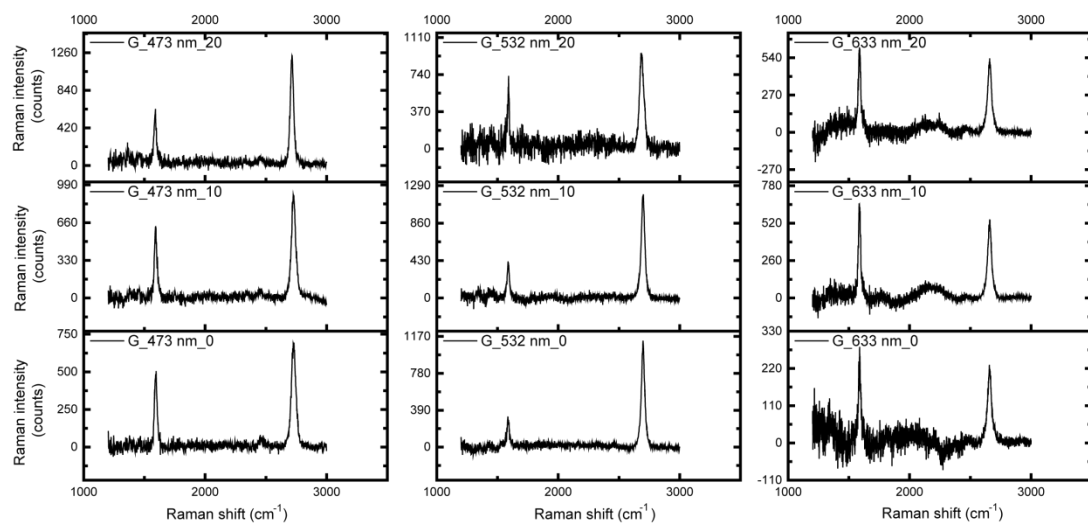
Figure S3. Bare graphene samples measured at various excitation wavelength and incident angle.
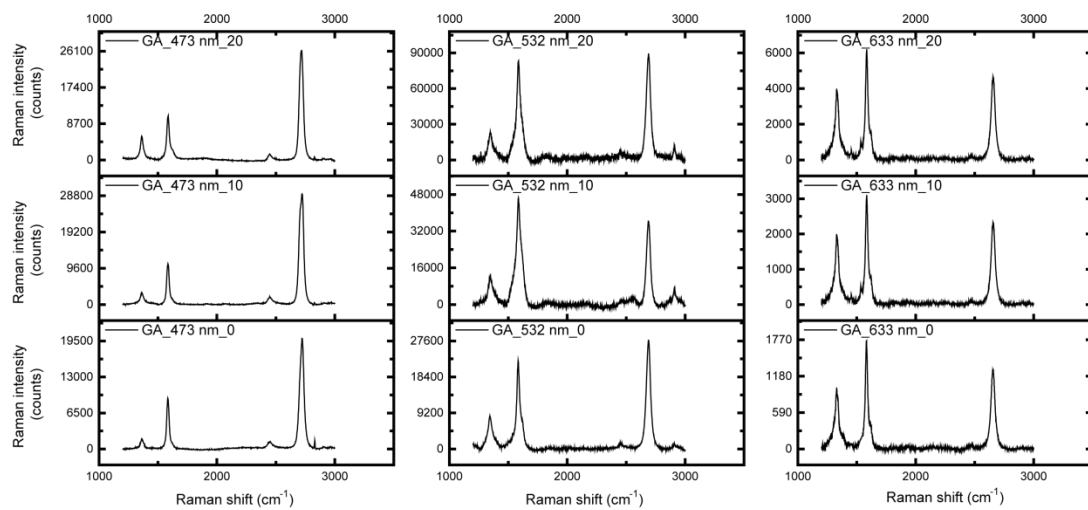
Figure S4. Graphene-AgNP samples measured at various excitation wavelength and incident angle.
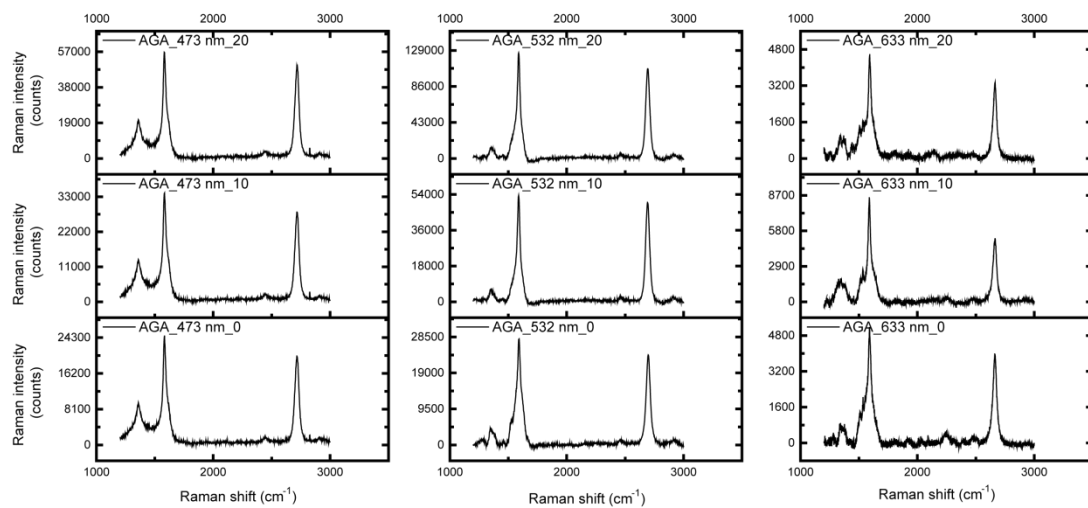
Figure S5. AgNP-graphene-AgNP samples measured at various excitation wavelength and incident angle.
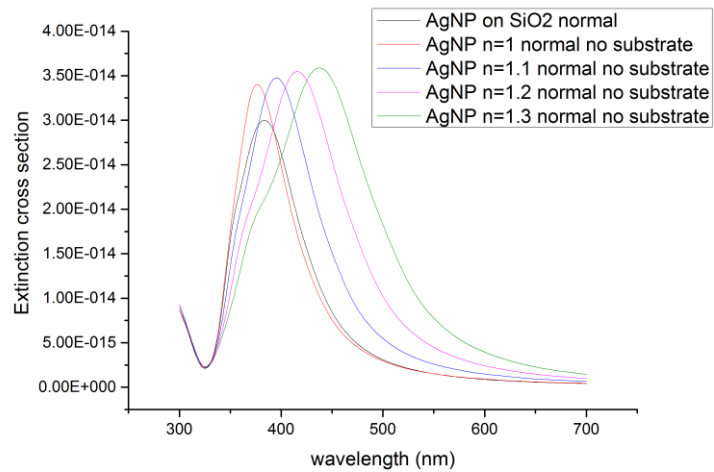
Figure S6. Comparison between the AgNP on the SiO$_2$ substrate and those in effective media with refractive index 1, 1.1, 1.2, and 1.3. The AgNPs are excited by a p-polarized light at normal incidence.
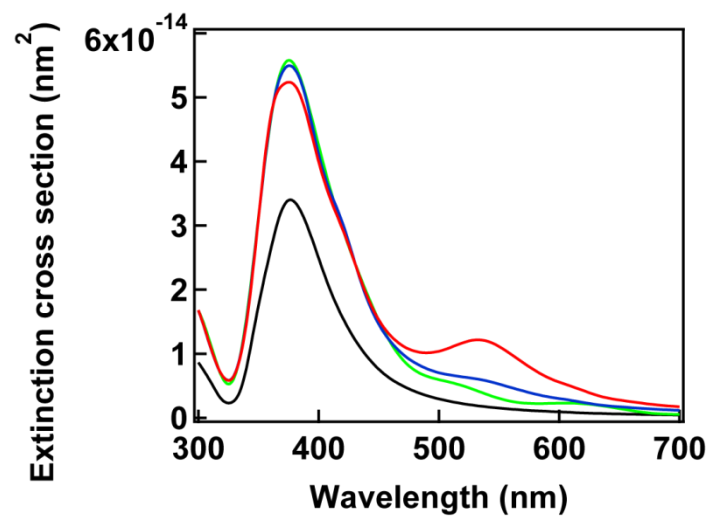
Figure S7. Extinction spectra of the AgNP monomer (black) and dimers excited at 0 °(green), 10 °(blue), and 20 ° (red) incident angles.
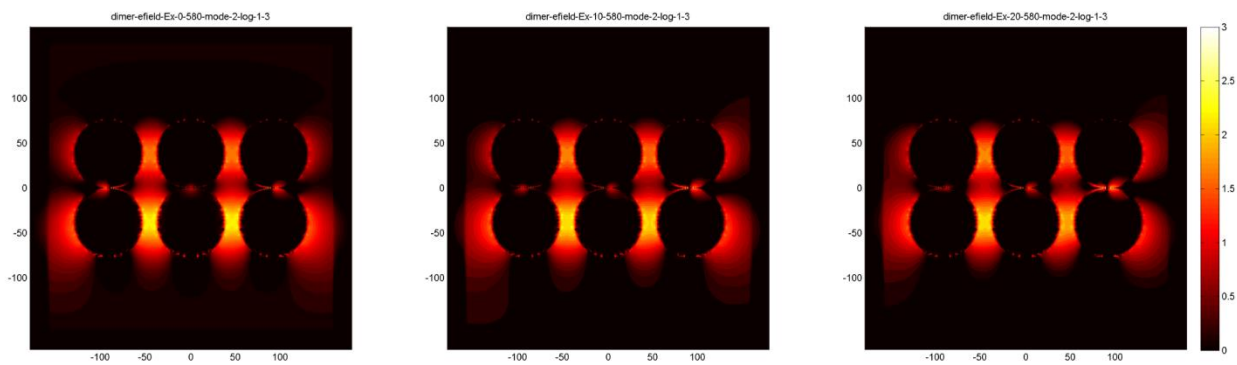
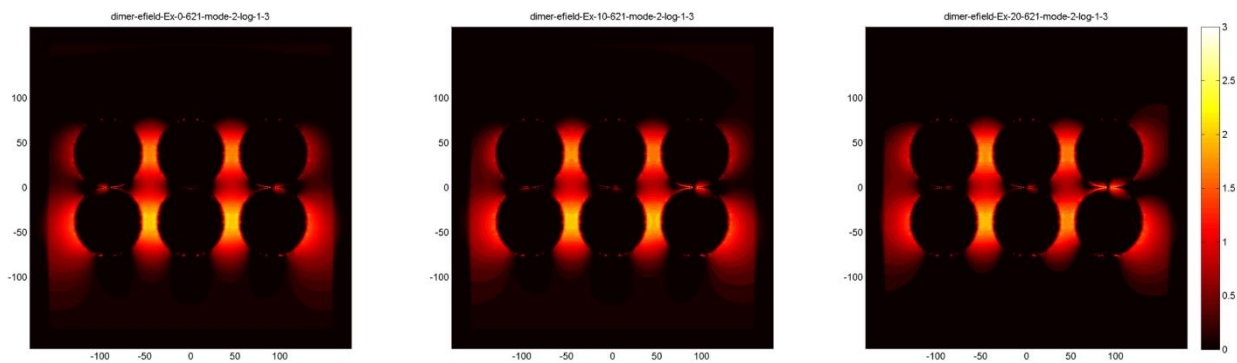Figure S8. Calculated logarithmic $[E_x^L/E_x^I]^2$ profiles of the AgNP dimer at 580 nm in case of 0 °, 10 °, and 20 ° incident angles.

Figure S9. Calculated logarithmic $[E_x^L/E_x^I]^2$ profiles of the AgNP dimer at 621 nm in case of 0 °, 10 °, and 20 ° incident angles.
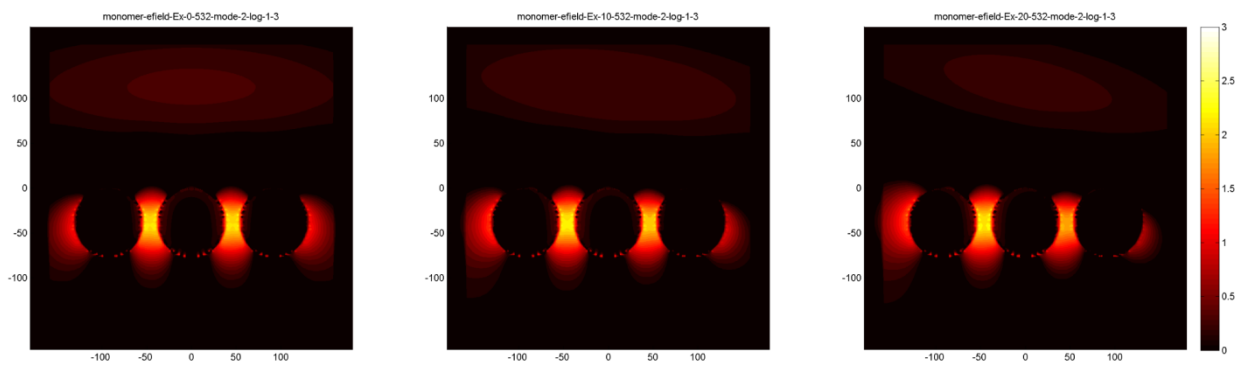
Figure S10. Calculated logarithmic $[E_x^L/E_x^I]^2$ profiles of the AgNP monomer at 532 nm in case of 0 °, 10 °, and 20 ° incident angles.
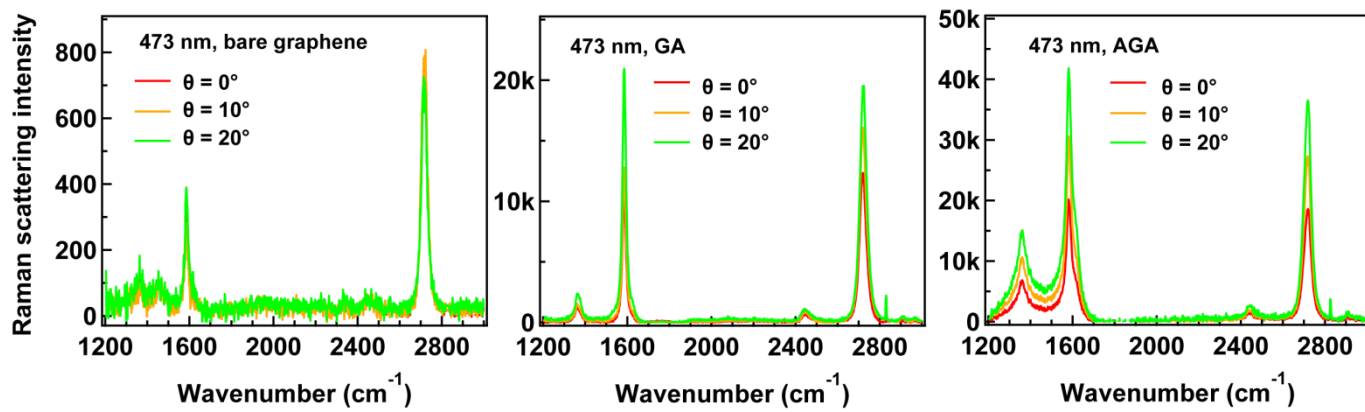
Figure S11. Raman spectra of bare graphene, GA, and AGA samples at 473 nm excitation wavelength.
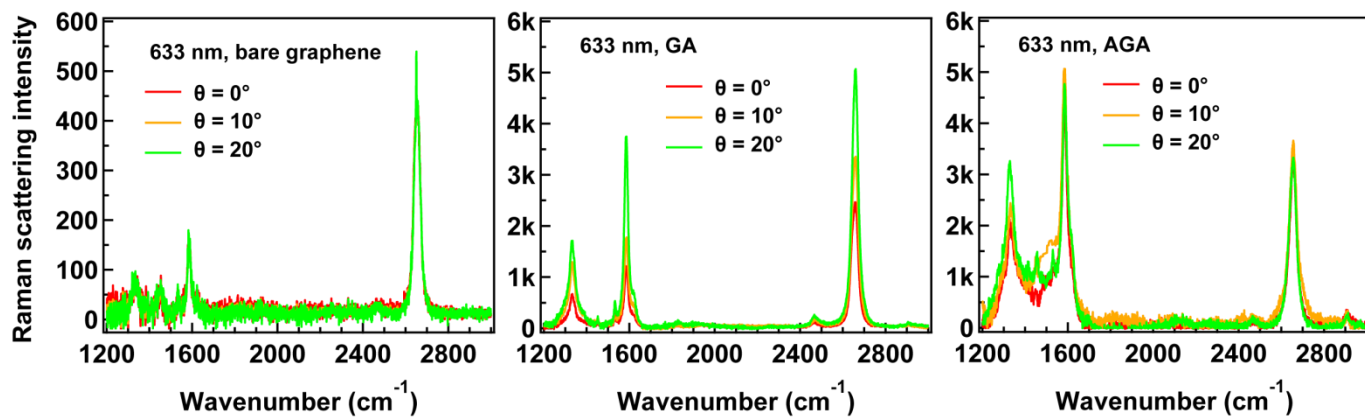
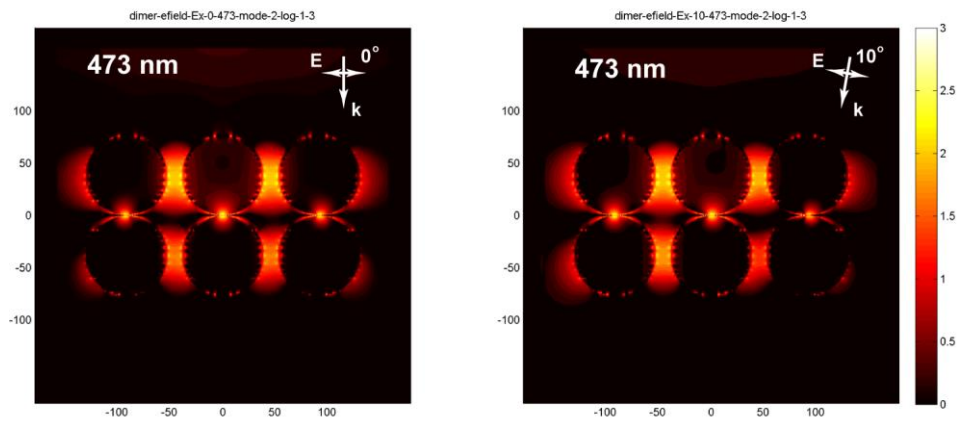Figure S12. Raman spectra of bare graphene, GA, and AGA samples at 633 nm excitation wavelength.

Figure S13. Calculated logarithmic $[E_x^L/E_x^I]^2$ profiles of the AgNP double layer structure at 473 nm in case of 0 ° and 10 ° incident angles.
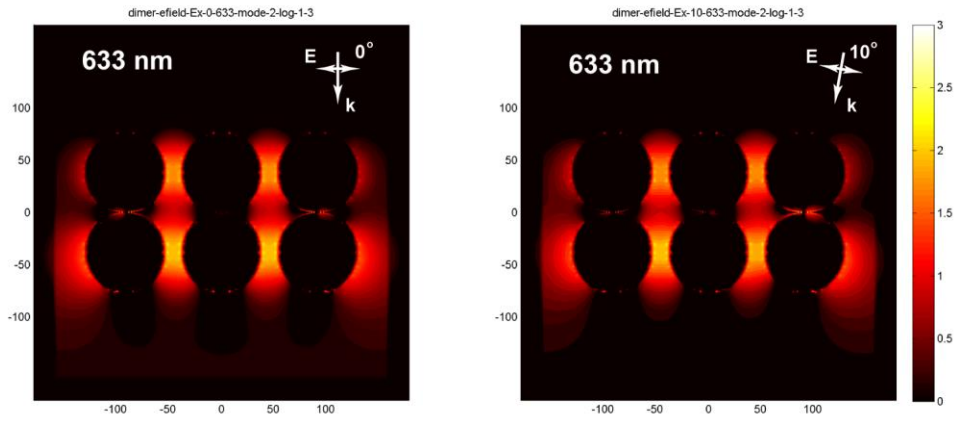
Figure S14. Calculated logarithmic $[E_x^L/E_x^I]^2$ profiles of the AgNP double layer structure at 633 nm in case of 0 ° and 10 °incident angles.
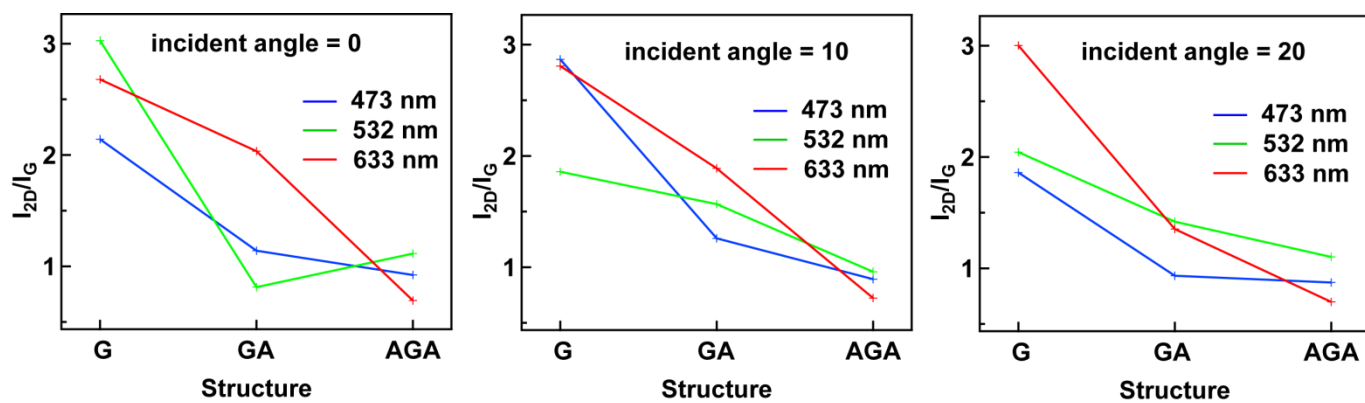
Figure S15. The ratio between 2D and G peaks of the graphene, I_{2D}/I_G, as a function of structure.