Electronic Supplementary Information

Synthesis of g-C$_3$N$_4$ Nanosheets/Au@Ag Nanoparticles Hybrids as SERS Probe for Cancer Cells Diagnostics

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Figure S1. (a) SEM image of the Au@AgNPs. The inset was the photograph of the synthesized Au@AgNPs. (b) TEM image of the Au@AgNPs. The illustration was the TEM image of Au@AgNPs with larger magnification.

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<th>Zeta-potential (mv)</th>
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<tr>
<td>C$_3$N$_4$</td>
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<td>-35.8</td>
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Table S1. The Zeta-Potential of the ultrathin g-C$_3$N$_4$ nanosheets and Au@AgNPs.
**Figure S2.** SEM image of the bulk g-C$_3$N$_4$.

**Figure S3.** TEM image of the ultrathin g-C$_3$N$_4$ nanosheet. The inset was the photograph of the suspension of ultrathin g-C$_3$N$_4$ nanosheets.
**Figure S4.** The IR spectrum of bulk g-C$_3$N$_4$ (a) and ultrathin g-C$_3$N$_4$ nanosheet (b).

**Figure S5.** Raman spectra of the bulk g-C$_3$N$_4$ (a) and ultrathin g-C$_3$N$_4$ nanosheet (b).
Figure S6. The size distribution of the obtained ultrathin g-C$_3$N$_4$ nanosheets.

Figure S7. (a) High-magnification TEM image of g-C$_3$N$_4$/Au@Ag NPs nanohybrids, (b) the corresponding HRTEM image of one single Au@Ag NP.
Figure S8. TEM image and the corresponding EDS elemental distribution of Au, Ag, N in the g-C$_3$N$_4$/Au@Ag NPs nanohybrids.

Figure S9. XRD patterns of (a) bulk g-C$_3$N$_4$, (b) ultrathin g-C$_3$N$_4$ nanosheets, (c) Au@Ag NPs and (d) g-C$_3$N$_4$/Au@Ag NPs nanohybrids.
**Figure S10.** The SERS intensity of $1 \times 10^{-13}$ M R6G molecules at 1360 cm$^{-1}$ from g-C$_3$N$_4$/Au@AgNPs hybrids with various concentrations Au@AgNPs: 0.05 nM, 0.10 nM, 0.20 nM and 0.40 nM.

**Figure S11.** Raman intensity of R6G at 1360 cm$^{-1}$ with different concentrations from $1 \times 10^{-17}$ M to $1 \times 10^{-9}$ M obtained from g-C$_3$N$_4$/Au@AgNPs hybrids.
Figure S12. (a) SERS spectra of $1.0 \times 10^{-13}$ M R6G molecules from 10 random sites, (b) the corresponding SERS intensity of R6G (at 1360 cm$^{-1}$) obtained from the above sites.

Figure S13. SERS spectra of FA with the same concentration (100 nM) obtained from g-$\text{C}_3\text{N}_4$/Au@AgNPs and Au@AgNPs, respectively.
Figure S14. (a) TEM image of ultrathin g-C$_3$N$_4$ nanosheets/AgNPs (g-C$_3$N$_4$/AgNPs) composite structure. The inset was the photograph of above mentioned nanocomposite. (b) SERS spectra of R6G molecules with different concentrations (from 1×10$^{-10}$ M to 1×10$^{-14}$ M) obtained from g-C$_3$N$_4$/AgNPs. (c) SERS spectra of FA with different concentrations: 0 nM, 25 nM, 50 nM, 75 nM, 100 nM. (d) SERS spectra of FA with the same concentration (100 nM) obtained from g-C$_3$N$_4$/Au@AgNPs (a) and g-C$_3$N$_4$/AgNPs (b).
Figure S15. UV-vis spectra of FA, Au@AgNPs and g-C$_3$N$_4$/Au@AgNPs-FA.

Figure S16. Viability of HeLa cells after 24 h of incubation with different concentrations of g-C$_3$N$_4$/Au@AgNPs-FA.