Supplementary Information for:

Label-free detecting the compaction and decompaction of ctDNA molecules induced by surfactants with SERS based on nanoPAA -$ZnCl_2$-AuLs solid substrate

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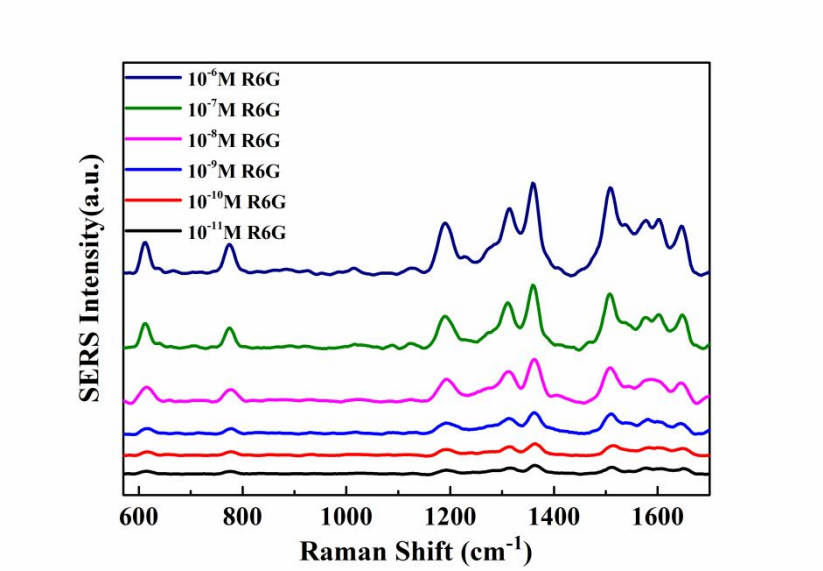

Figure S1. SERS Spectra of R6G solution with concentration changed from 10^{-6} M to 10^{-11} M on nanoPAA-$ZnCl_2$-AuLs substrate.

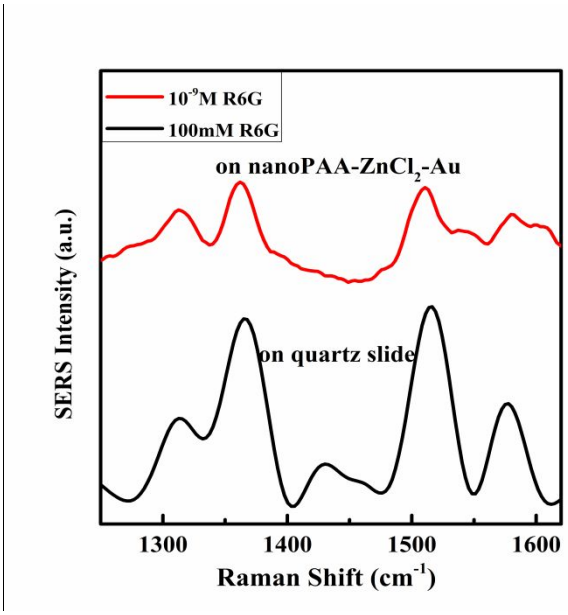

Figure S2. Spectrum of 10^{-9}M R6G collected on nanoPAA-$ZnCl_2$-AuLs substrate for Enhancement factors (EFs) calculation with a Raman spectrum of 100 mM R6G collected on quartz slide as a reference.

For enhancement factors, the scientific fomula commonly used definition is:

$$EF = \frac{I_{surf}/N_{surf}}{I_{bulk}/N_{bulk}}, \quad (1)$$

where I_{surf} and I_{bulk} represent the intensities of SERS and the normal

Raman scattering, respectively, while N_{surf} and N_{bulk} are the corresponding number of molecules able to be irridiated by laser, respectively.

$$\overline{N} = C \cdot V \cdot N_A \cdot \frac{S_2}{S_1} , \quad (2)$$

where C represents concentration of probe solution, V represents droplet volume, N_A is Avogadro's number, S_1 represents droplet size and S_2 represents irradiation area size of laser, respectively.

In the experiment, the parameters V, S_1 and S_2 were precisely controlled to be constant. Therefore, the ratio of molecule number is equal to ratio of probe concentration, EFs for each characteristic SERS peak could be estimated according to the deformation of formula (1):

$$EF = \frac{I_{SERS}/C_{SERS}}{I_{Raman}/C_{Raman}}, \quad (3)$$

where I_{SERS} and I_{Raman} are the SERS and the normal Raman scattering intensities, respectively, while C_{SERS} and C_{Raman} are the corresponding concentration, respectively.

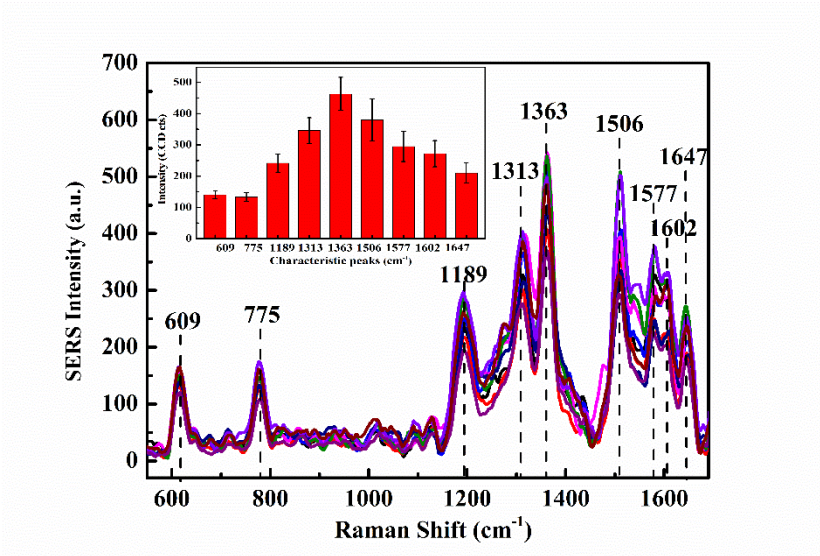

Figure S3. SERS spectra of 10^{-9}M R6G aqueous solution collected from 9 different spots on nanoPAA-$ZnCl_2$-AuLs substrate. The inset shows mean ± standard deviation of SERS intensity for each characteristic peak.