

## Supporting Information

### Quantitative Label Free RNA detection using Surface Enhanced Raman Spectroscopy.

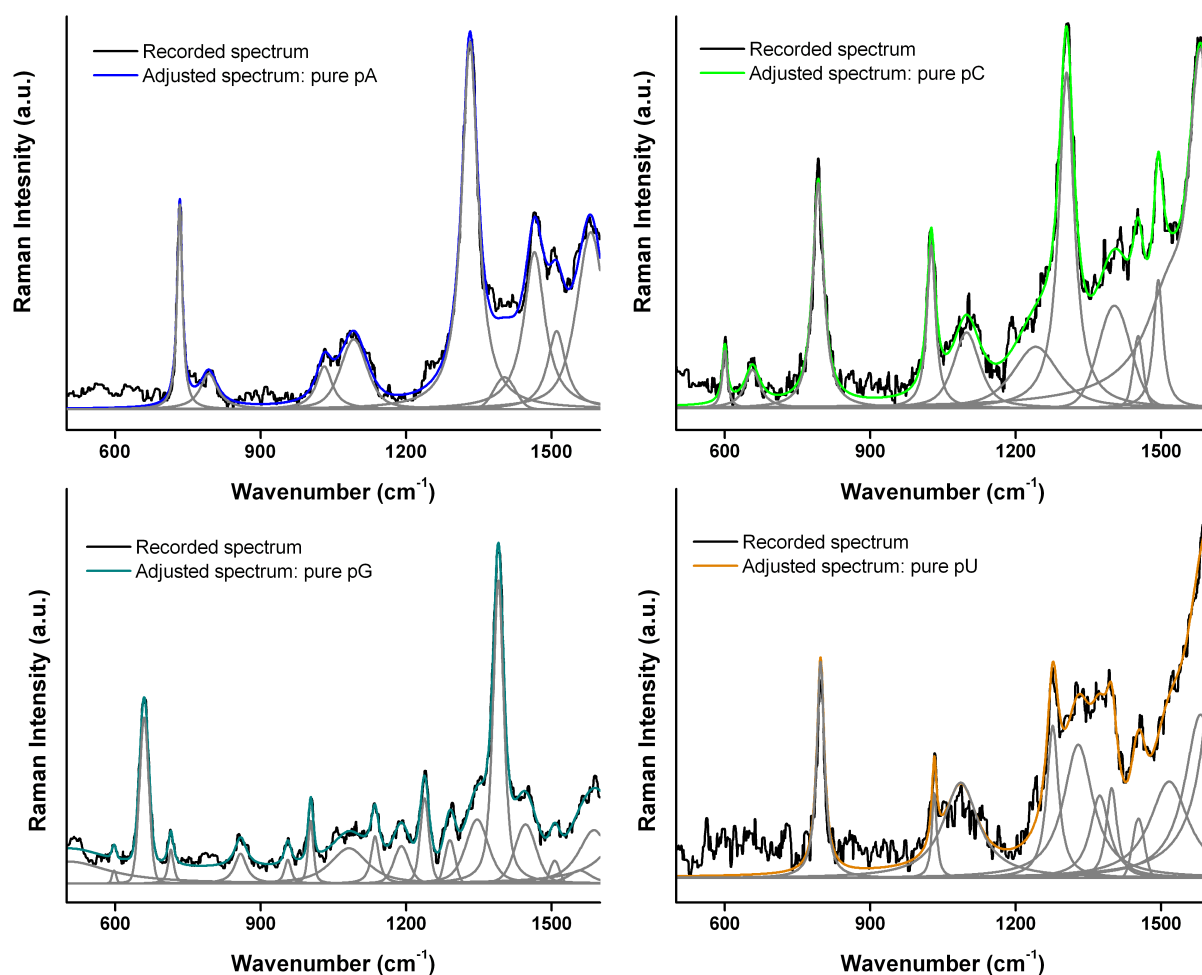
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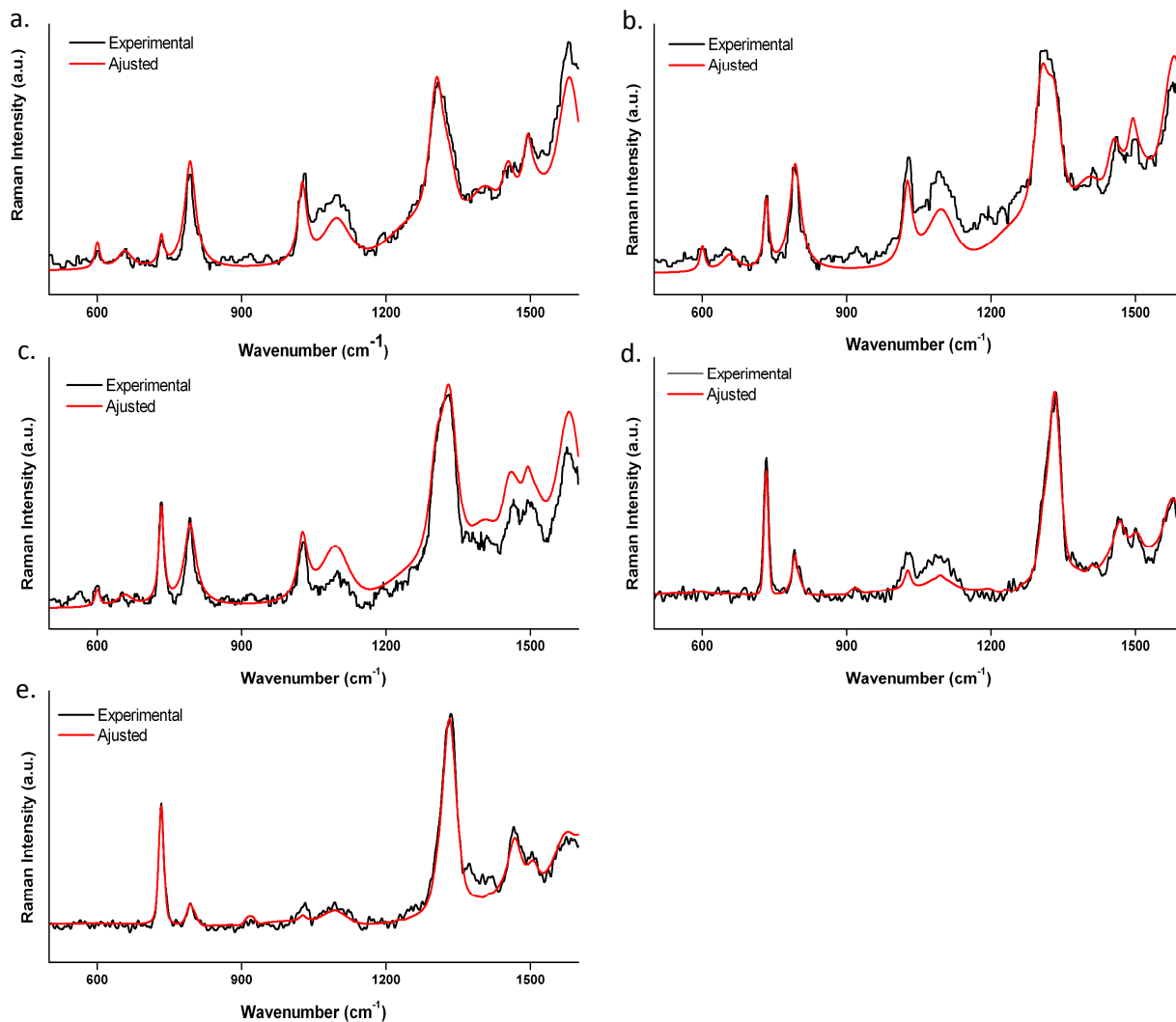
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#### 1. Deconvolution of the pure spectra of each bases.

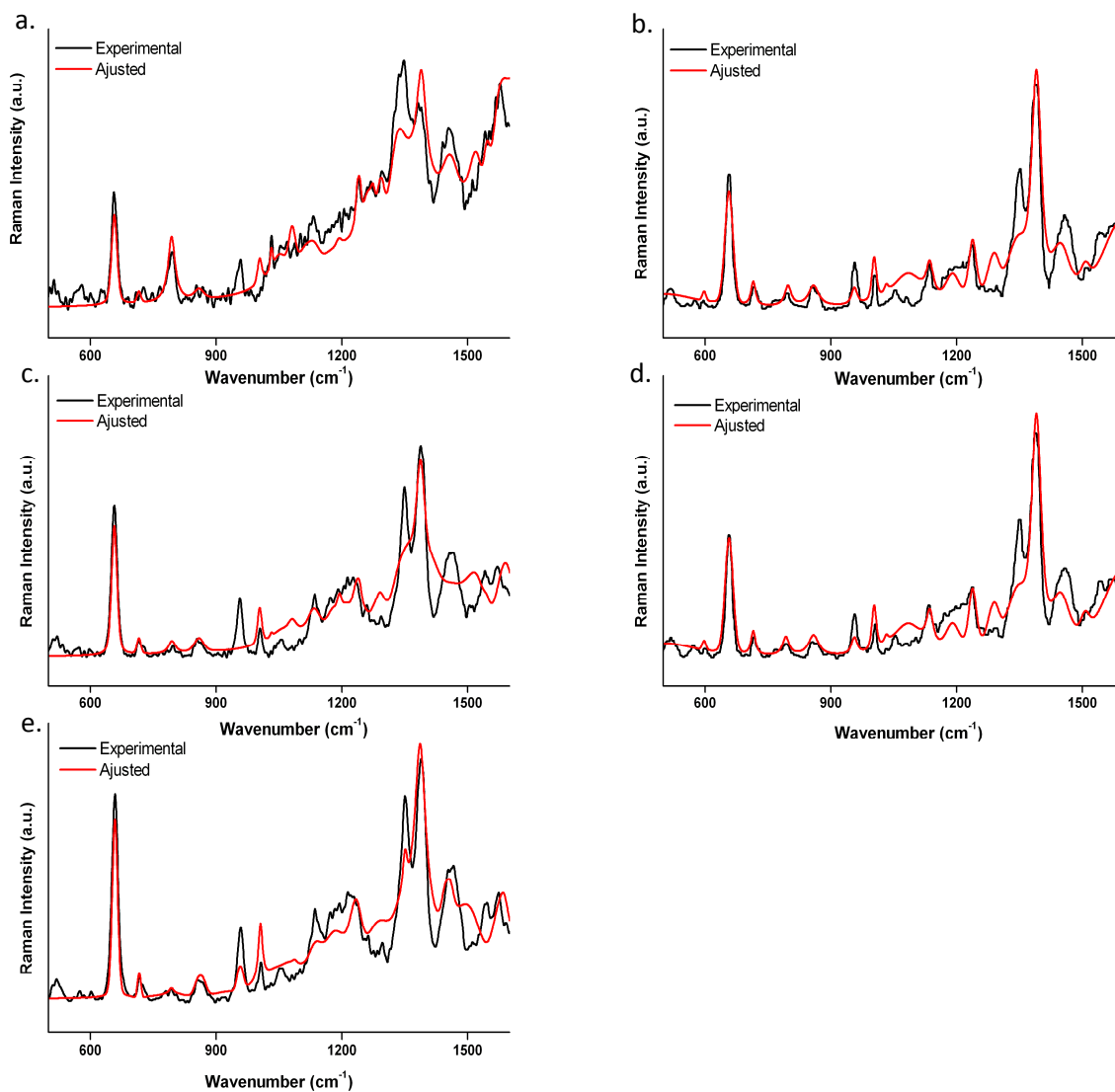


**Fig. S1** Decomposition of the SERS spectrum (black line) of each polynucleotide (pA, pC, pG and pU at 2 nmol (sb)) in elementary bands (mixture Lorentz-Gauss). Adjusted spectra are shown in blue for pA, green for pC, cyan for pG and orange for pU. Conditions for record SERS spectra: silver colloids, [MgCl<sub>2</sub>]=2.5mM,  $\lambda_{\text{exc}}$  = 514nm, accumulation time 60 s; power at the sample 10mW.

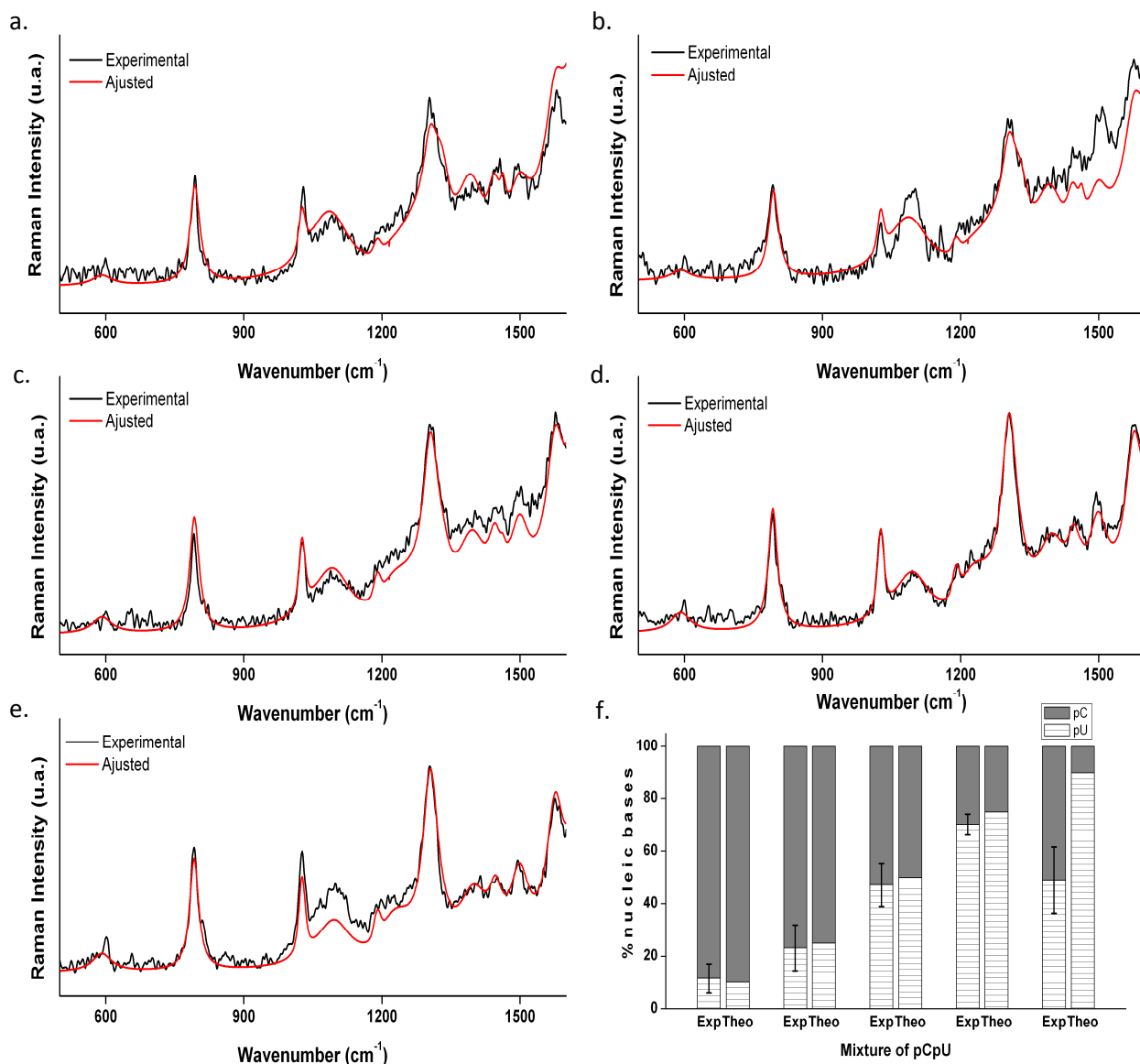
## 2. Experimental and adjusted SERS spectra for all mixtures.



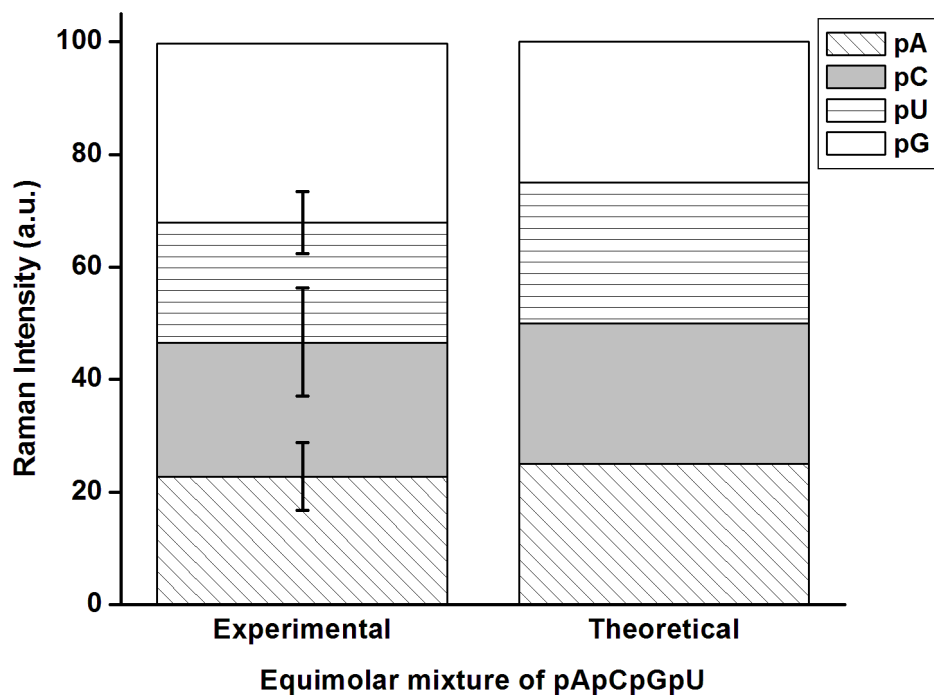
**Fig. S2** Mixing spectrum of pA and pC. Spectra of pure pA and pC (1 nmol sb each) fitted then combined in order to obtain adjusted spectrum (silver colloids, [MgCl<sub>2</sub>]=2.5mM,  $\lambda_{ex}$  = 514nm, accumulation time 60 s; 10mW). **a.** Mixing spectrum of pA and pC (0.2 nmol sb and 1.8 nmol sb respectively). **b.** Mixing spectrum of pA and pC (0.5 nmol sb and 1.5 nmol sb respectively). **c.** Mixing spectrum of pA and pC (1 nmol sb for each species). **d.** Mixing spectrum of pA and pC (1.5 nmol sb and 0.5 nmol sb respectively). **e.** Mixing spectrum of pA and pC (1.8 nmol sb and 0.2 nmol sb respectively). Experimental spectra in black, adjusted spectra in red.



**Fig. S3** Mixing spectrum of pG and pU. Spectra of pure pG and pU (1 nmol sb each) fitted then combined in order to obtain adjusted spectrum (silver colloids, [MgCl<sub>2</sub>]=2.5mM,  $\lambda_{\text{ex}} = 514\text{nm}$ , accumulation time 60 s; 10mW). **a.** Mixing spectrum of pG and pU (0.2 nmol sb and 1.8 nmol sb respectively). **b.** Mixing spectrum of pG and pU (0.5 nmol sb and 1.5 nmol sb respectively). **c.** Mixing spectrum of pG and pU (1 nmol sb for each species). **d.** Mixing spectrum of pG and pU (1.5 nmol sb and 0.5 nmol sb respectively). **e.** Mixing spectrum of pG and pU (1.8 nmol sb and 0.2 nmol sb respectively). Experimental spectra in black, adjusted spectra in red.



**Fig. S4** Mixing spectrum of pC and pU. Spectra of pure pC and pU (1 nmol sb each) fitted then combined in order to obtain adjusted spectrum (silver colloids,  $[\text{MgCl}_2]=2.5\text{mM}$ ,  $\lambda_{\text{ex}} = 514\text{nm}$ , accumulation time 60 s; 10mW). **a.** Mixing spectrum of pC and pU (0.2 nmol sb and 1.8 nmol sb respectively). **b.** Mixing spectrum of pC and pU (0.5 nmol sb and 1.5 nmol sb respectively). **c.** Mixing spectrum of pC and pU (1 nmol sb for each species). **d.** Mixing spectrum of pC and pU (1.5 nmol sb and 0.5 nmol sb respectively). **e.** Mixing spectrum of pC and pU (1.8 nmol sb and 0.2 nmol sb respectively). **f.** Comparison between experimental (Exp) and theoretical (Theo) proportions of pC and pU in different mixtures (2 nmol sb). The error bars were determined from the analysis of eight mixtures prepared with the same proportion of bases. Experimental spectra in black, adjusted spectra in red.



**Fig. S5** Comparison between experimental (Exp) and theoretical (Theo) proportions of pA, pC, pG and pU in equimolar mixing (0.5 nmol (sb) for each specie). The error bars were determined from the analysis of eight mixtures prepared with the same proportion of bases (0.5 nmol (sb) for each).