

Supporting Information

**Gold nanostars as SERS-active substrates
for FT-Raman spectroscopy**

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Fig S1 – Extinction spectra recorded on fresh SF-NSs and one day after.

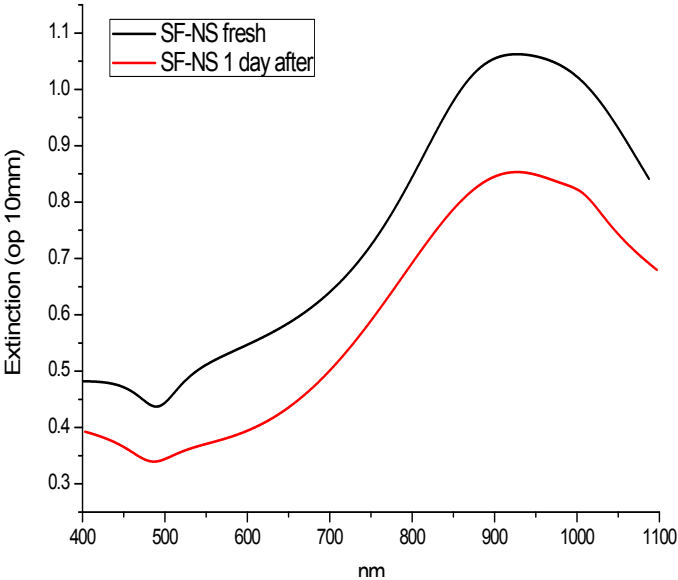


Fig S2 – Absorption spectrum of 1.6×10^{-6} M NF8 in H₂O:EtOH 10:1 at different CTAB concentrations.

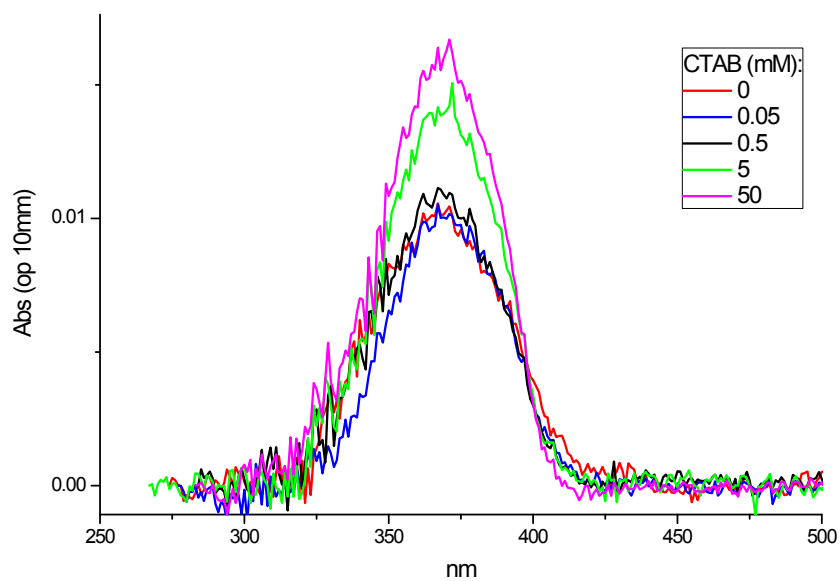


Fig S3 – Structural features of *SF-NSs* obtained by Log-normal fitting of the statistical distributions.

<u>Core diameter</u>	<u>Tip angle</u>	<u>Branch length</u>	<u>Tip radius</u>	<u>Circumscribed circumference diameter</u>
Peak: 39 nm σ^- : 17 nm σ^+ : 29 nm	Peak: 9° σ^- : 5° σ^+ : 11°	Peak: 27 nm σ^- : 10 nm σ^+ : 15 nm	Peak: 3 nm σ^- : 1 nm σ^+ : 1 nm	Peak: 120 nm σ^- : 28 nm σ^+ : 36 nm

Fig S4 – Structural features of *CTAB-NSs* obtained by Log-normal fitting of the statistical distributions.

<u>Core diameter</u>	<u>Tip angle</u>	<u>Branch length</u>	<u>Tip radius</u>	<u>Circumscribed circumference diameter</u>
Peak: 76 nm σ^- : 9 nm σ^+ : 10 nm	Peak: 23° σ^- : 7° σ^+ : 10°	Peak: 53 nm σ^- : 14 nm σ^+ : 20 nm	Peak: 5 nm σ^- : 1 nm σ^+ : 1 nm	Peak: 179 nm σ^- : 29 nm σ^+ : 34 nm

Fig S5 – Dependence of the SERS signal of NF8 (measured as the integrated area of the band at 1400 cm^{-1}) on the NF8 concentration (log scale).

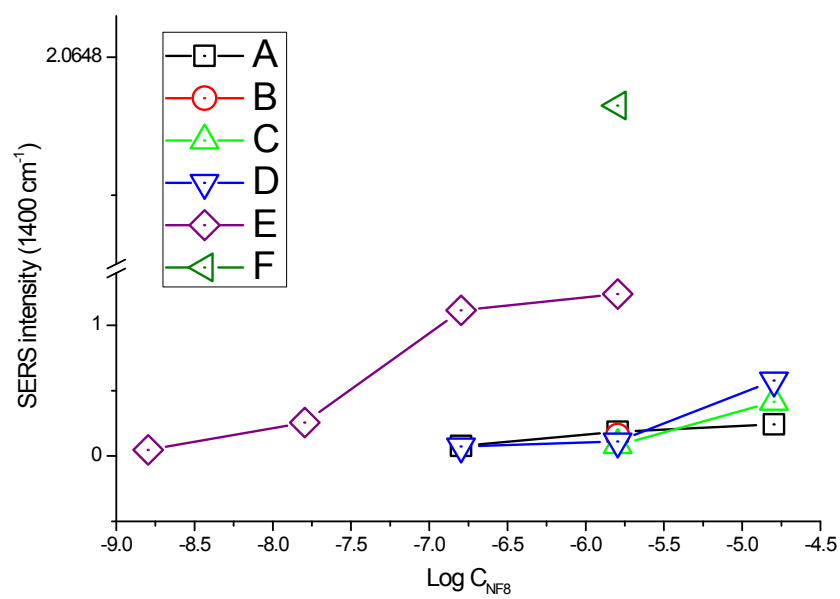


Fig S6 – UV-vis spectra of a) supernatant solutions of Au-NSs incubated with 1.6×10^{-6} M NF8; b) NF8 in the supernatant of **C4** sample compared with that taken from the original solution (50 mM CTAB); c) NF8 in the supernatant of **D4** sample compared with that taken from the original solution (5 mM CTAB).

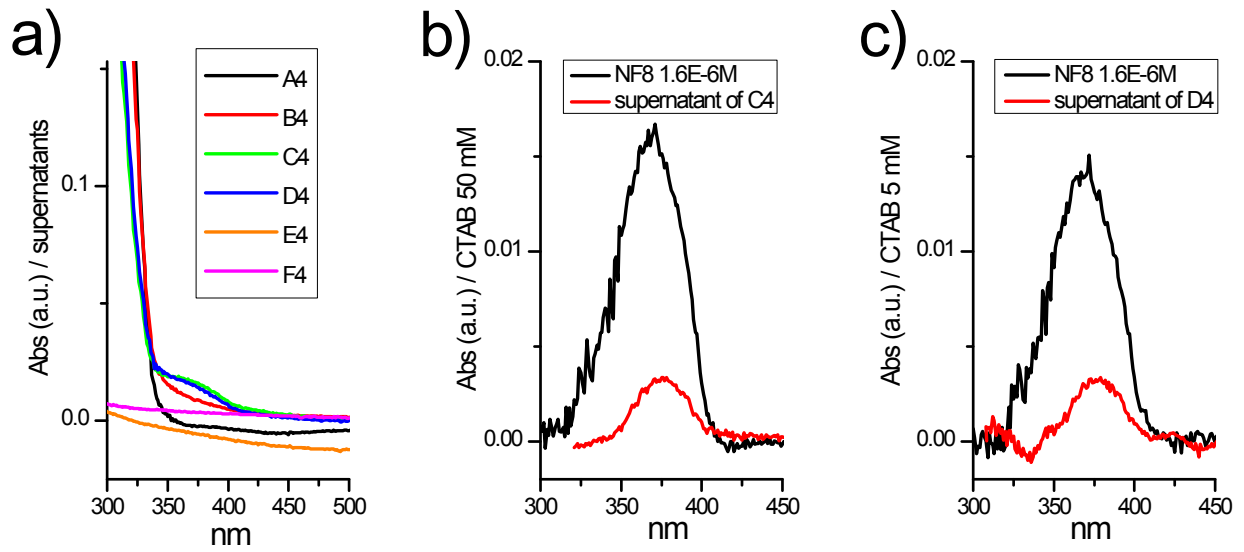
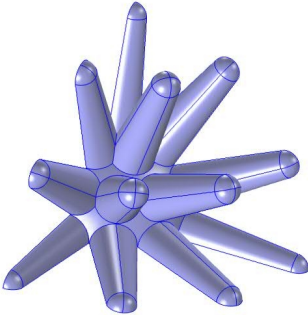
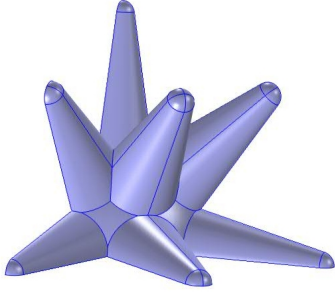


Fig S7 – Model structures of *SF-NSs* and *CTAB-NSs* and morphological data.

		<i>SF-NSs</i> (54 tips)	<i>CTAB-NSs</i> (26 tips)
Portion (1/8) of the modelled structure			
Single nanostar	tips surface (nm ²)	2789	3250
	total surface (nm ²)	37490	83278
	volume (nm ³)	629900	101480
NSs density: nanoparticles/ml		1.7×10^{10}	2.4×10^9
1 ml of solution	tips surface (nm ²)	4.7×10^{13}	7.8×10^{12}
	total metallic surface (nm ²)	6.4×10^{14}	2.4×10^{14}