

Supporting Information

Polydiacetylene stabilized gold nanoparticles – extraordinary high stability and integration into a nanoelectrode device

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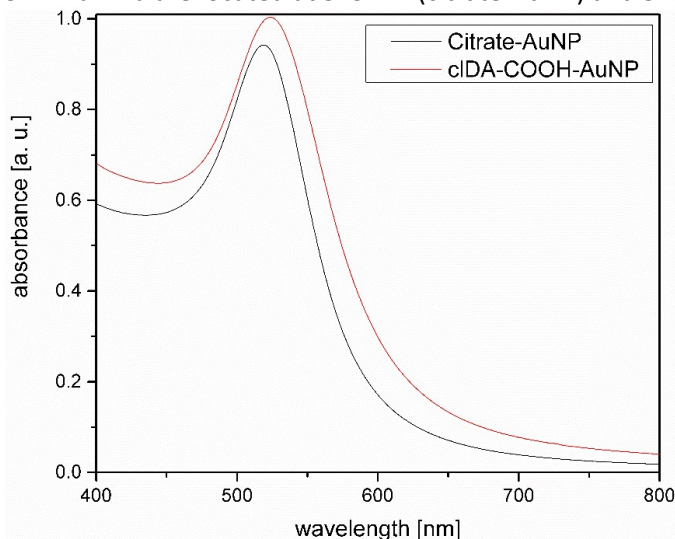
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SI_figure 1:

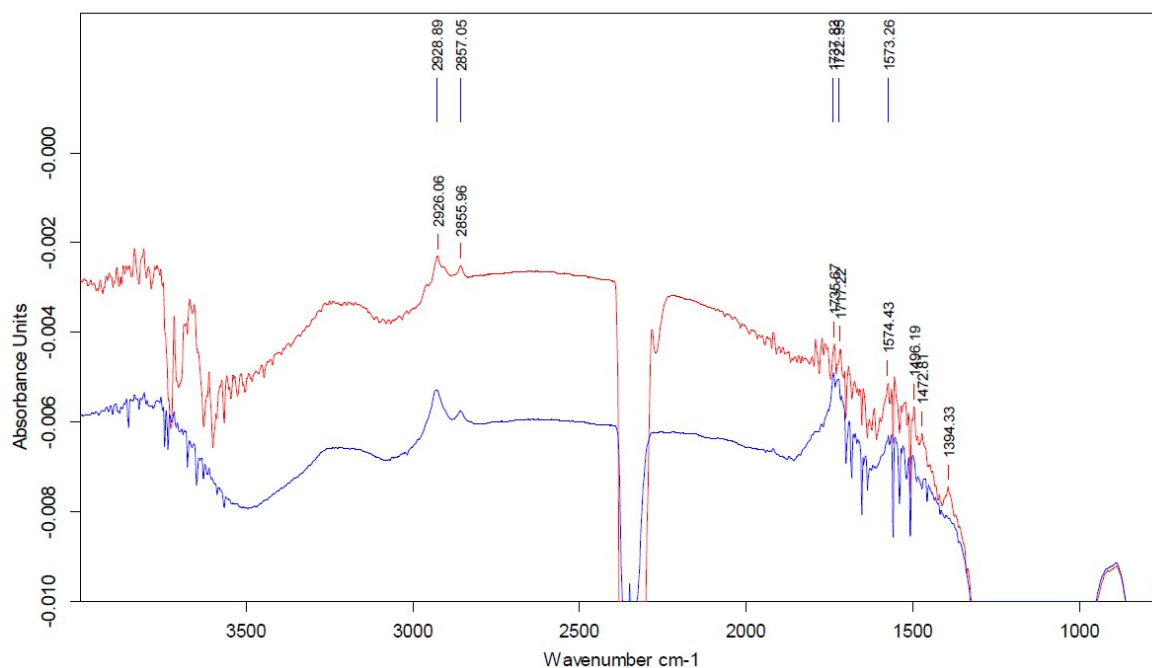
UV-vis spectra of citrate-AuNP and *c*/DA-COOH-AuNP from 400-800 nm.

SPR maxima are located at 519 nm (citrate-AuNP) and 523 nm (*c*/DA-COOH-AuNP).



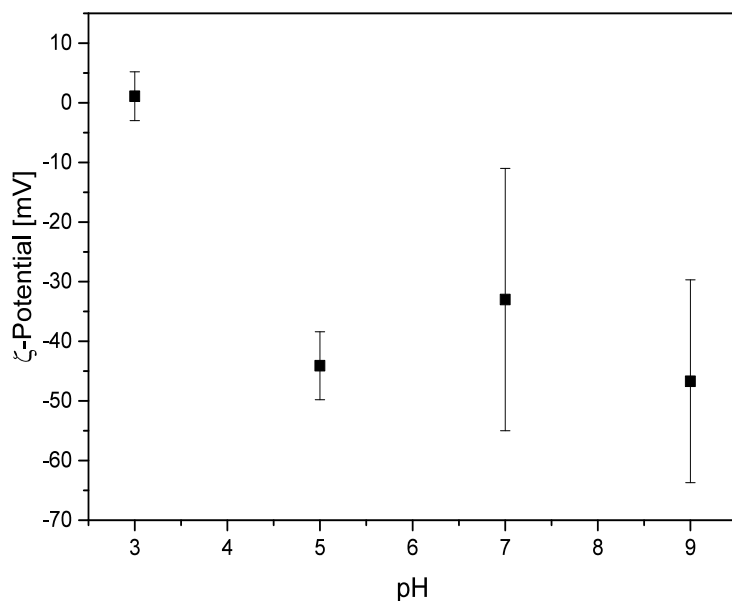
SI-figure 2:

IRRAS spectra of citrate-AuNP (red spectrum) and *c*/DA-COOH-AuNP (blue spectrum).



SI-figure 3:

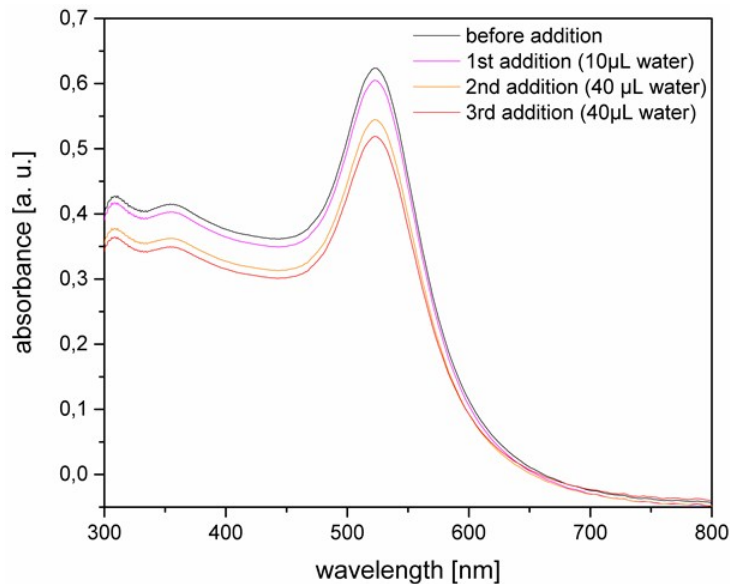
ζ -potential Measurements of *c*/DA-COOH-AuNP at pH 3, 5, 7 and 9. Solvent: Phosphate buffer solution (10 mM).



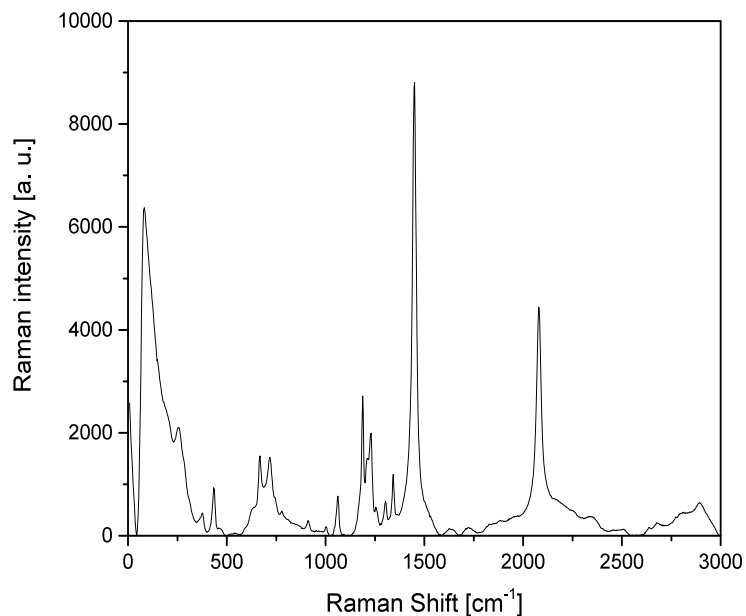
Phosphate buffer 10mM	ξ -Potential [mV]	STD
pH3	+1.1	4.1
pH5	-44.1	5.7
pH7	-33.0	22.0
pH9	-46.7	17.0

SI-figure 4:

In order to demonstrate the dilution effect on the absorption intensity, we performed UV-vis reference measurements of *c*/DA-COOH-AuNP redispersed in water. Therefore we added pure water in the same volume as applied in our experiments adding NaOH or HCl solution, respectively. The corresponding UV-vis spectra are shown below. Upon adding water the absorption intensity is lowered. The absolute intensity decrease cannot be directly correlated to the experiments addition NaOH or HCl due to different extinction coefficients.

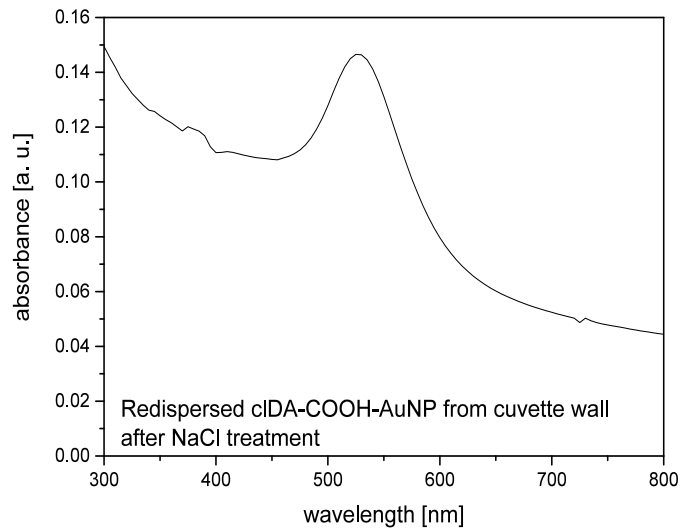
**SI-figure 5:**

RAMAN spectrum of unbounded DA-COOH monomer with characteristic bounds at 1451 cm^{-1} $\nu(\text{CO})$ and 2081 cm^{-1} $\nu(\text{CC})$.



SI-figure 6:

UV-vis spectrum of redispersed AuNP after NaCl treatment from 300-800 nm. SPR maximum is located at 525 nm.



SI-figure 7:

Thermal stability of *c*/DA-COOH-AuNP towards continuous heating at 50°C. UV-vis spectra of *c*/DA-COOH-AuNP in phosphate buffer (0.1M, pH8) incubated at 50°C for 5h. SPR band maximum is located at 523 nm.

