

## Supplementary Materials

# Suitable Polymeric Coatings to Avoid Localized Surface Plasmon Resonance Hybridization in Printed Patterns of Photothermally Responsive Gold Nanoinks

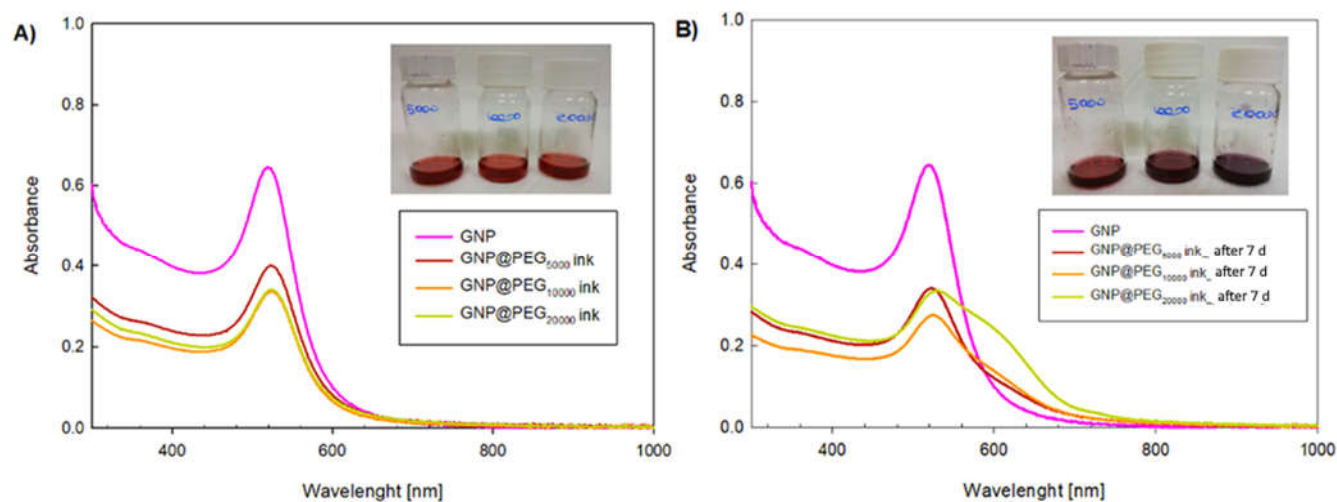
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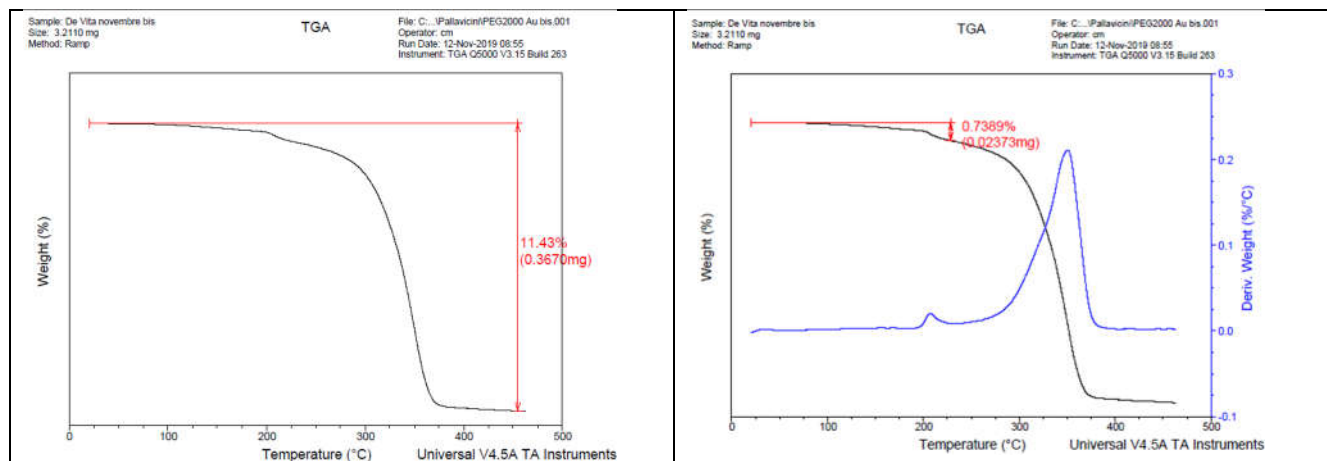
### SM1. Inks ageing for AuNP@HS-PEGX000 (X = 5, 10, 20)



A: Absorption spectra of GNP in water (pink spectrum) and absorption spectra of inks 1 d after preparation; inset: photography of the three inks just before recording the spectra

B: same, after 7 days

**SM 2. TGA (thermogravimetric analysis) for AuNP@HS-PEG<sub>X000</sub> (X = 2, 5, 10, 20)**

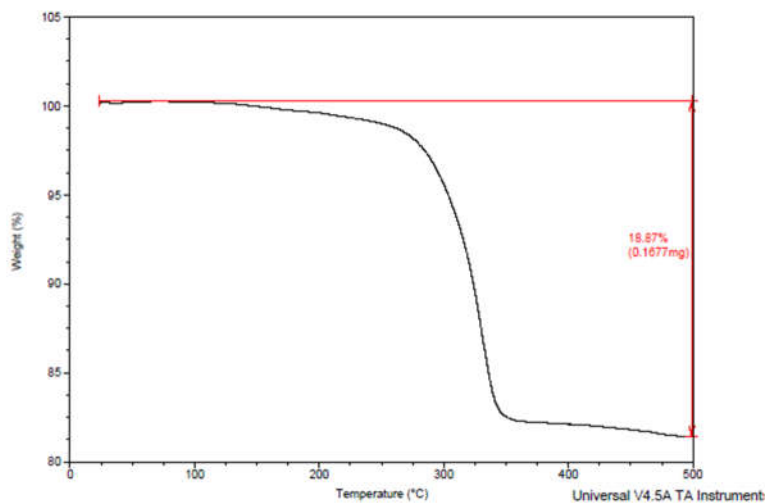


**SM2A:** left, TGA on AuNP@HS-PEG<sub>2000</sub>; right, determination of the solvent (water) content.

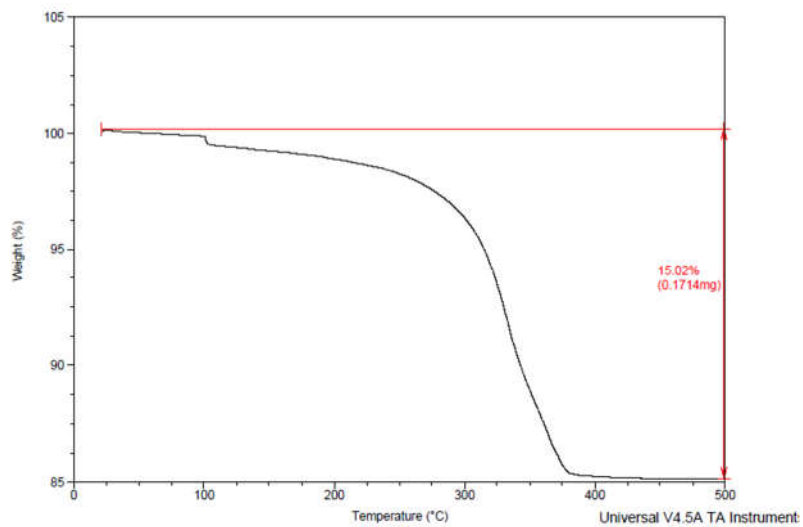
Au content in a 100 g sample of AuNP@HS-PEG<sub>2000</sub>:  $100 - 11.43 = 88.57\text{g}$

HS-PEG<sub>2000</sub> content in a 100 g sample of AuNP@HS-PEG<sub>2000</sub>:  $11.43 - 0.74 = 10.69\text{g}$  ( $5.345 \times 10^{-3}$  mol)

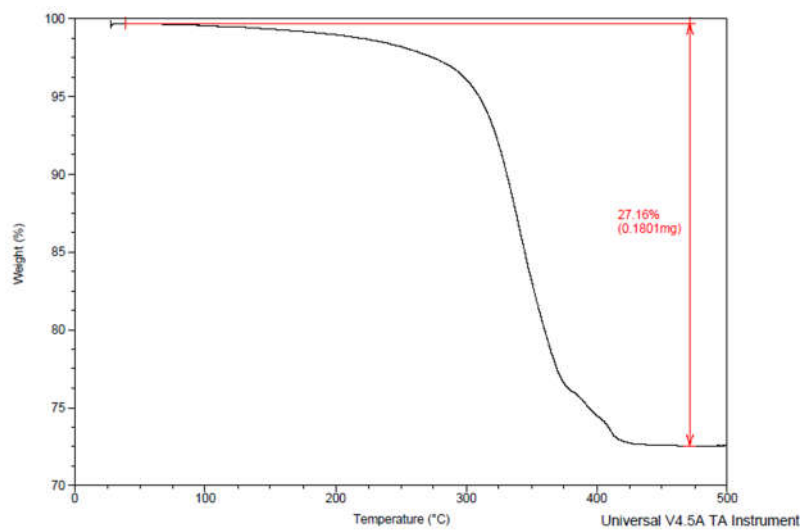
mass of a spherical AuNP of 17 nm diameter:  $4.97 \times 10^{-17}\text{g}$  → number of AuNP in a 100 g sample of AuNP@HS-PEG<sub>2000</sub> =  $1.782 \times 10^{18}$  → mol of AuNP =  $2.959 \times 10^{-6}$  → number of HSPEG<sub>2000</sub> per AuNP =  $5.345 \times 10^{-3} \text{ mol} / 2.959 \times 10^{-6} = 1805$



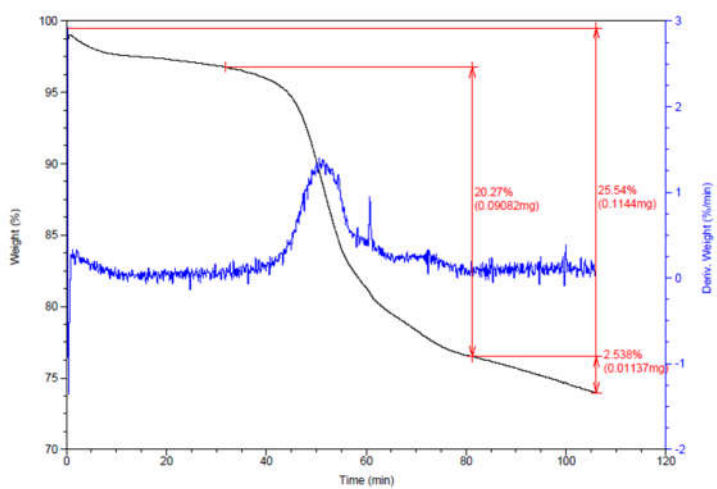
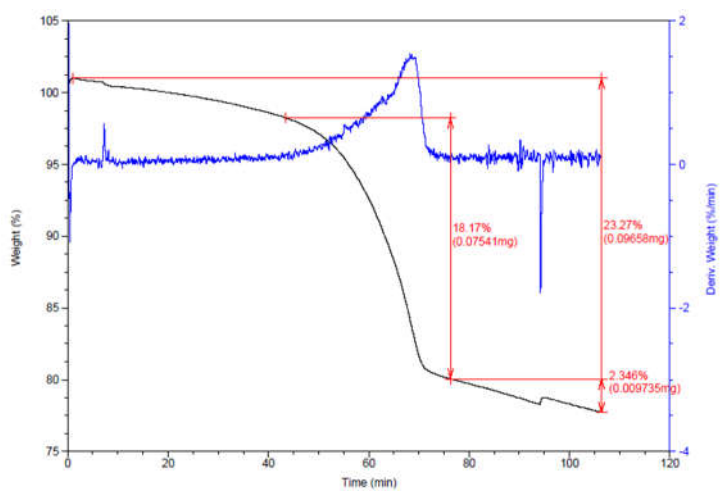
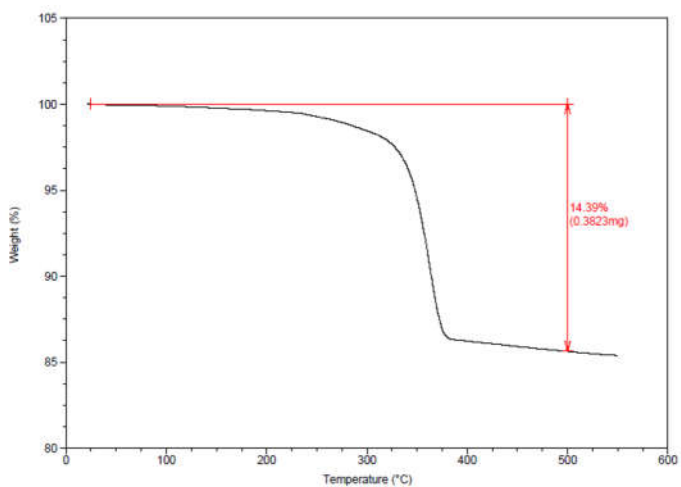
**SM2B:** TGA on AuNP@HS-PEG<sub>5000</sub>



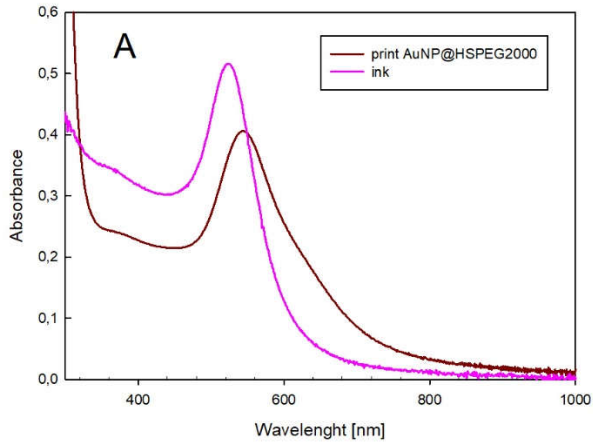
SM2C: TGA on AuNP@HS-PEG<sub>10000</sub>



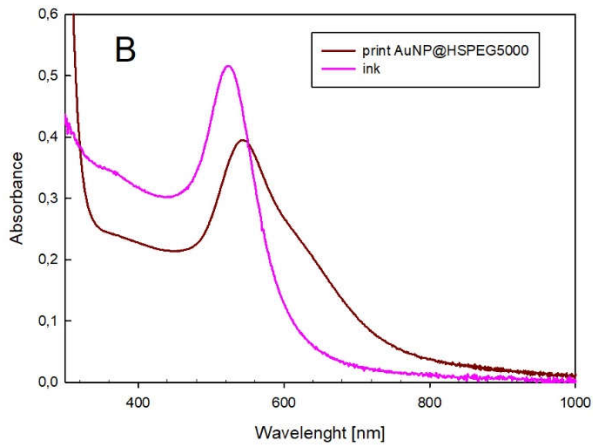
SM2D: TGA on AuNP@HS-PEG<sub>20000</sub>



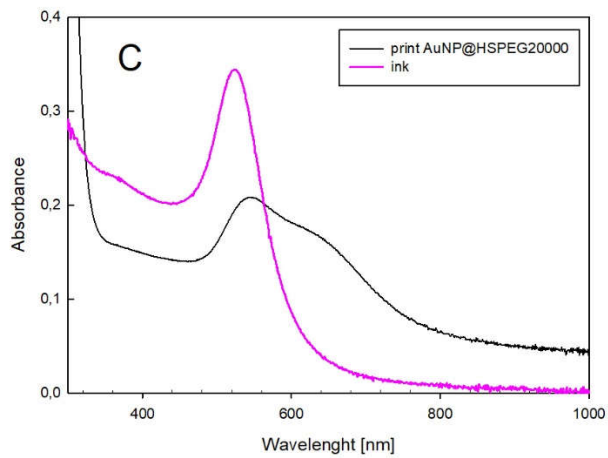
**SM3 – prints with AuNP@HS-PEGs**



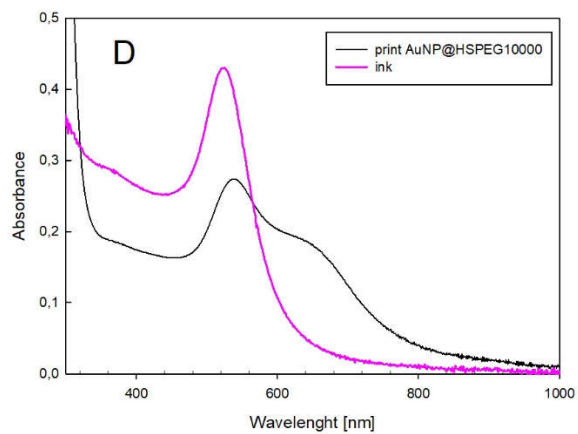
**SM3A:** Absorption spectra of AuNP@HS-PEG<sub>2000</sub> ink (pink) and a print on glass after 1 day



**SM3B:** Absorption spectra of AuNP@HS-PEG<sub>5000</sub> ink (pink) and a print on glass after 1 day

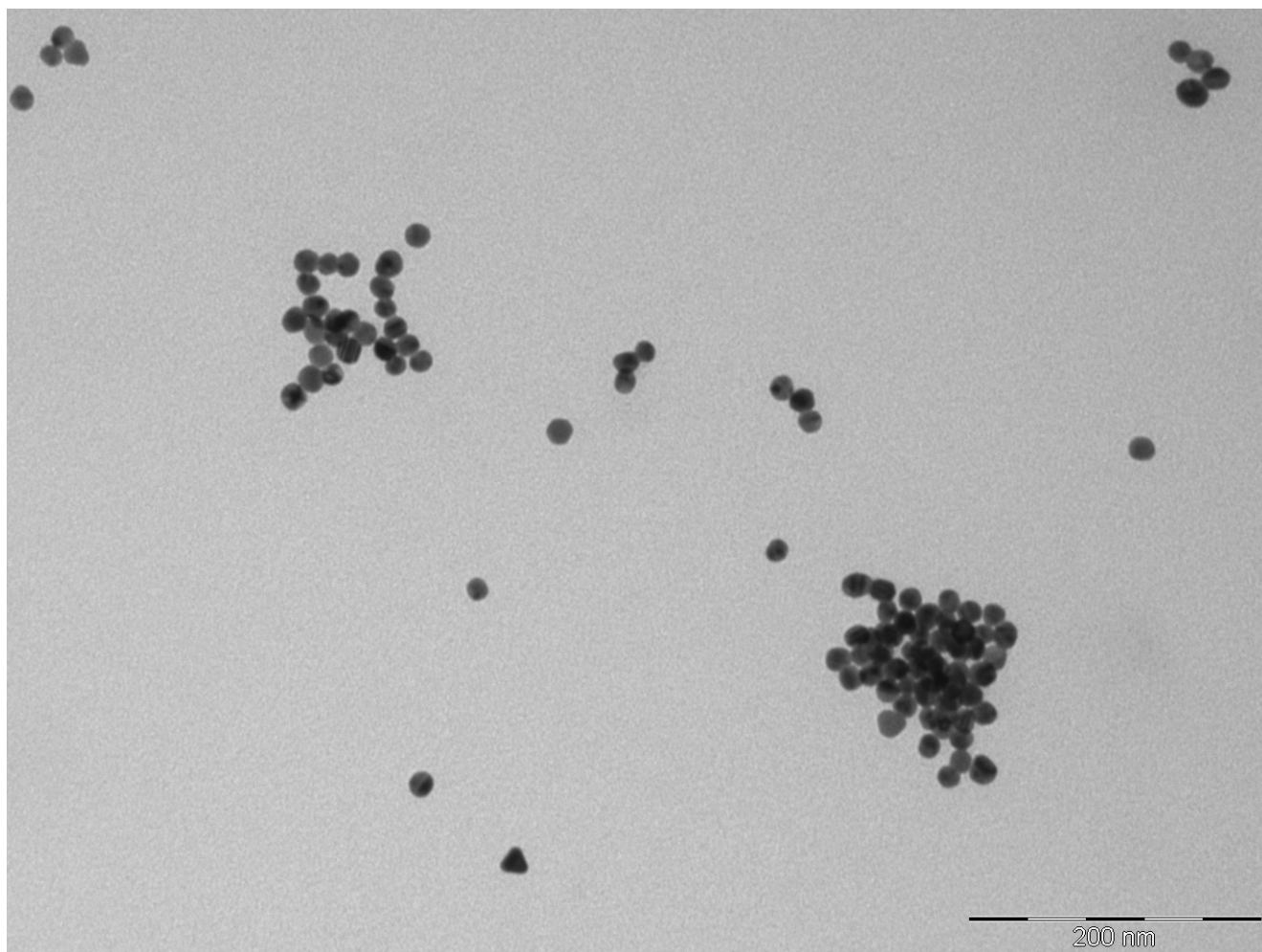


**SM3C:** Absorption spectra of AuNP@HS-PEG<sub>10000</sub> ink (pink) and a print on glass after 1 day



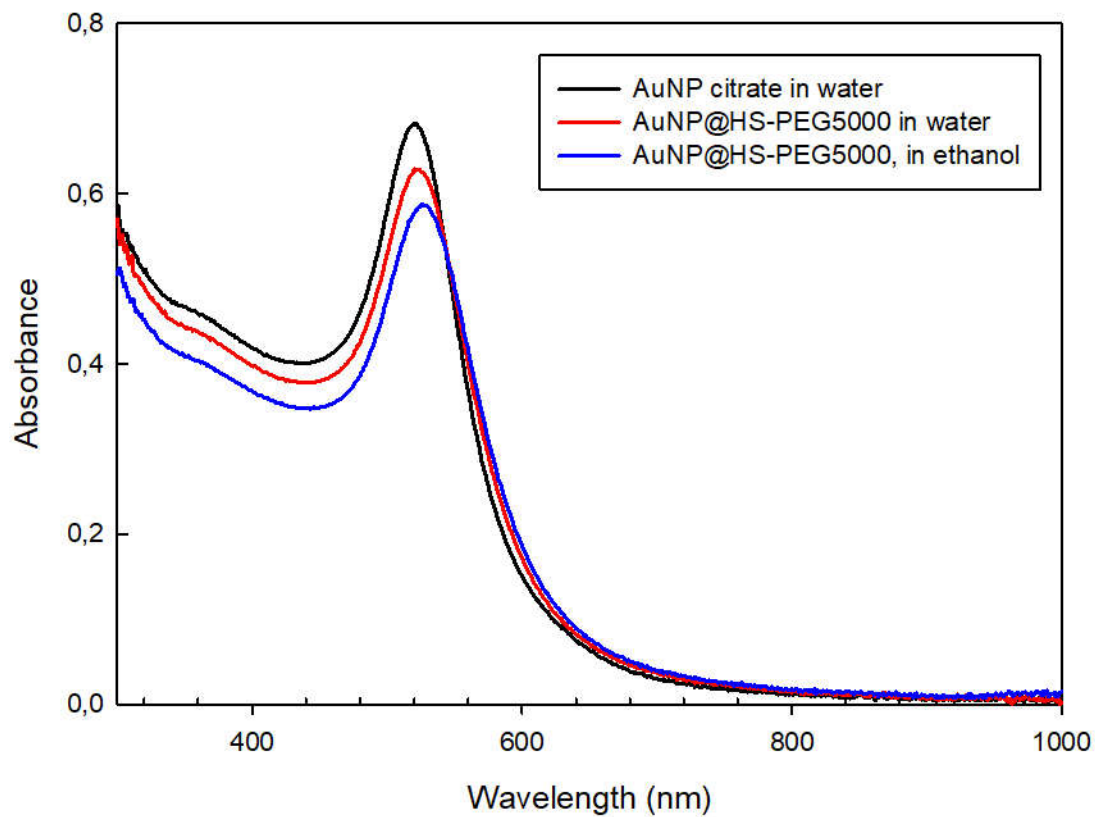
SM3D: Absorption spectra of AuNP@HS-PEG<sub>20000</sub> ink (pink) and a print on glass after 1 day

SM4. Larger TEM image of AuNP@HS-PEG5000 redissolved in water after printing



This image is the same as Figure 4G, main text, with larger dimensions

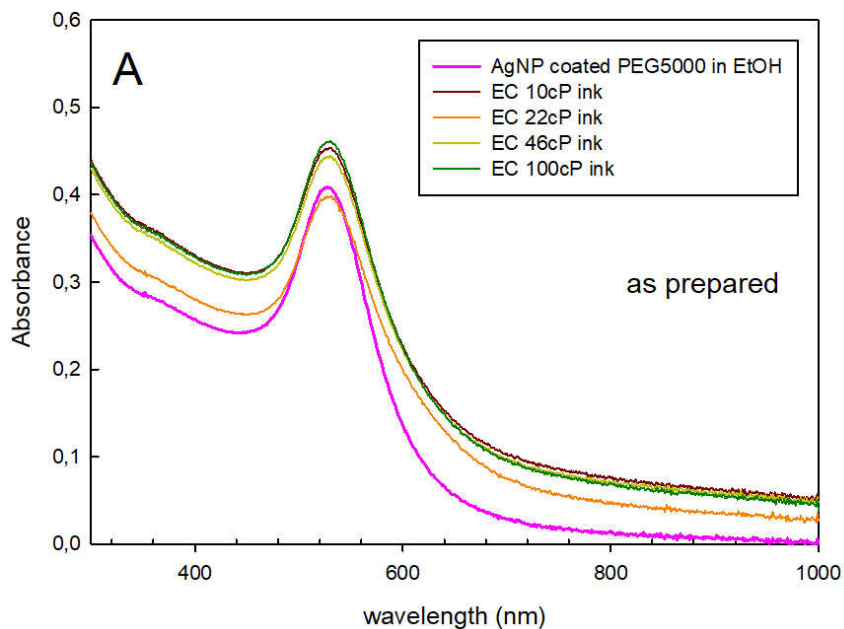
SM5. Absorption spectrum of AuNP@HS-PEG<sub>5000</sub> in ethanol



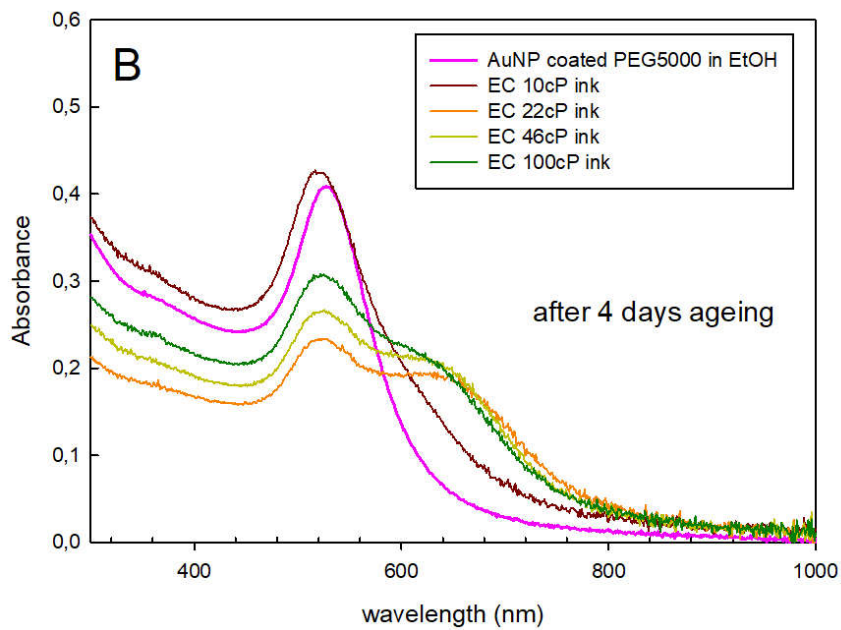
The spectrum of AuNP@HS-PEG<sub>5000</sub> in ethanol (blue) was recorded after 2 h from preparation. It did not change after a further 22 h (spectrum not reported – even after 4 d, no significant changes were observed, see pink spectrum in Figure SM6B). Spectra of citrate-coated AuNP in water (black) and of AuNP@HS-PEG<sub>5000</sub> in water (red) are also included for comparison



SM6. AuNP@HS-PEG5000 in EtOH with added Ethyl Cellulose

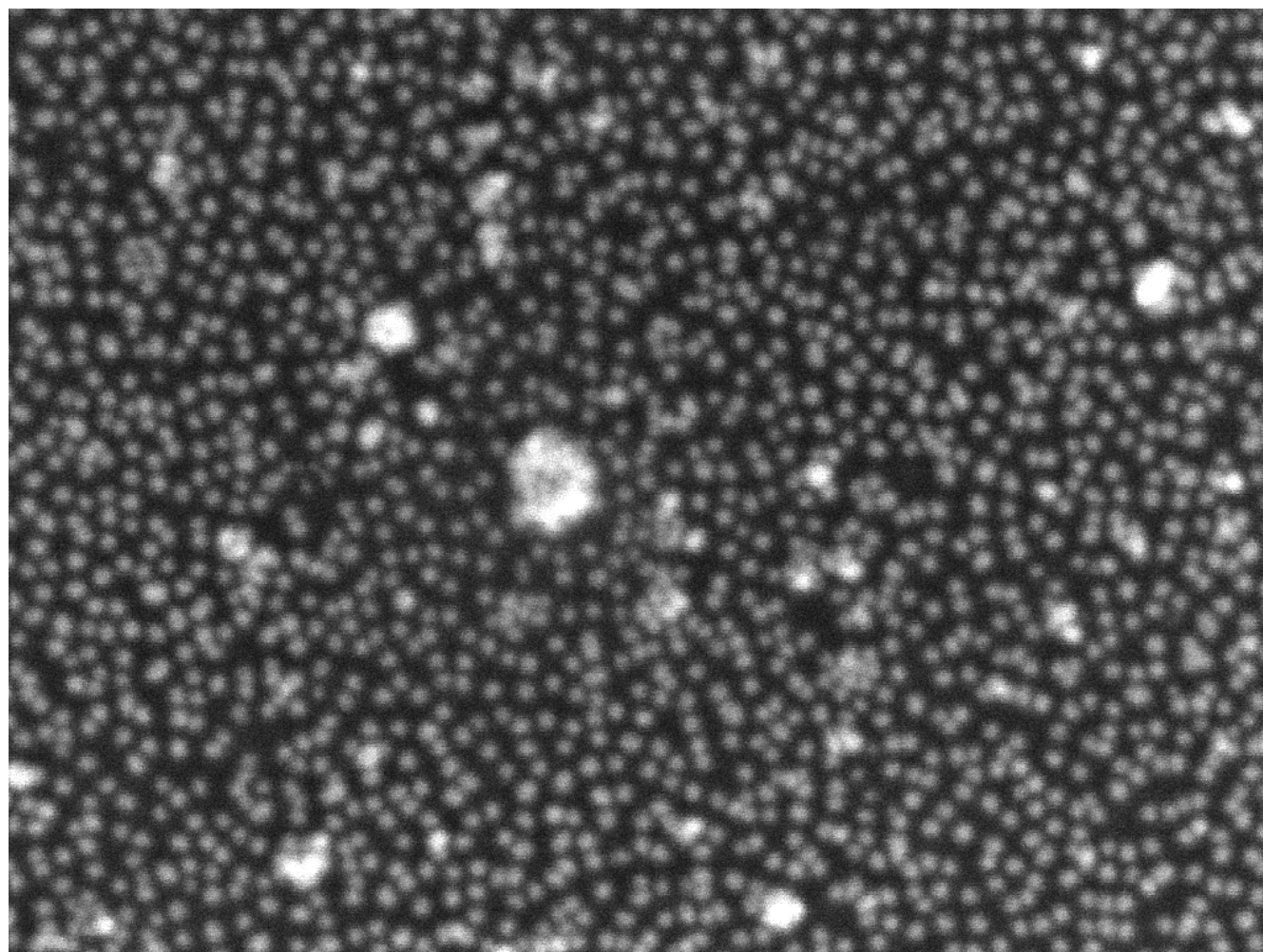




A: as prepared AgNP@HS-PEG<sub>5000</sub> in ethanol (pink) and in solutions (0.1%) with EC of different viscosity



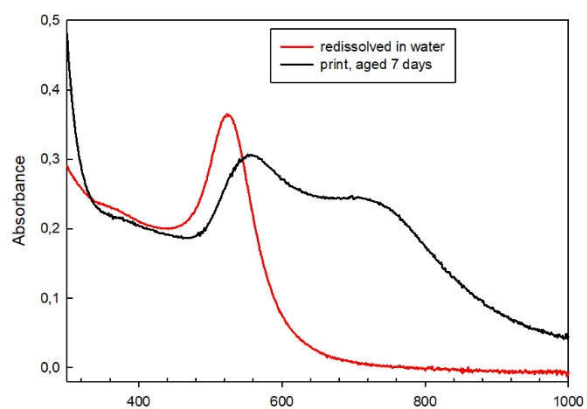
B: same solutions as in A, after 4 days

SM7. SEM image of a 14 d aged print with AuNP@HS-PEGCOO(-)/PAH(+) ink

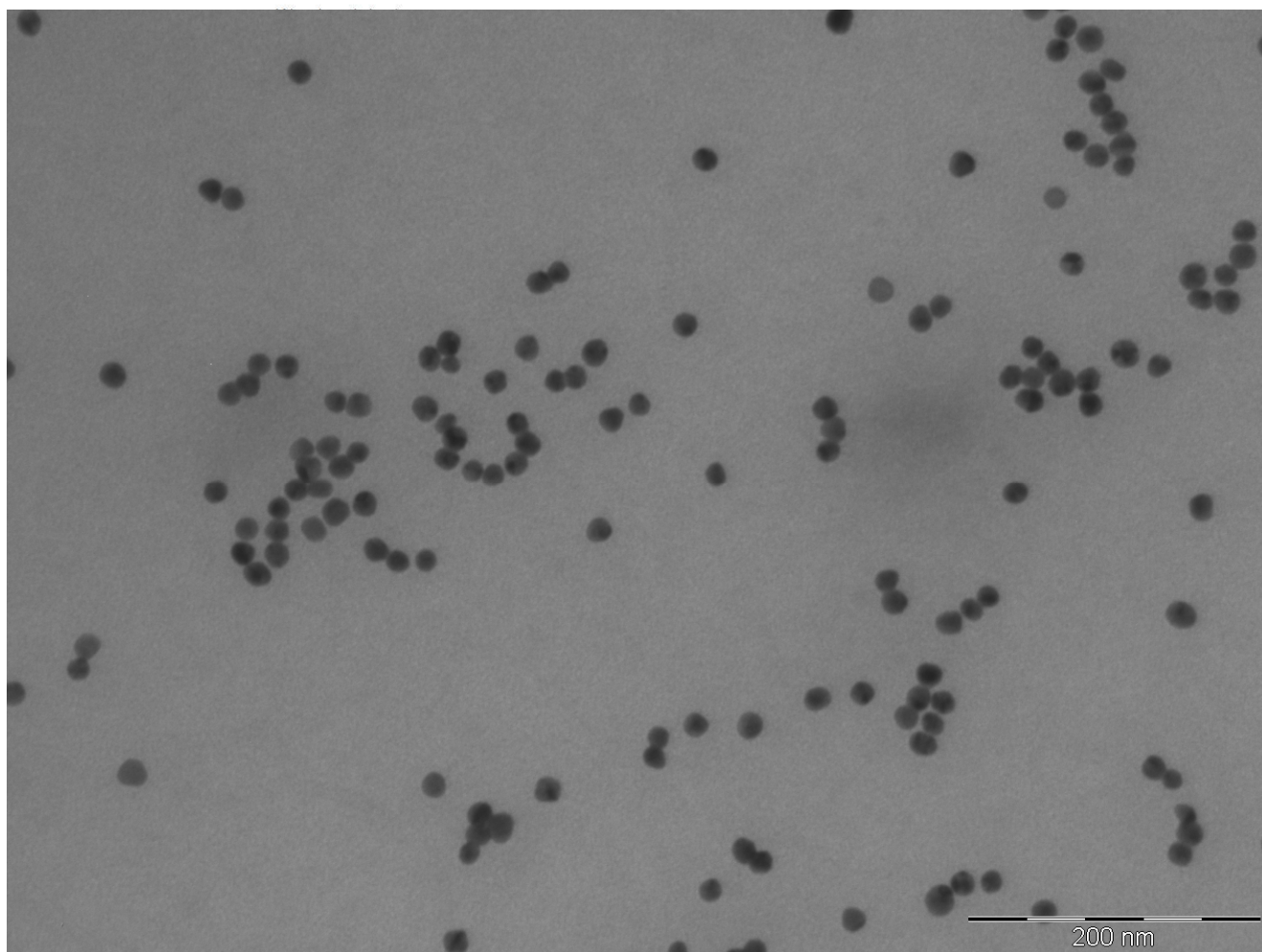


SEM HV: 8.0 kV	WD: 3.99 mm		MIRA3 TESCAN
SEM MAG: 200 kx	Det: In-Beam SE	200 nm	
BI: 10.00	Date(m/d/y): 10/19/18	Arvedi Lab, CISRIC, UniPV	

SM8 – UV-Vis absorbance spectra and TEM images of redissolved AuNP@HS-PEGCOO(-) prints



Absorption spectrum of a print with AuNP@HS-PEGCOO(-) ink (7 days aged) and of the same print redissolved in water.



SM8B – TEM image obtained from the redissolved ink