

Supporting Information

RAFT-Polymers with Single and Multiple Trithiocarbonate Groups as Uniform Gold-Nanoparticle Coatings

*Bastian Ebeling, Philipp Vana**

Georg-August-Universität Göttingen, Institut für Physikalische Chemie,
Tammannstraße 6, 37077 Göttingen, Germany.

Size-exclusion chromatography

Figure S1 on the following page shows the SEC traces of all employed conventional RAFT polymers and Figure S2 on page 3 the SEC traces of the multiblock polymers. Figure S3 on page 4 shows the SEC traces of the multiblock nanohybrids.

Transmission electron microscopy

Figure S4 on page 5 shows an exemplary TEM image of the octadecylamine-coated AuNP which had been used for analysis. Figures S5 on page 6, S6 on page 7, S7 on page 8, S8 on page 9, and S9 on page 10 show micrographs of conventional nanohybrids. Figure S10 on page 11 shows a micrograph of the nanohybrid μ' with a defunctionalized polymer measured one month after functionalization (blue solution). Figures S11 on page 12 and S12 on page 13 show micrographs of multiblock nanohybrids. Figure S13 on page 14 shows the diameter distribution for the used AuNP, obtained from images like in Figure S4 on page 5. Table S1 on page 6 shows all properties for the AuNP determined this way.

*pvana@uni-göttingen.de

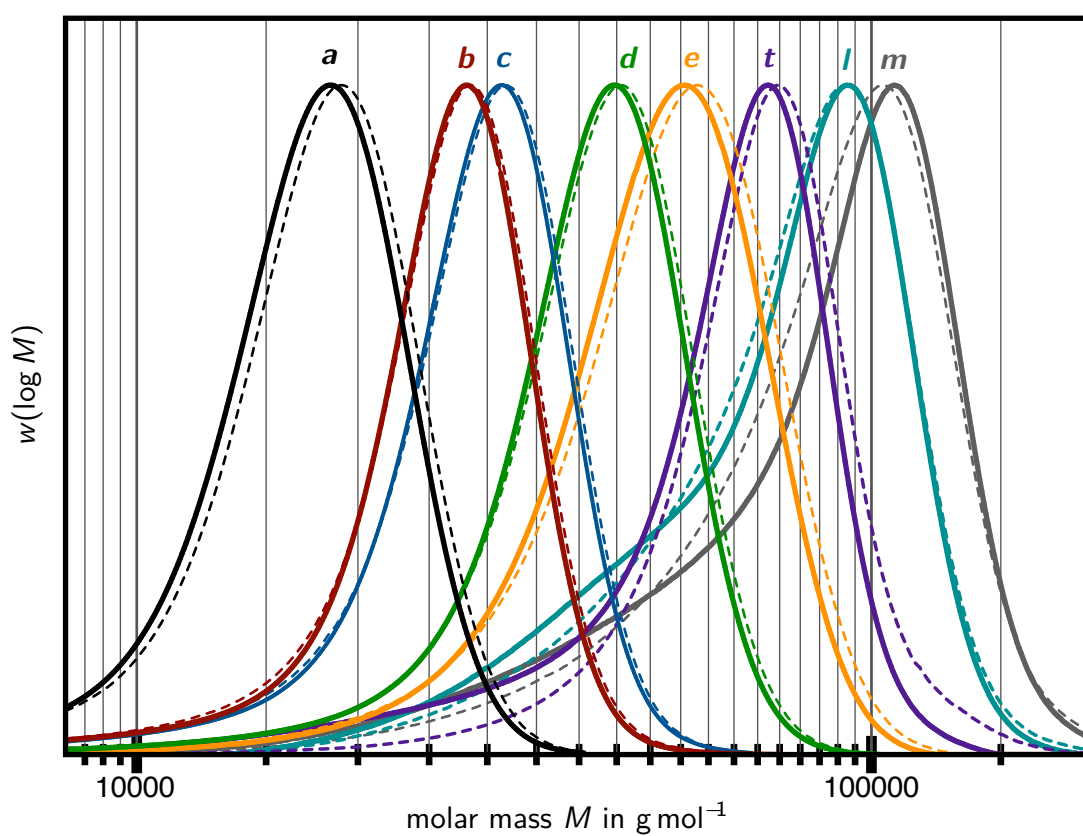


Figure S1: SEC traces of the employed conventional polymers. Solid lines: signal of RI detector, dashed lines: signal of UV detector (310 nm).

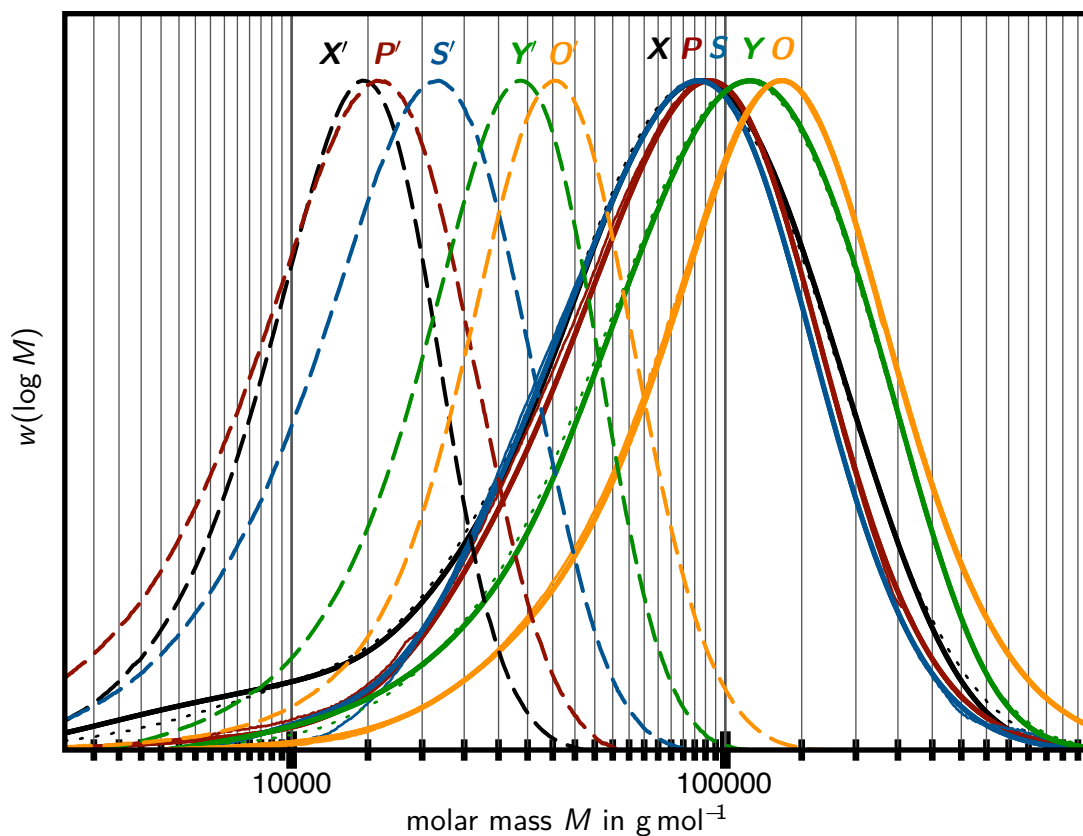


Figure S2: SEC traces of the employed multiblock polymers and the cleavage products. Solid lines: signal of RI detector for the multiblock polymers before the cleavage reaction, dotted lines: signal of UV detector (310 nm) for the multiblock polymers before the cleavage reaction, dashed lines: signal of RI detector for the cleavage products of the multiblock polymers.

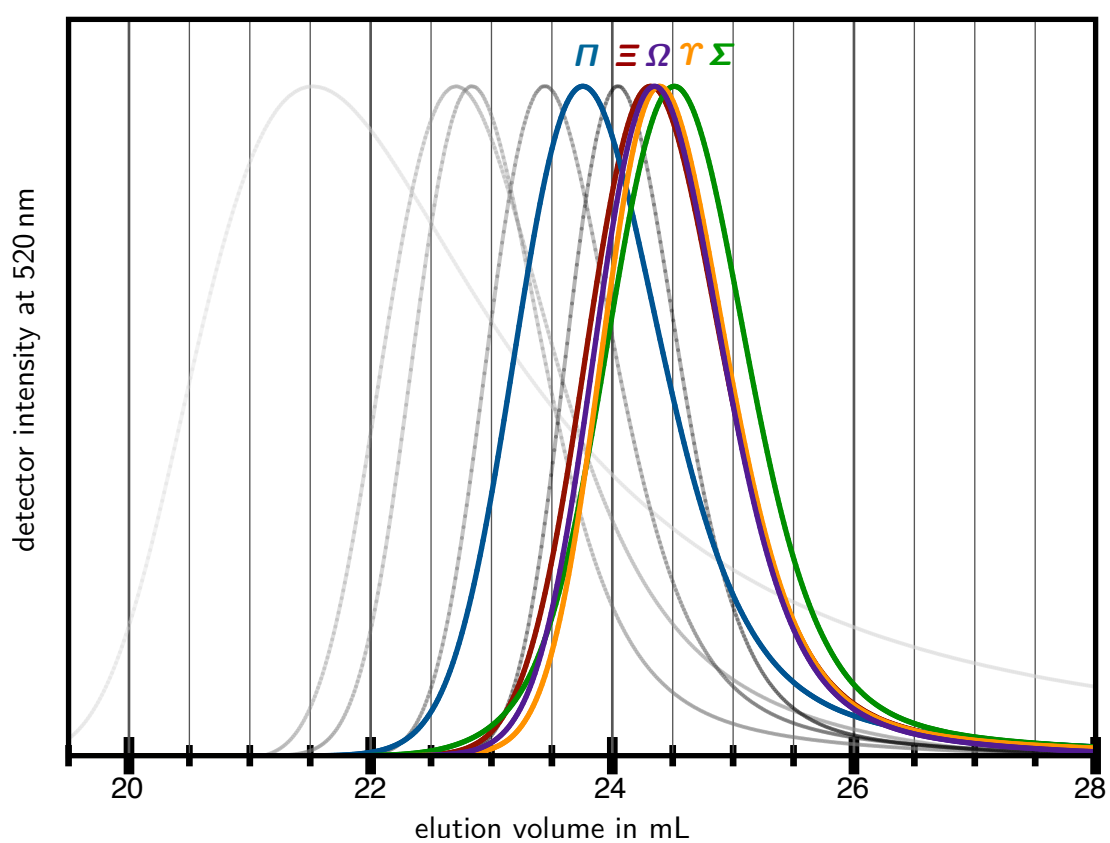


Figure S3: SEC traces of the multiblock nanohybrids. The traces for the conventional nanohybrids are reproduced in grey as a reference.

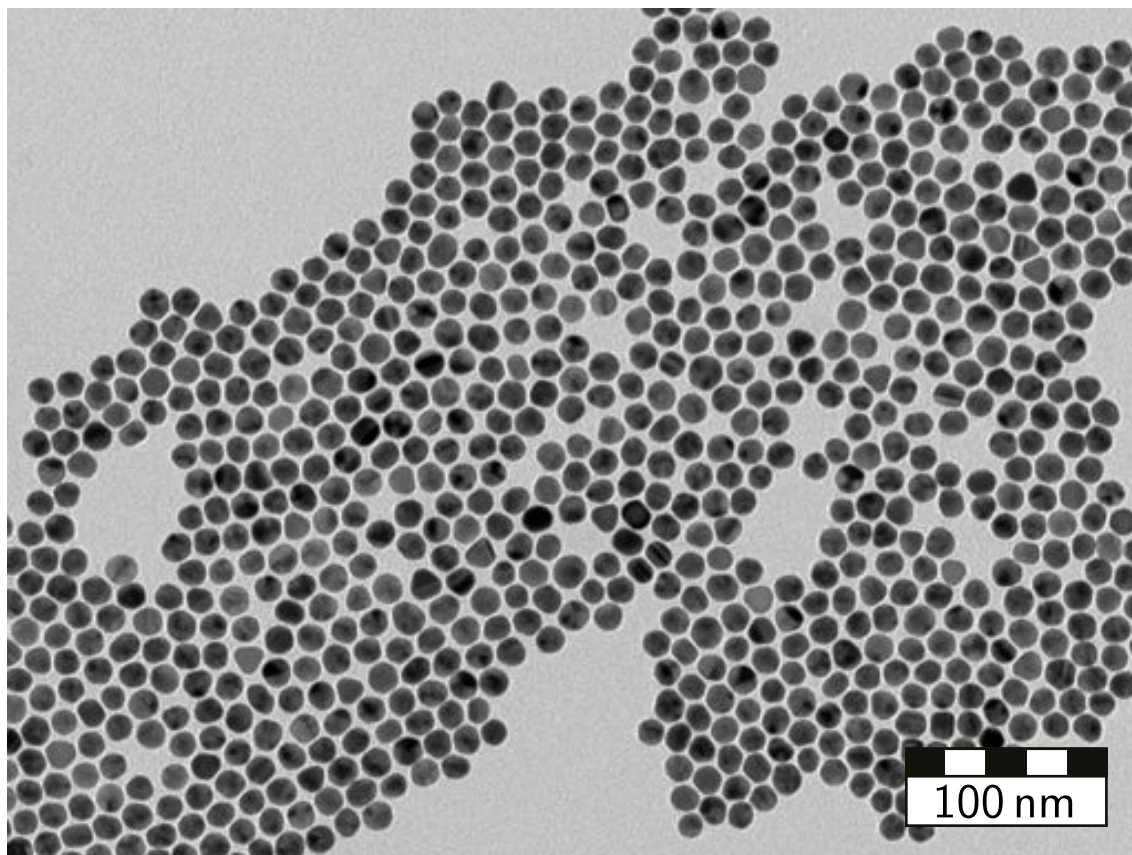


Figure S4: Exemplary TEM image of octadecylamine-coated AuNP which has been used for analysis.

UV/Visible spectroscopy

Figure S14 on page 15 shows the UV/Vis spectrum of the used citrate-stabilized gold sol and an exemplary spectrum of a prepared nanohybrid (sample Σ). The spectrum remains practically identical, providing excellent evidence that no crosslinking by the multiblock polymers occurs.

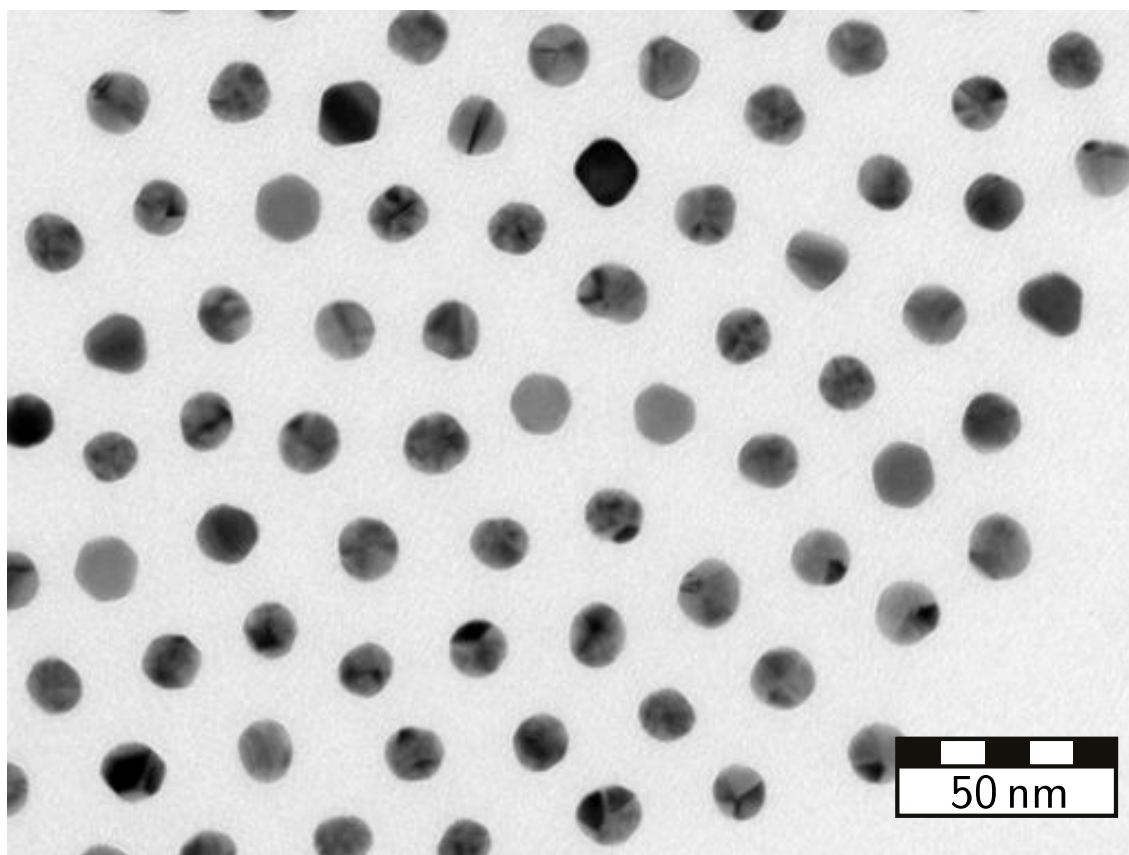


Figure S5: Exemplary TEM image of α .

Table S1: Various parameters for the prepared gold nanocrystals extracted from the TE micrographs.

diameter	$(13.6 \pm 1.4) \text{ nm}$
circularity	0.909 ± 0.02
surface	$(590 \pm 240) \text{ nm}^2$
mean curvature	$(7.4 \pm 0.5) 10^{-2} \text{ nm}^{-1}$
volume	$(1.4 \pm 2.2) \mu\text{m}^3$
particle mass	$(2.7 \pm 4.3) 10^{-17} \text{ g}$
atoms per particle	$(8.1 \pm 13.2) 10^4$
atoms on surface	~ 6

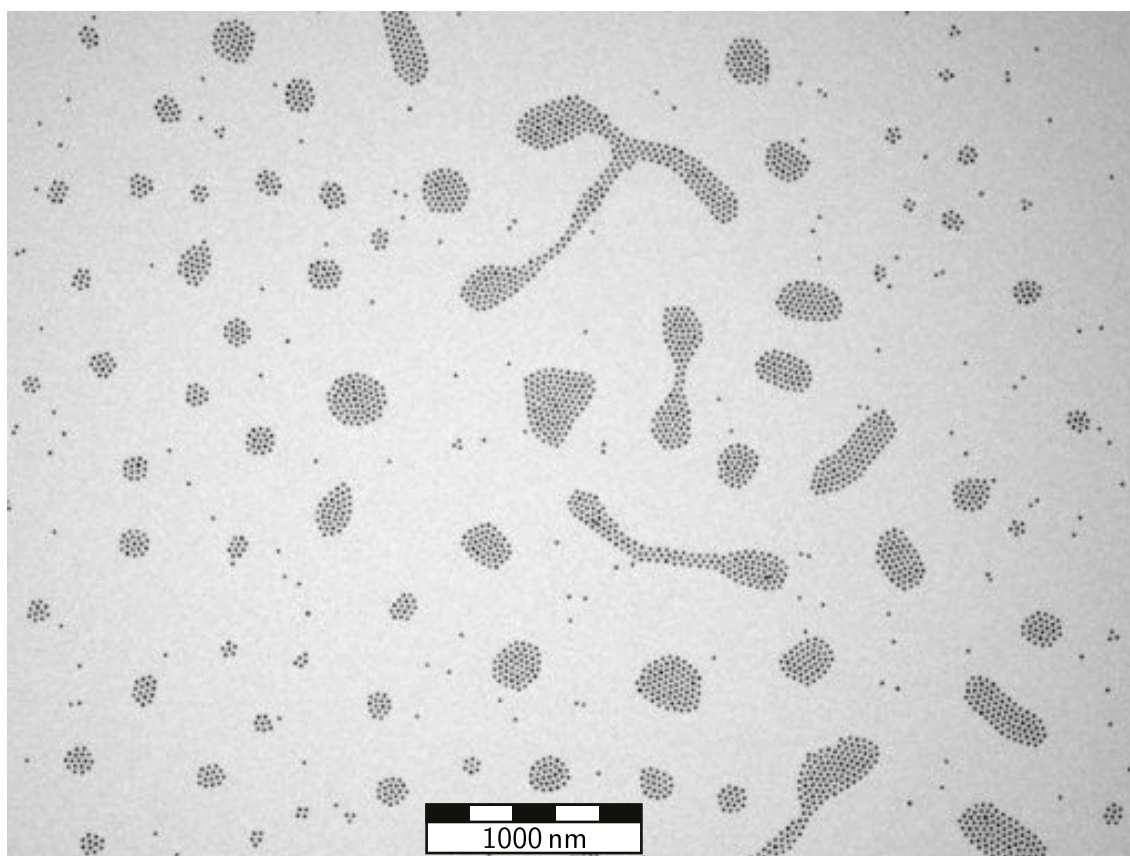


Figure S6: Exemplary TEM image of β .

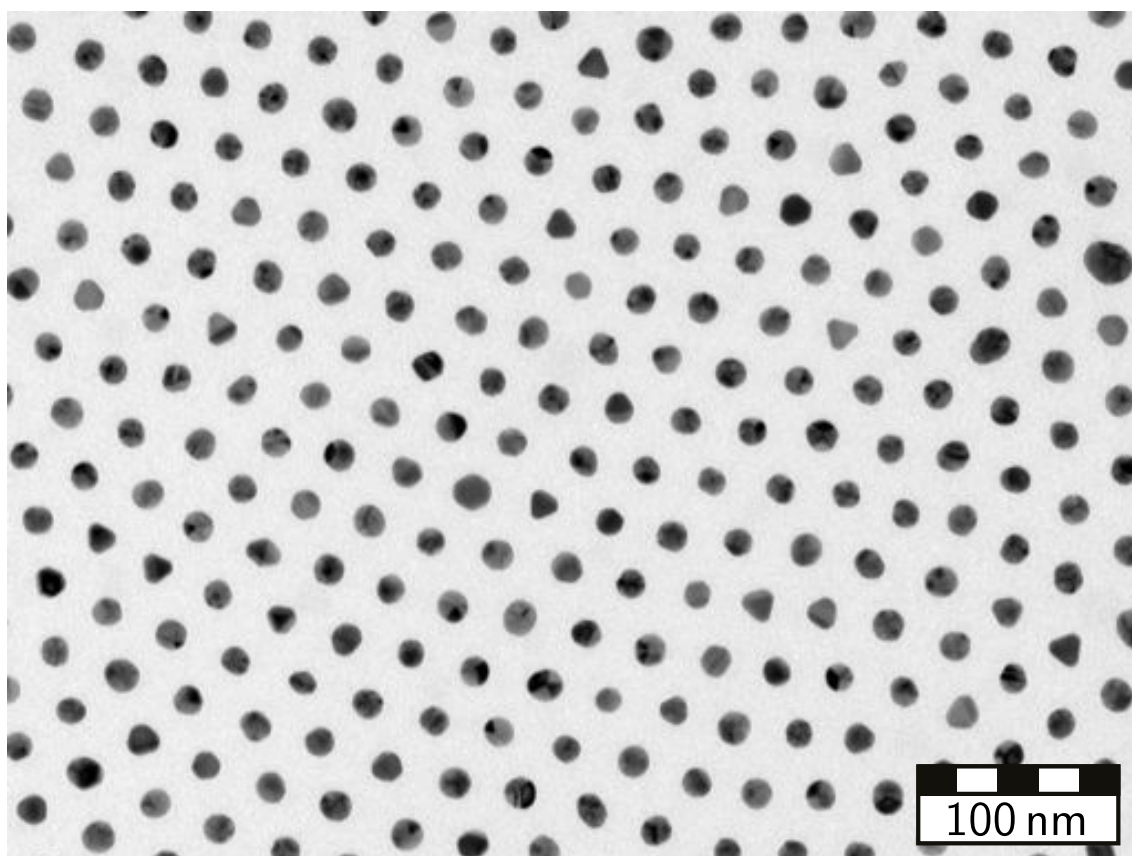


Figure S7: Exemplary TEM image of γ .

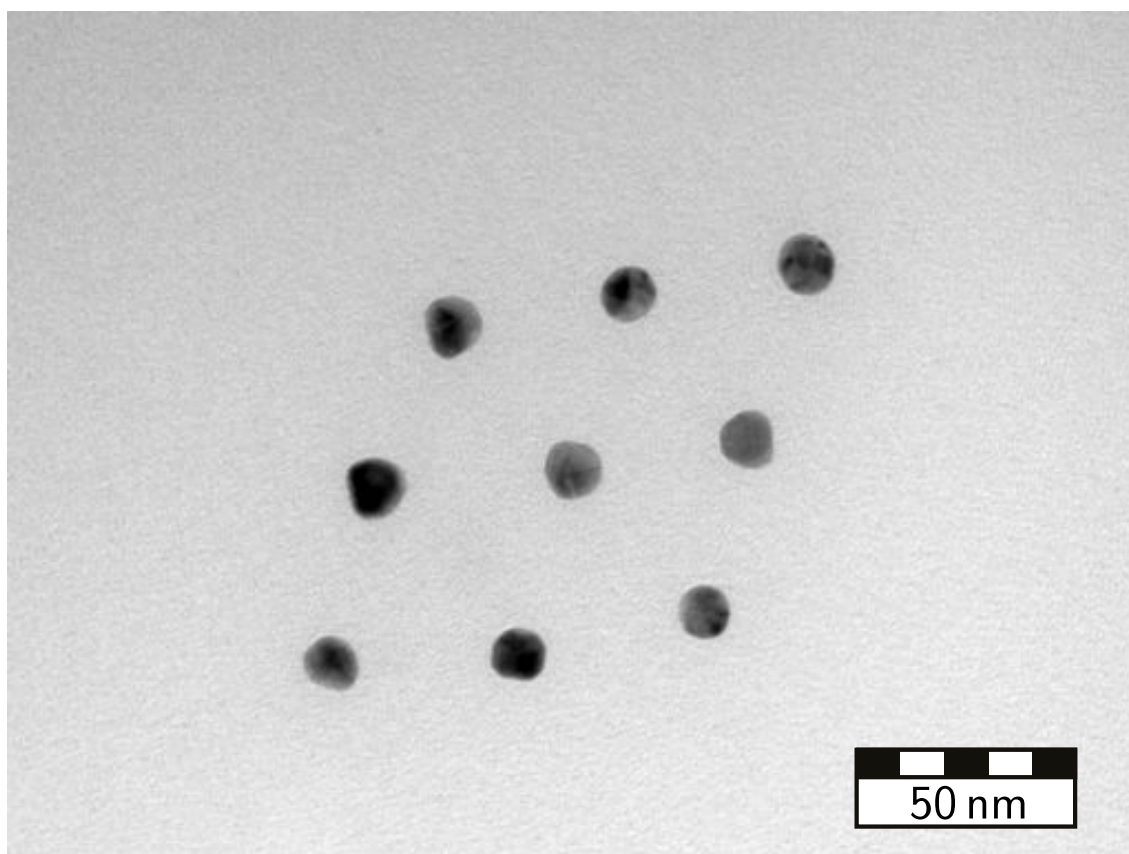


Figure S8: Exemplary TEM image of ϵ .

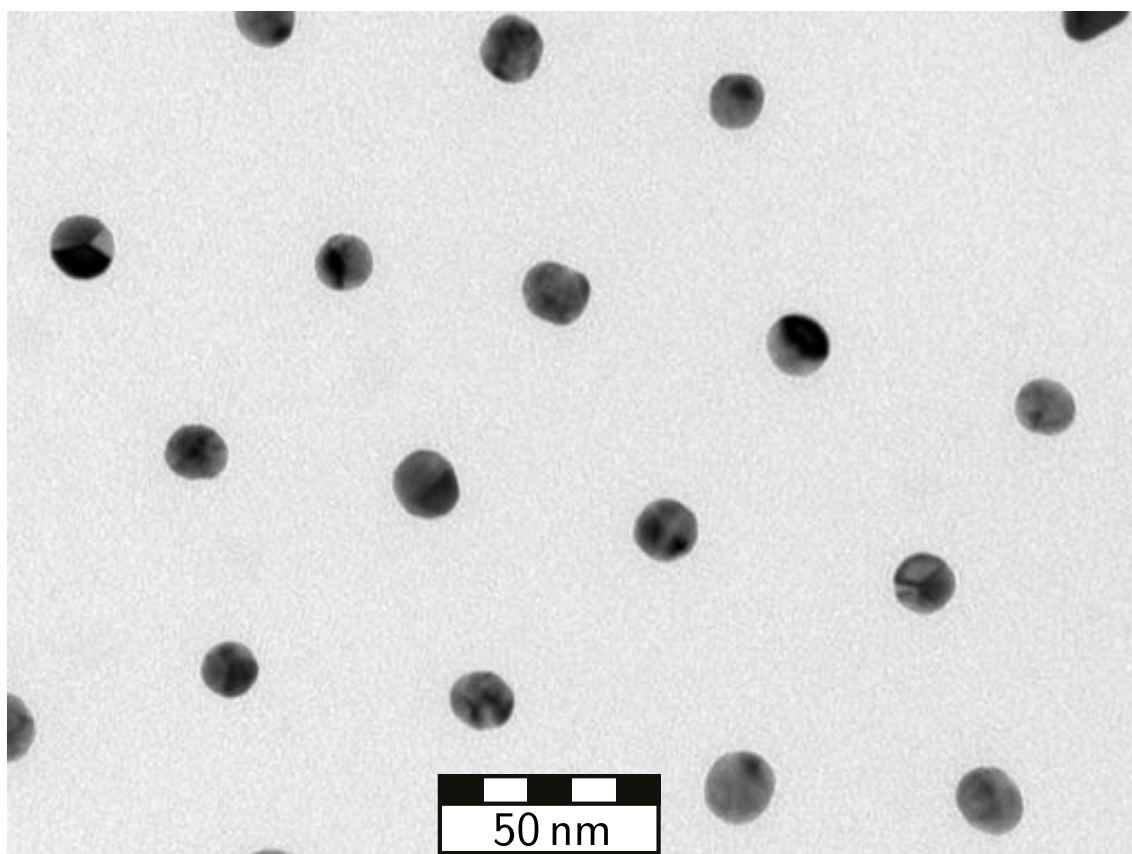


Figure S9: Exemplary TEM image of μ .

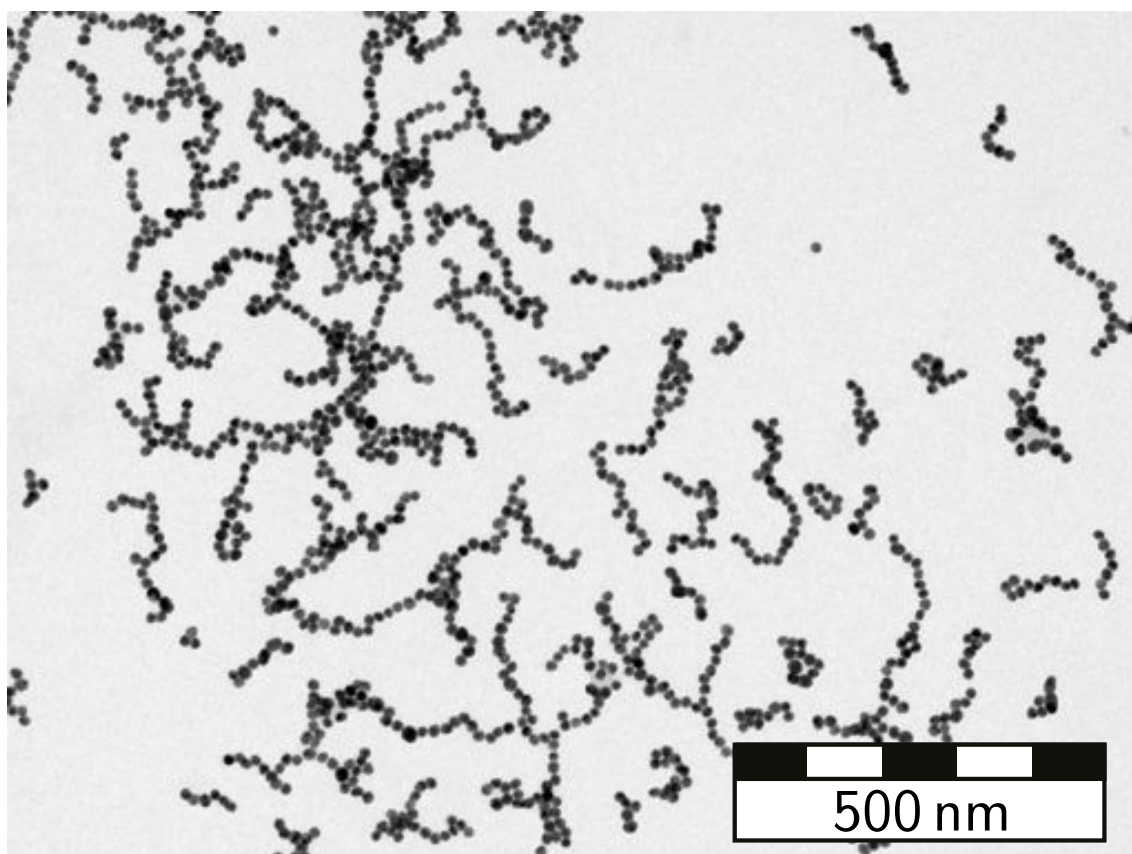


Figure S10: Exemplary TEM image of μ' .

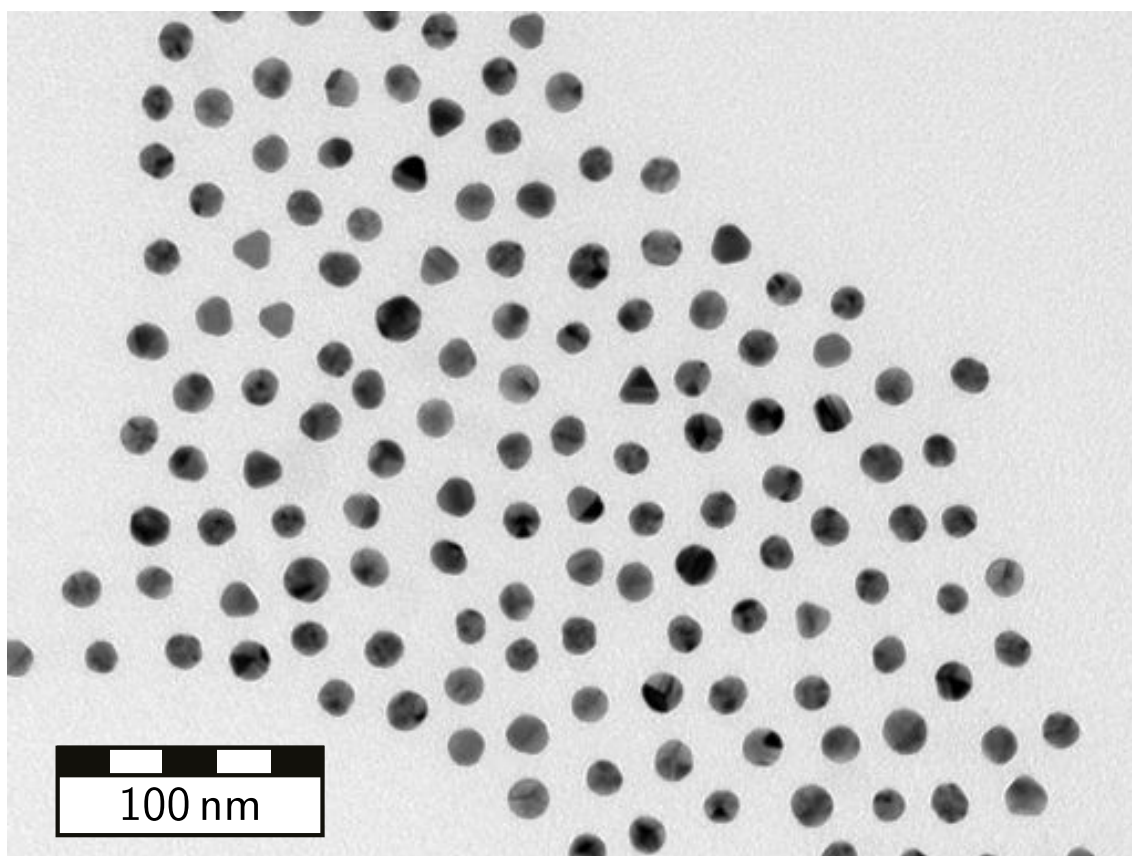


Figure S11: Exemplary TEM image of Σ .

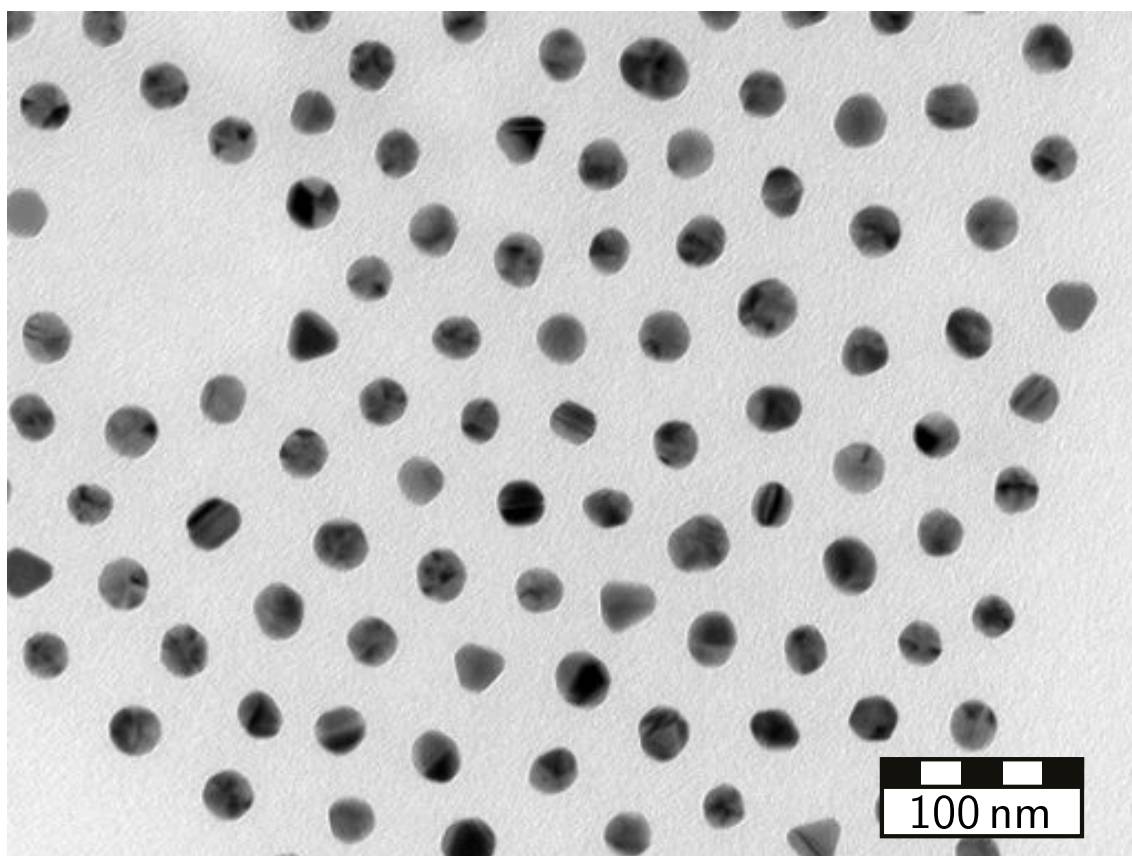


Figure S12: Exemplary TEM image of *II*.

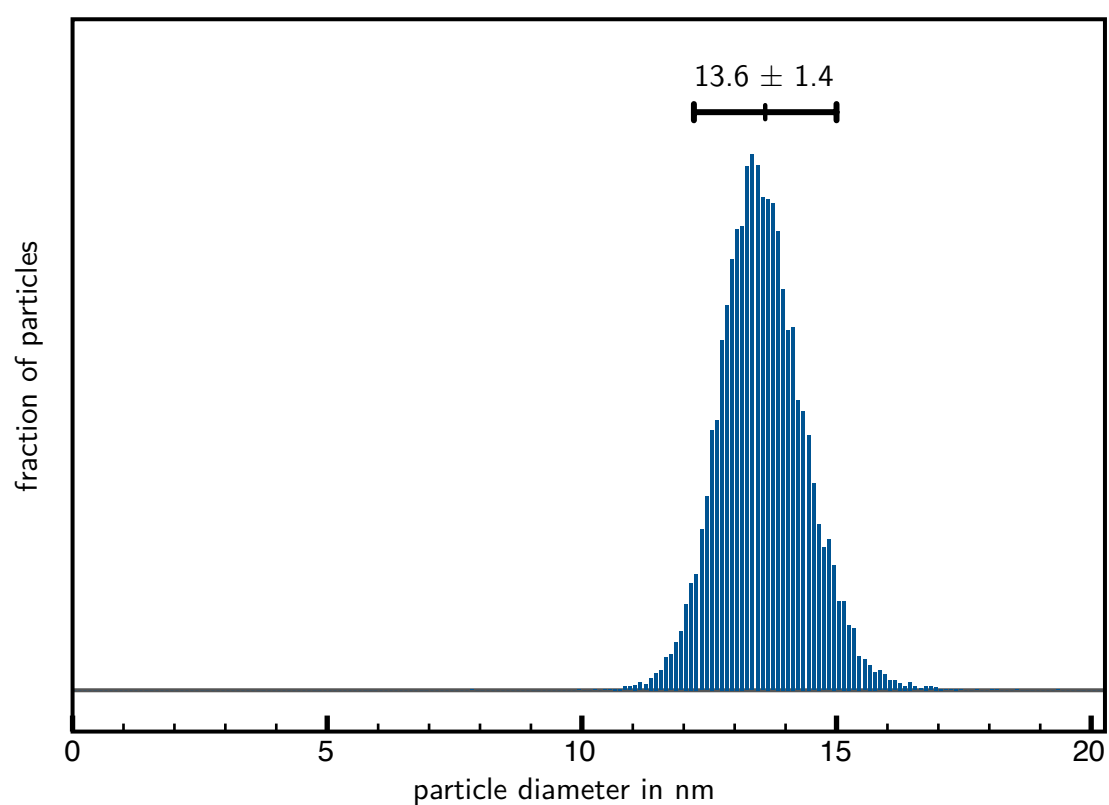


Figure S13: Diameter histogram of the employed AuNP. The measurements of a total of 16180 particles were taken.

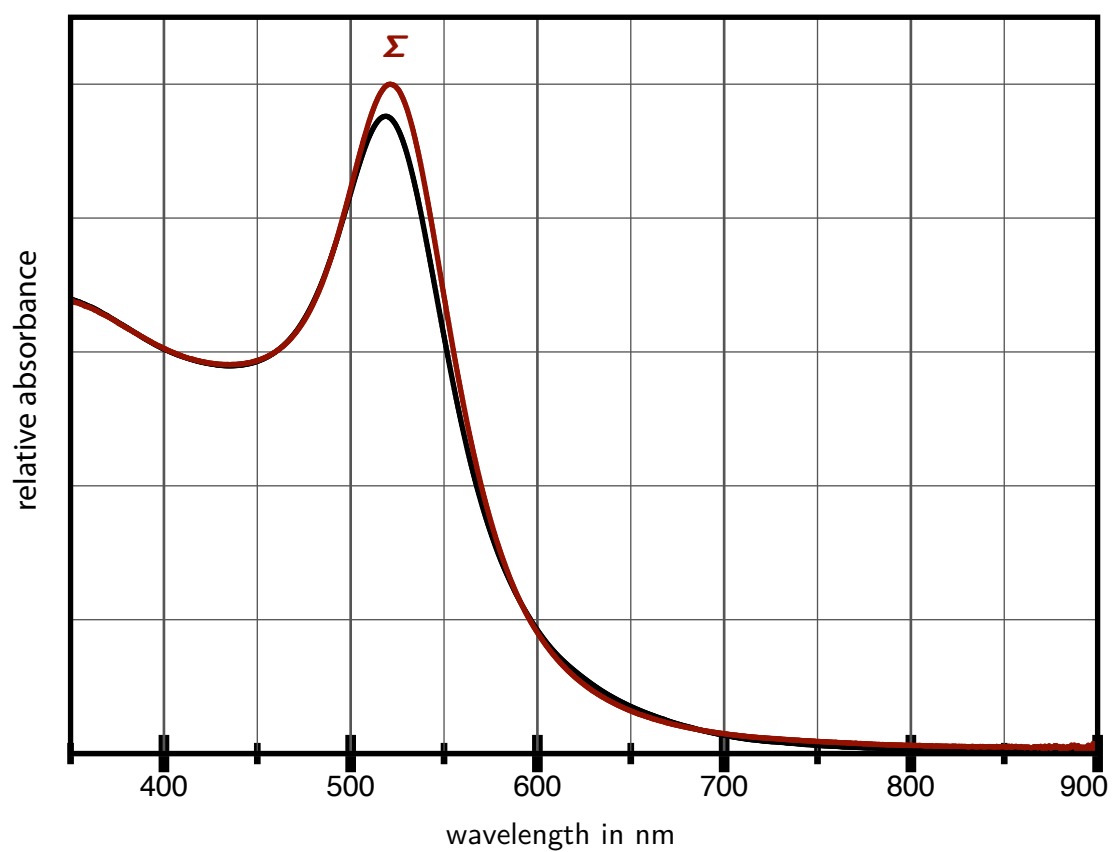


Figure S14: UV/Vis spectrum of the used citrate-stabilized gold sol (black), measured in water, and an exemplary spectrum of a prepared nanohybrid (sample Σ , red), measured in methanol.