

# Supporting Information:

## Protein Cages as Containers for Gold Nanoparticles

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S1. FPLC chromatogram of CCMVAu7c, CCMVAu12c and CCMVAu17c.

S2. Dynamic light scattering (DLS) analysis of native CCMV comparing with hybrid NPs of CCMVAu7c, CCMVAu7b and CCMVAu7t.

S3. STE M characterization of hybrid NPs, CCMVAu7t, CCMVAu12c, CCMVAu12t and CCMVAu17c.

S4. TEM characterization of hybrid NPs, CCMVAu7t, CCMVAu7c, CCMVAu7b, CCMVAu12t, CCMVAu12c, CCMVAu17t.

S5. FPLC chromatogram of CCMVAu7t, CCMV CP, unencapsulated Au7t and CCMVAu7t reinjected after several days for comparison.

S6. (a) TEM image of CCMV-TA; (b) Dynamic light scattering (DLS) analysis of CCMV-TA; (c) FPLC analysis of CCMV-TA and (d) UV-vis of tannic acid (TA), free coat protein and tannic acid encapsulated hybrid nanoparticles (CCMV-TA).

S7. MM2 force field calculations of BSPP.

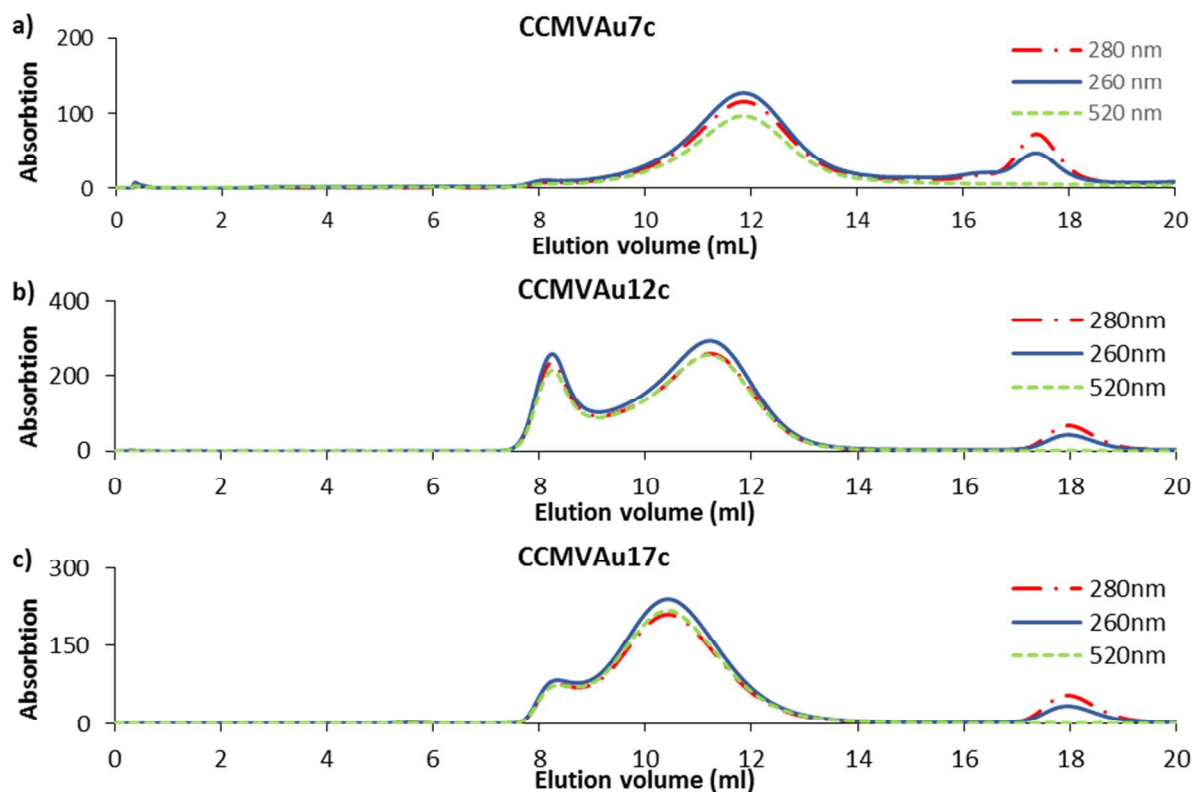


Figure S1: FPLC chromatogram at  $\lambda = 280$  nm, 260 nm and 520 nm of encapsulated gold nanoparticles with Citrate ligands with the partially, aggregated and unencapsulated gold (8 ml), fully encapsulated CCMVAu7c (12 ml) and capsidprotein dimers (18 ml); (a) 7 nm NP (b) 12 nm NP; (c) 17 nm NP.

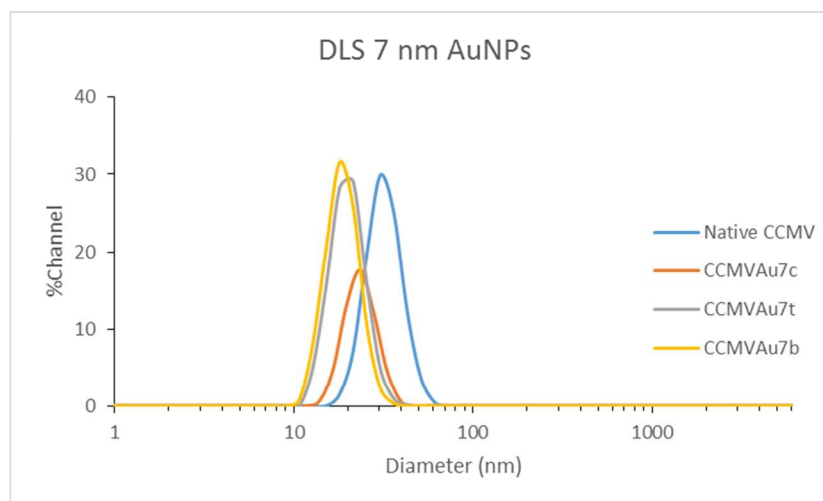


Figure S2: Dynamic light scattering data of the encapsulated 7nm AuNPs in CCMV at pH 7.5 with the different ligands: Tannic acid, Citrate and Bis-p-(sufonatophenyl) phenyl phosphine; additionally the native virus is included.

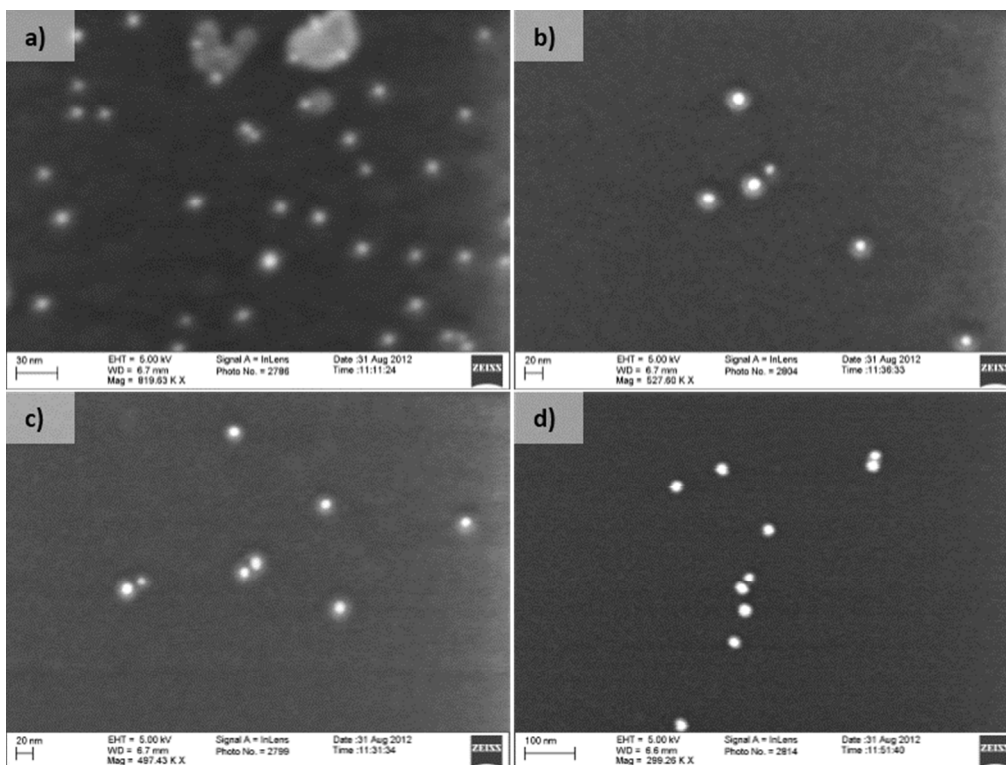


Figure S3: STEM images showing the core-shell morphology of: (a) CCMVAu7t; (b) CCMVAu12c; (c) CCMVAu12t; (d) CCMVAu17c.

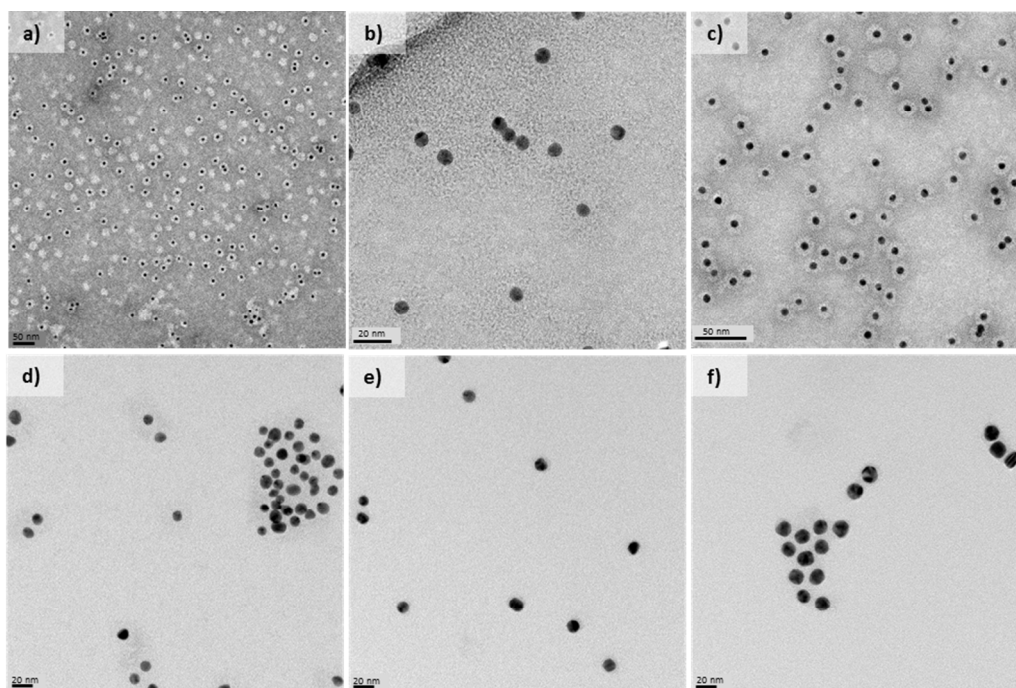


Figure S4: TEM images showing the core-shell morphology of: (a) CCMVAu7t; (b) CCMVAu7c; (c) CCMVAu7b; (d) CCMVAu12t; (e) CCMVAu12c; (f) CCMVAu17t.

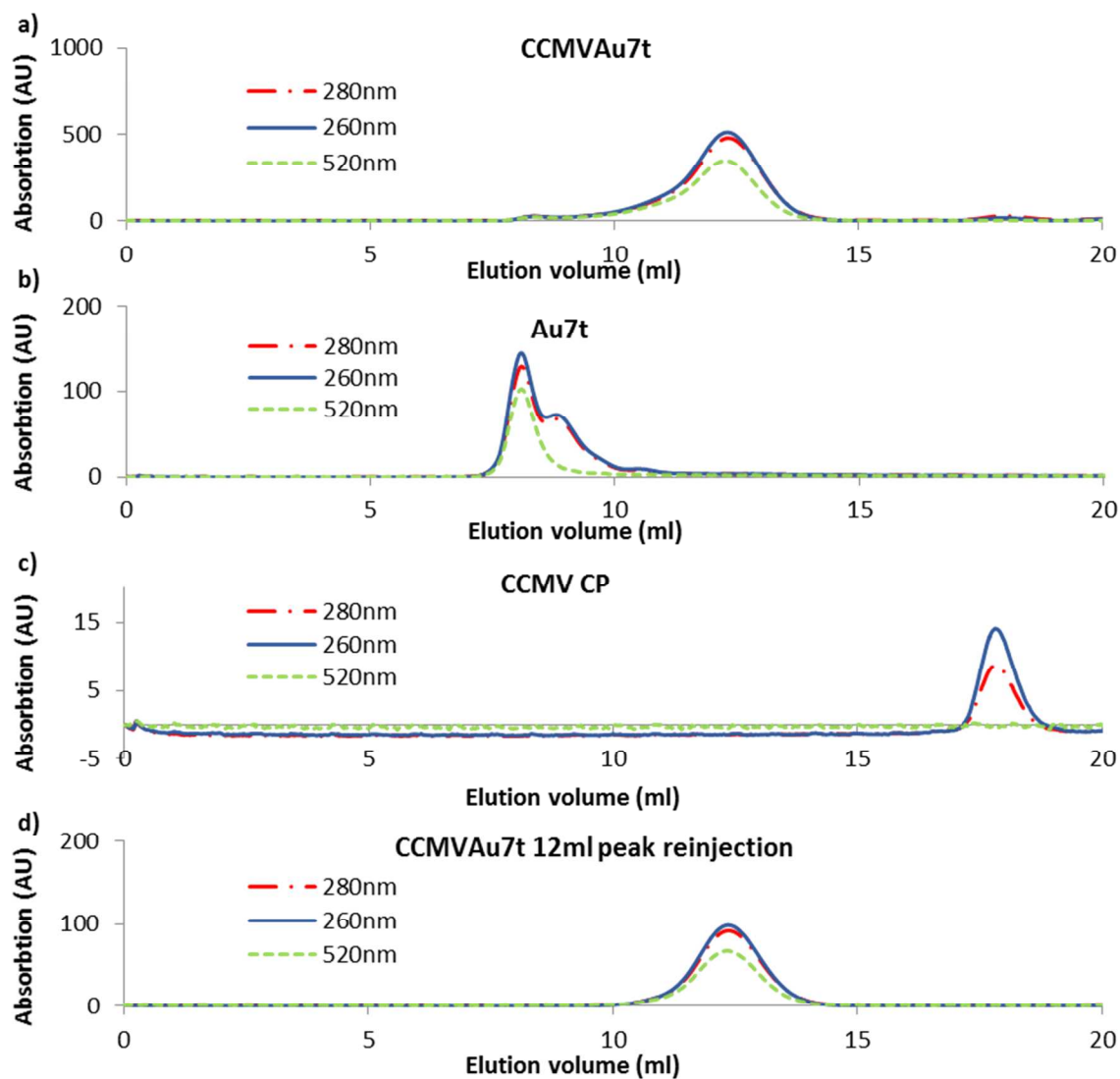


Figure S5: FPLC chromatogram at  $\lambda = 280$  nm, 260 nm and 520 nm of (a) CCMVAu7t (12 ml) and CCMV CP (18 ml); (b) CCMV capsid protein dimers, showing a single peak with no 520 nm absorption; (c) unencapsulated Au7t, showing aggregation; and (d) CCMVAu7t reinjected after several days eluting again at 12ml, showing no deterioration.

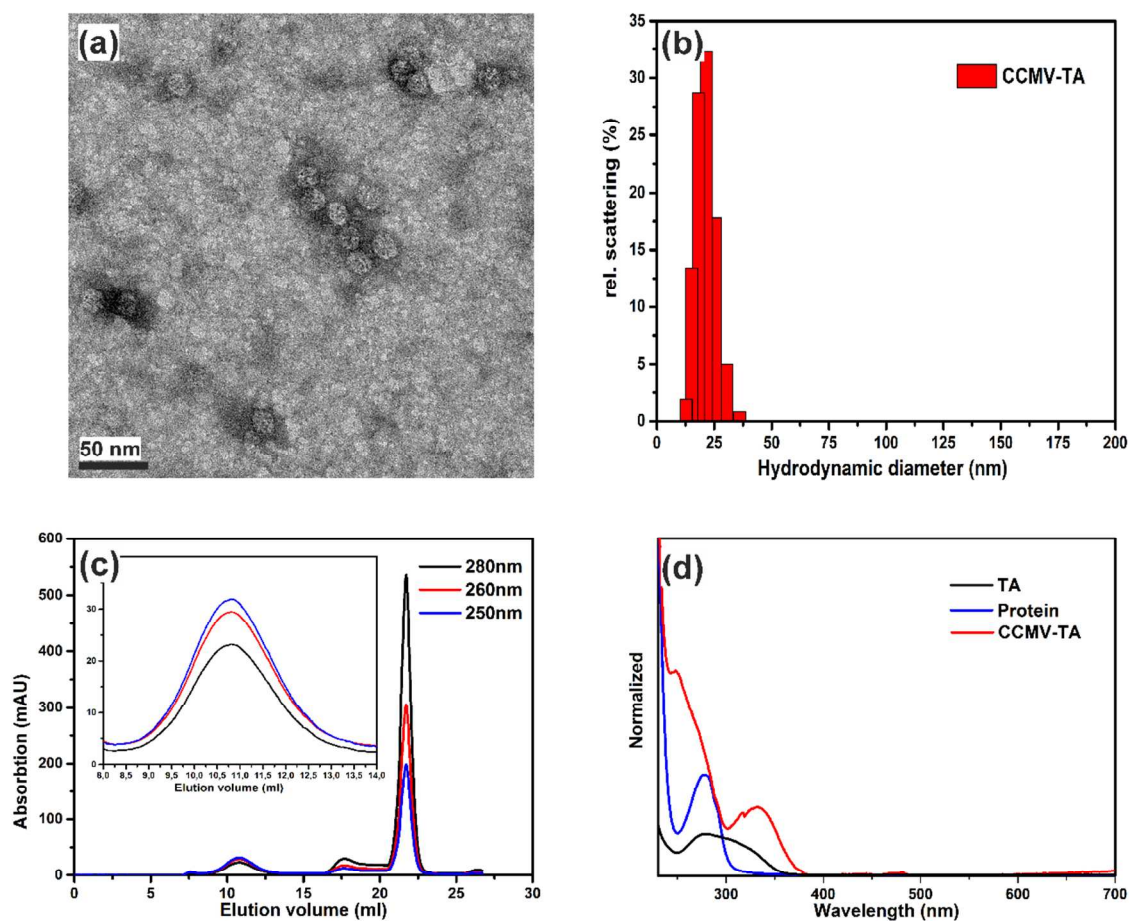


Figure S6: (a) TEM image of CCMV-TA; (b) Dynamic light scattering (DLS) analysis of CCMV-TA; (c) FPLC analysis of CCMV-TA and (d) UV-vis of tannic acid (TA), free coat protein and tannic acid encapsulated hybrid nanoparticles (CCMV-TA).

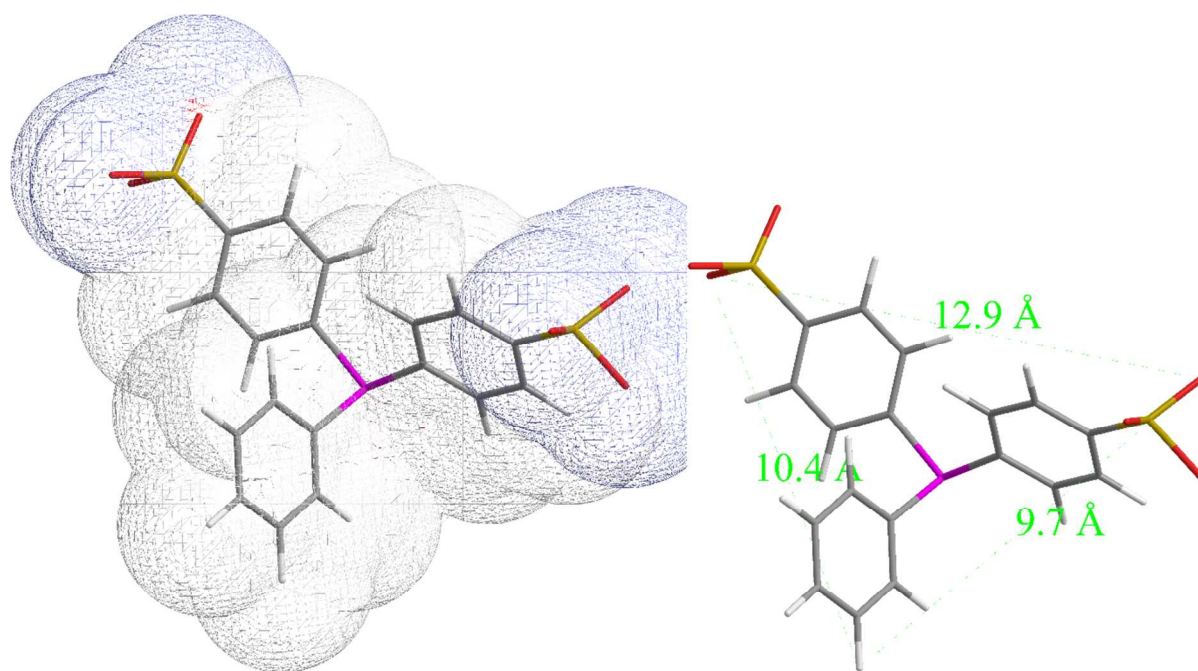


Figure S7: MM2 force field calculations of BSPP.