Supporting Information for

Synthesis of dumbbell AuNRs@BCP nanoparticles via UV light-initiated RAFT polymerization-induced self-assembly

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Data analysis:

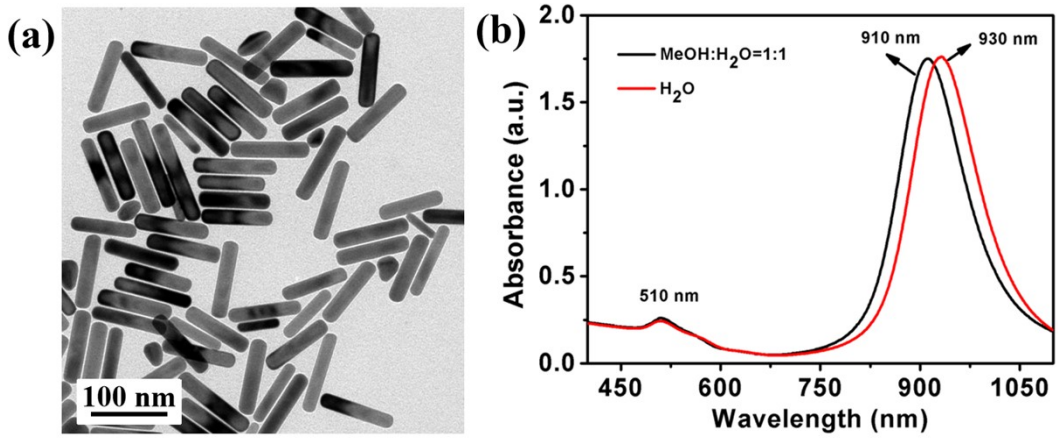

Figure S1. (a) The TEM of AuNRs, (b) the UV-Vis spectra of AuNRs in H_2O and the mixture of methonal:H_2O=1:1.

Table S1. Experimental fomula directly using AuNRs@CTAB as seeds by UV-light initiated RAFT PISA method.

No.	AuNRs@CTAB[a]	P4VP-CTA	St	AIBN	methanol	H_2O
1	500 μL	4 mg	0.08 mL	0.02 mg	3.75 mL	0.5 mL

[a] The AuNRs@CTAB is concentrated in H_2O and stored at 5 °C before use. Experimental condition: UV light intentsity: I_{365} = 2.50 mW cm^{-2}, irradiation time: 18 h, 25 °C.

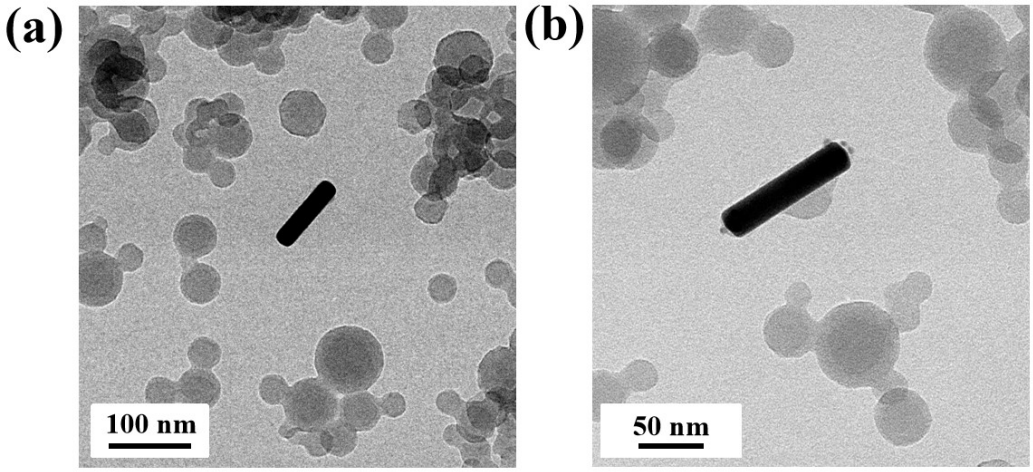

Figure S2. The TEM images of the mixture of AuNRs and micelles by directly using AuNRs without modification under UV ligh-inithiated RAFT PISA process.

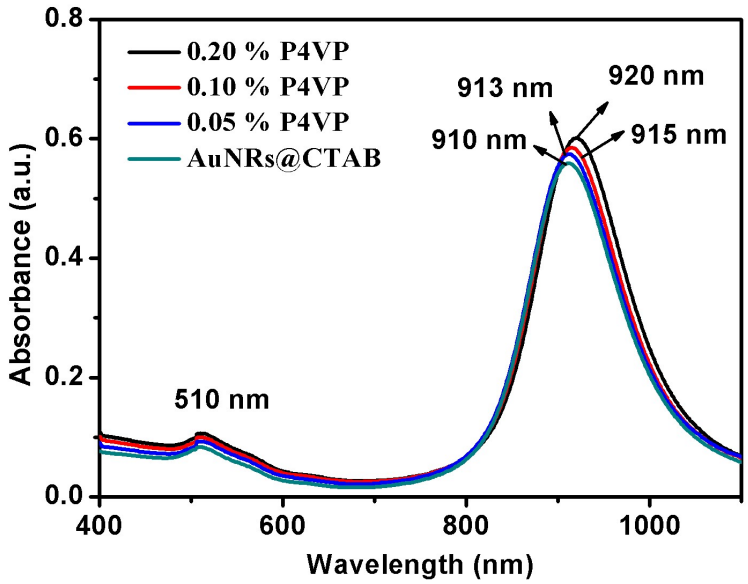

Figure S3. The UV-Vis spectra of AuNRs@P4VP modified with different contents of P4VP-CTA in methonal:H_2O = 1:1.

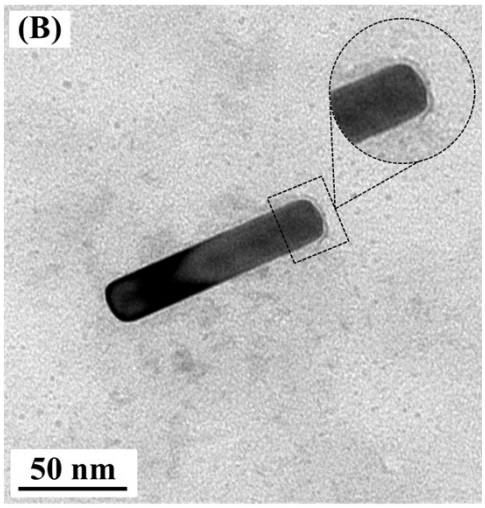

Figure S4. TEM images of modified AuNRs@all-P4VP.

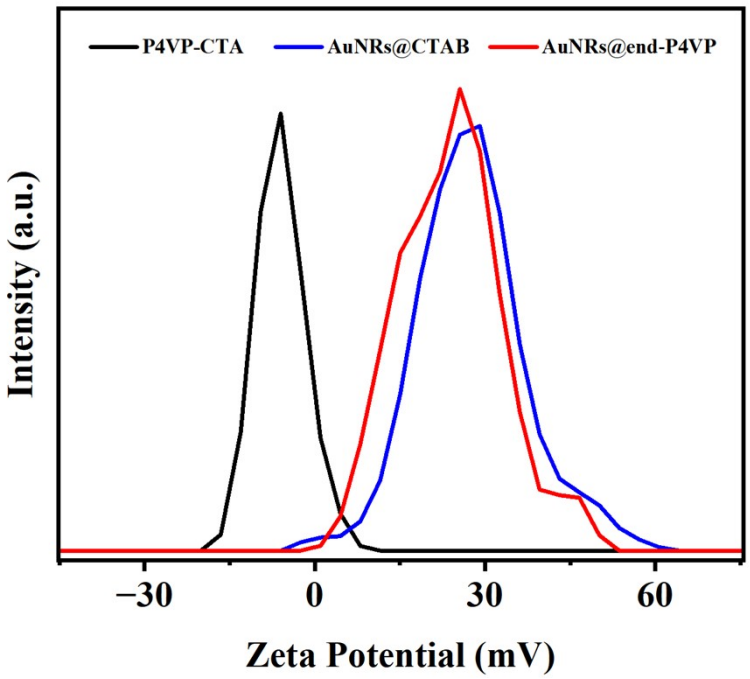

Fig. S5. The comparison zeta potential values of P4VP-CTA, AuNRs@CTAB, and AuNRs@end-P4VP in water.

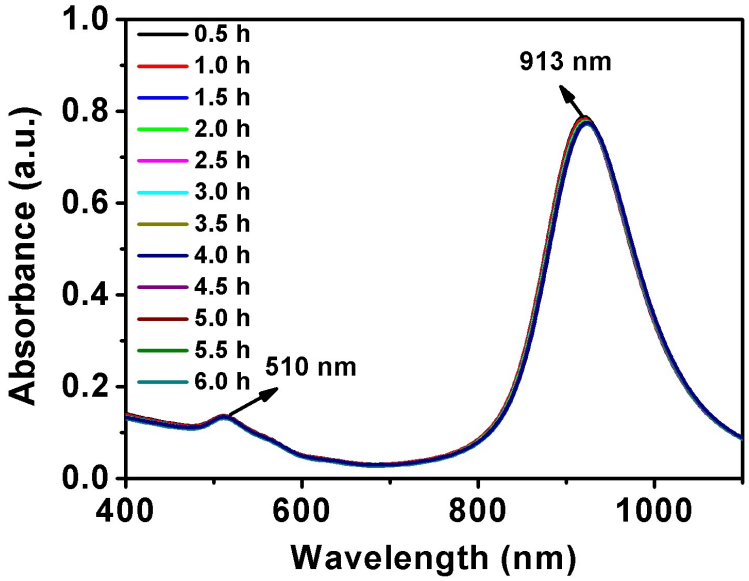

Figure S6. The UV-Vis spectra of AuNRs@end-P4VP in methonal : H_2O = 1:1 under UV light irridiation for 6 h.

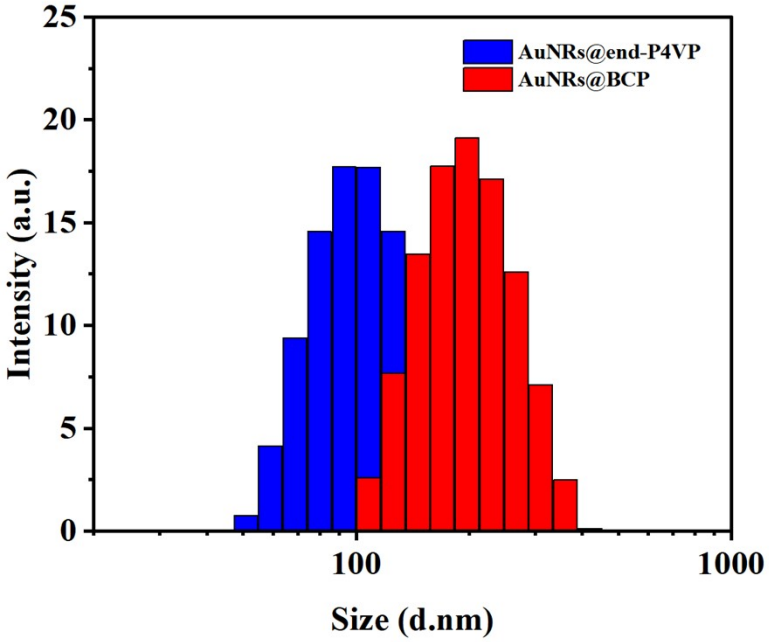

Fig. S7. The comparison diameter distribution values of AuNRs@end-P4VP, and the dumbbell AuNRs@BCP in water.

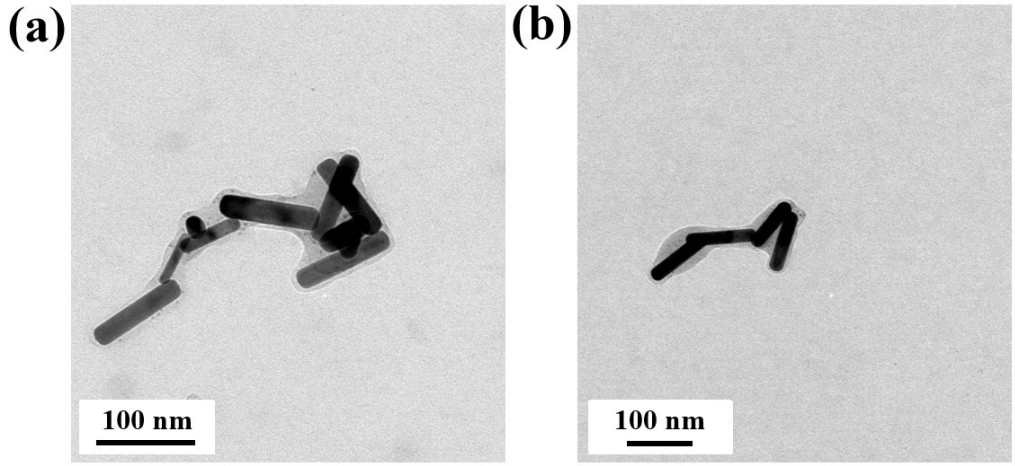

Figure S8. TEM images of core-shell AuNRs@BCP nanoparticles by using AuNRs@all-P4VP under UV ligh-initiated RAFT PISA process.

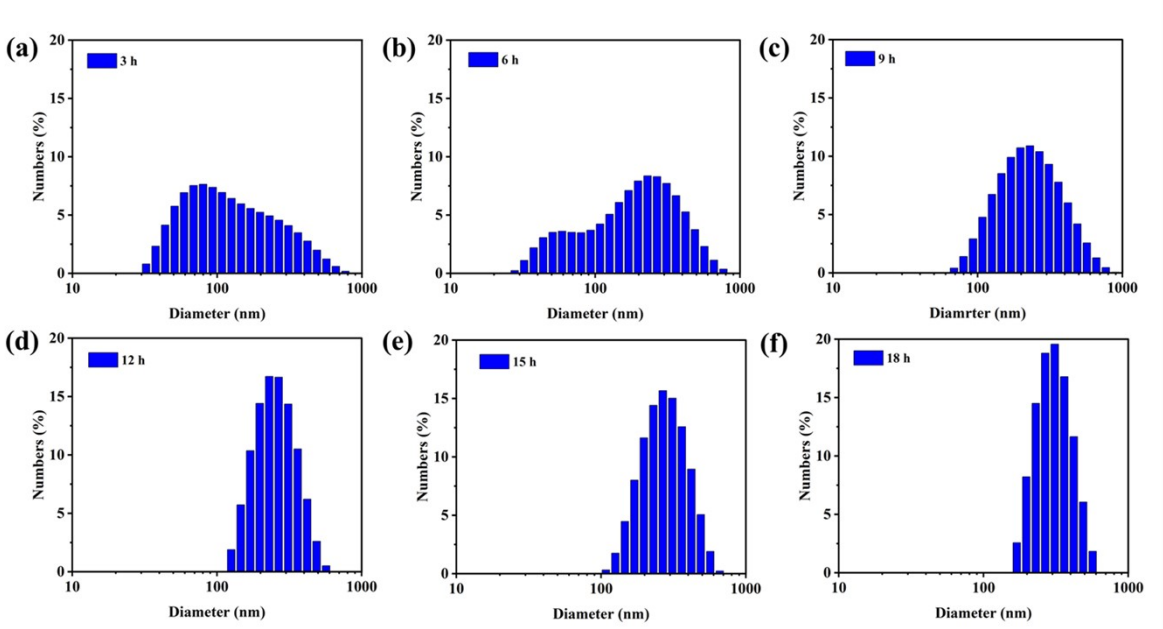

Fig. S9. The comparison diameter distribution changes which were monitored by DLS measurement via the UV light-initiated RAFT PISA method at different polymerization times: (a) 3h, (b) 6h, (c) 9h, (d) 12h, (e) 15h, and (f)18h.

Table S2. Experimental fomula using AuNRs@end-P4VP as seeds by UV-light initiated RAFT PISA method.

No.	AuNRs@ end-P4VP[a]	P4VP	St	AIBN	methanol	H_2O
1	500 μL	4 mg	0.08 mL	0.02 mg	3.75 mL	0.5 mL
2	750 μL	4 mg	0.08 mL	0.02 mg	3.75 mL	0.5 mL
3	1000 μL	4 mg	0.08 mL	0.02 mg	3.75 mL	0.5 mL

[a] The AuNRs@end-P4VP is concentrated in methanol and stored at 5 °C before use. Experimental condition: UV light intentsity: I_{365} = 2.50 mW cm^{-2}, irradiation time: 18 h, 25 °C.

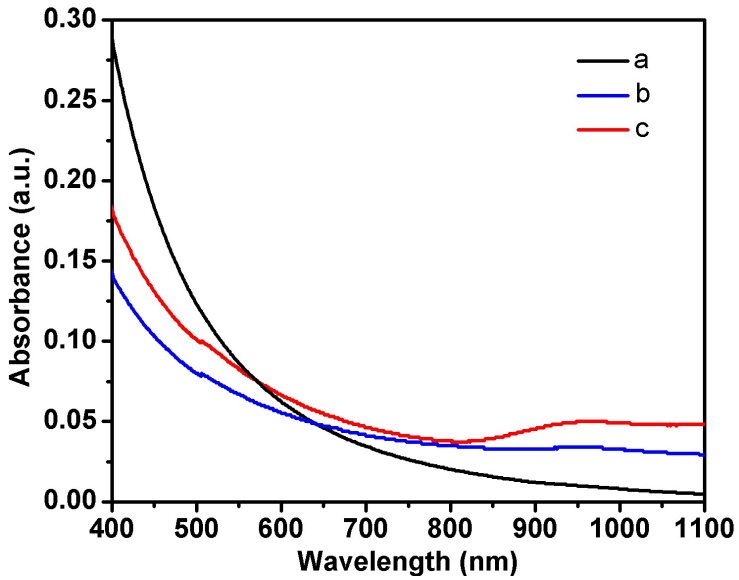

Figure S10. The UV-Vis absorption spectra of different nanoparticles prepared by UV light initiated RAFT PISA method: (a) P4VP-*b*-PS micelles and dumbbell AuNRs@P4VP-*b*-PS nanoparticles, (b) larger dumbbell AuNRs@P4VP-*b*-PS nanoparticles, (c) smaller dumbbell AuNRs@P4VP-*b*-PS nanoparticles.

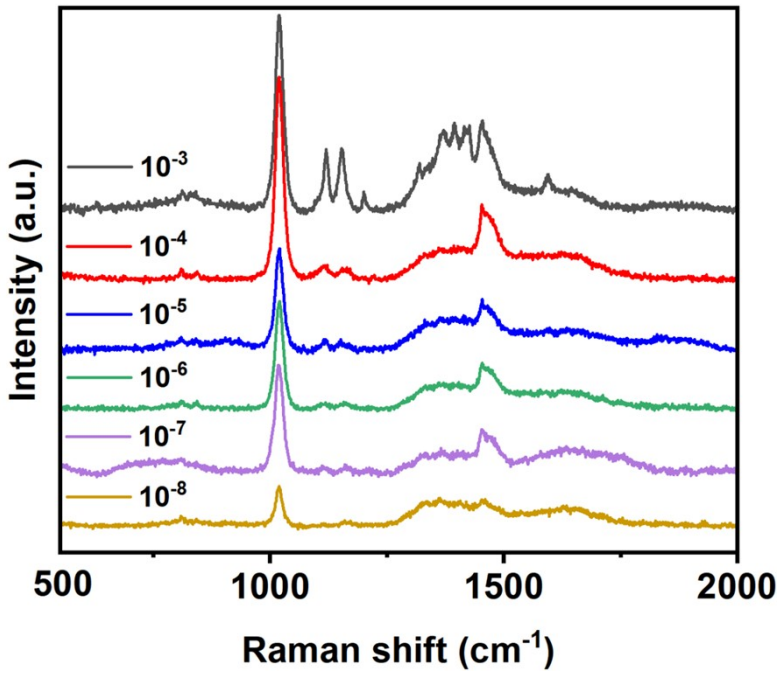

Fig. S11. SERS spectra of MO with different concentrations at 10^{-3}-10^{-8} M on core-shell AuNRs in dispersion.

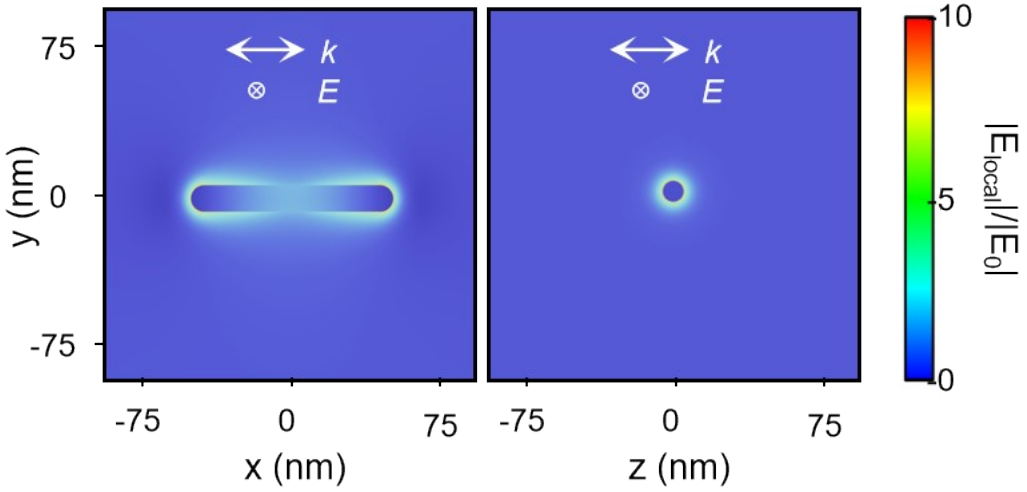

Fig. S12. The numerical simulated electric field amplitude for AuNRs.

Table S3. The comparative analysis of different self-assembly methods to prepare hybrid inorganic/block copolymers nanomaterials.

No.	Methods	Materials	Characteristics/Yields	Applications	References
1	Directed supramolecular assembly	P4VP-*b*-PS, AuNRs@PS	Cylindrical PS domain, dilute solutions	—	Ref 1
2	Solution self-Assembly	PS-*b*-PAA, gold (spheres, nanorods and nanostars)	Core-shell hybrid nanomaterials, dilute miscible mixture and heating	—	Ref 2
3	Heat-induced transformation	PS-*b*-PAA, AuNRs	different modes (contraction, bimodal contraction, dissociation, and winding), dilute solution mixture and heating	—	Ref 3
4	Heat polymerization-induced surface self-assembly	silica particles	fabrication of surface nanostructures, heat polymerization	—	Ref 4
5	UV light Polymerization-Induced Self-Assembly	P4VP-*b*-PS, AuNPs	Janus AuNPs@BCP, photopolymerization, high yields contents	—	Ref 5
6	UV light Polymerization-Induced Self-Assembly	PS-b-P2VP, AuNRs	Dumbbell AuNPs@BCP, tunable morphologies, photopolymerization	SERS	This work

Reference:

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