## Supplementary Information

# Tunable reactivity of silver nanoclusters: Facile route to synthesize a range of bimetallic nanostructures

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|---|---|---|
| Video S2 | Tomographic reconstruction of AuNT@**1** | Attached |

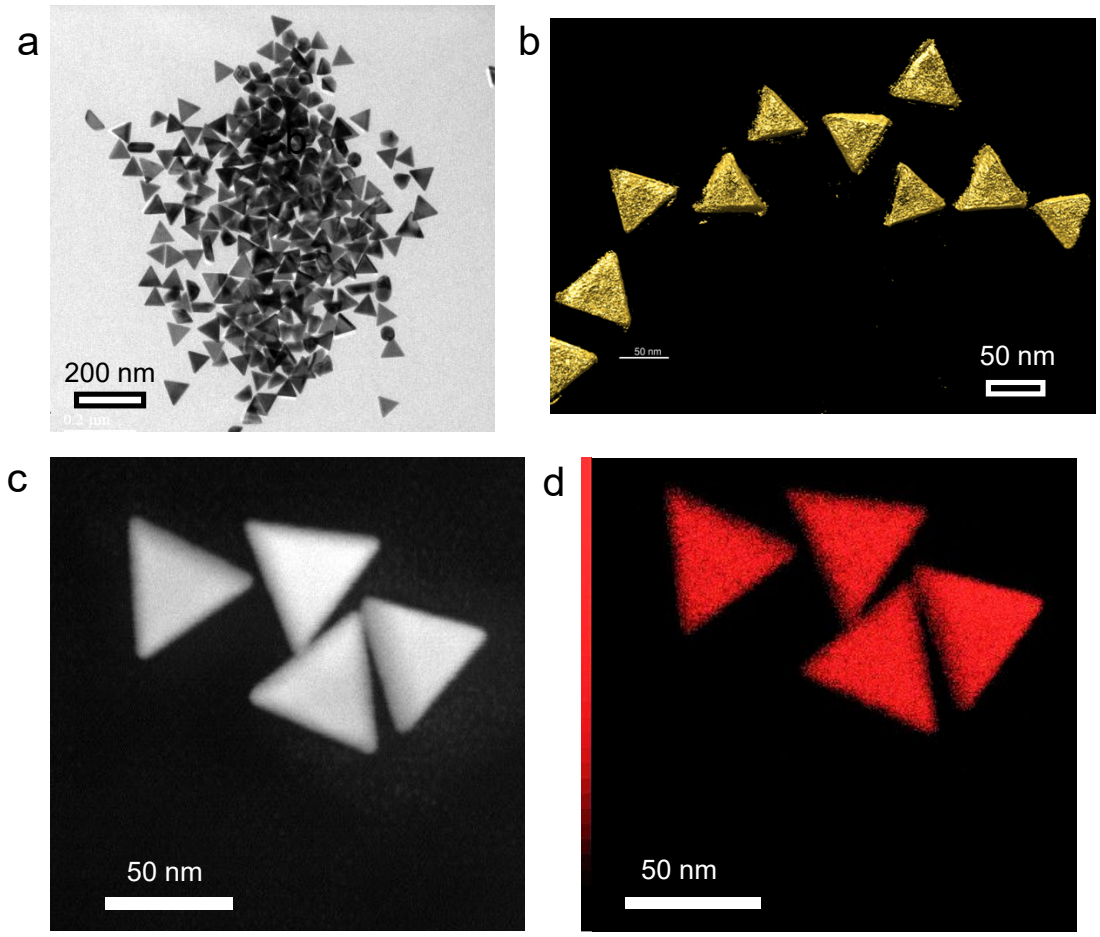



**Fig. S1** Characterization of AuNT: a) TEM image, b) 3D tomographic reconstruction, c) dark-field STEM image, and d) corresponding EDS elemental mapping (Au is shown in red).

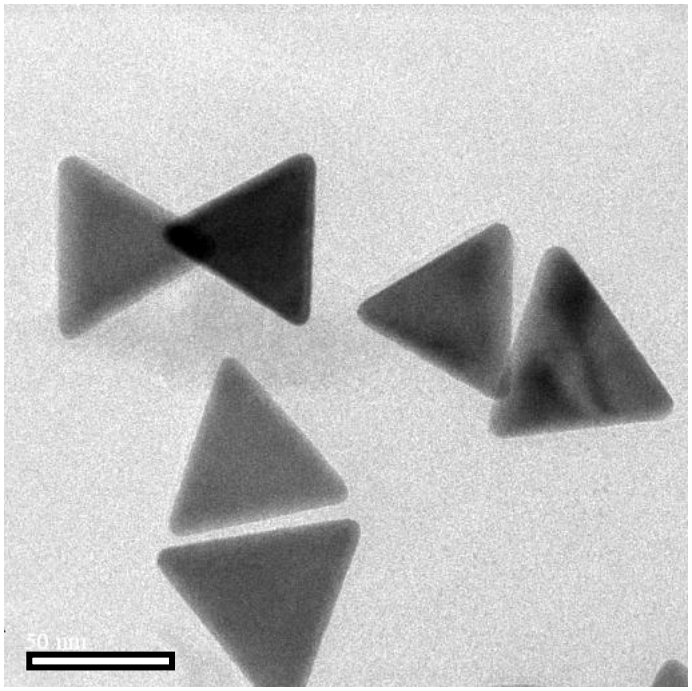



**Fig. S2** TEM image of AuNTs dispersed in DMF after a week. Scale bar 50 nm.

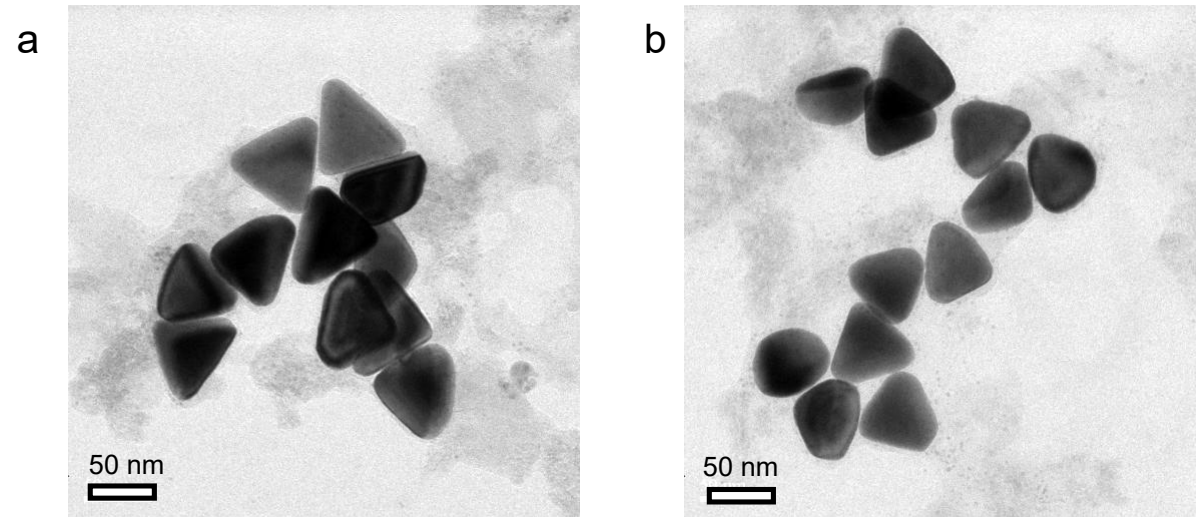



**Fig. S3** TEM image of AuNT@**1** upon addition of a) 40 uL, and b) 200 uL **1** showing minor effect of NC concentration on the product.

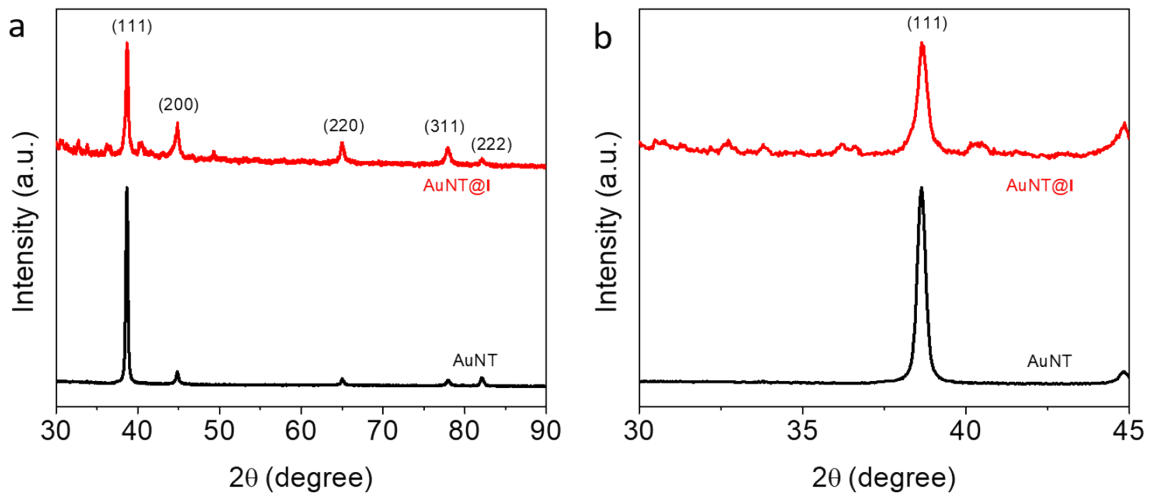



**Fig. S4**. Comparative powder XRD of AuNT and AuNT@**1** (a) and magnified view of the peaks corresponding to the (111) lattice plane (b), showing no change in the peak position.

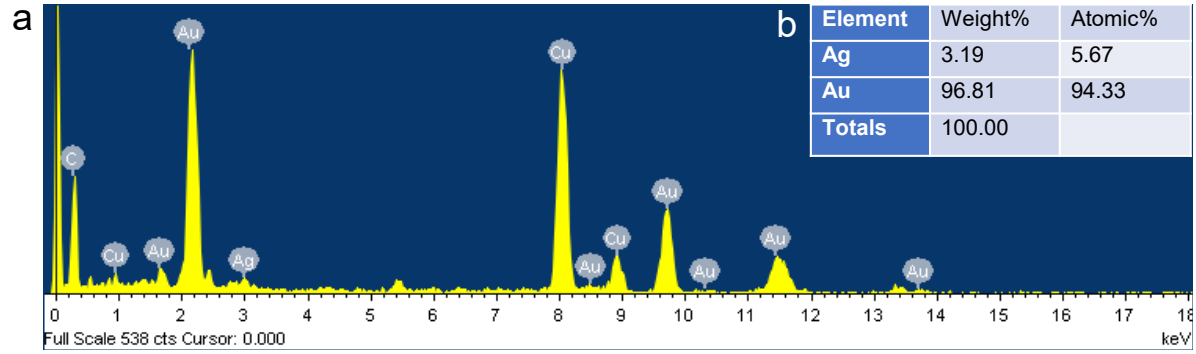



**Fig. S5** TEM EDS analysis of AuNT@**2** in water: EDS spectrum (a) and corresponding elemental quantification (b).

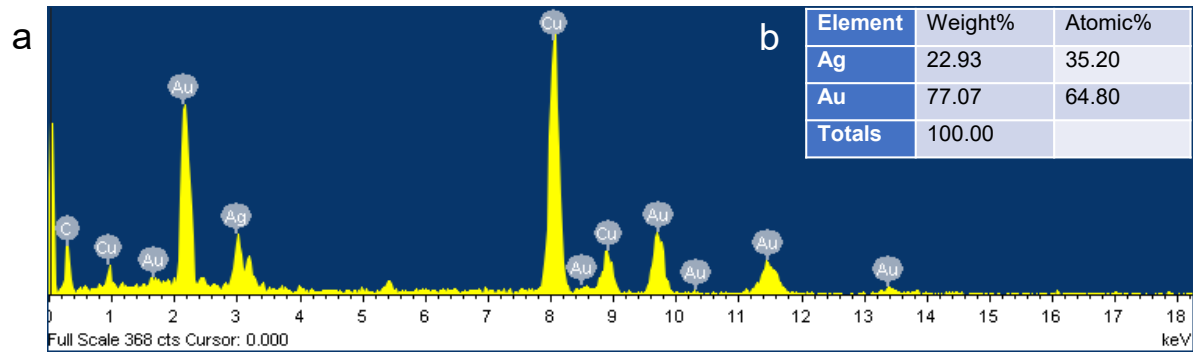



**Fig. S6** TEM EDS analysis of AuNT@**2** in DMF: EDS spectrum (a) and corresponding elemental quantification (b).

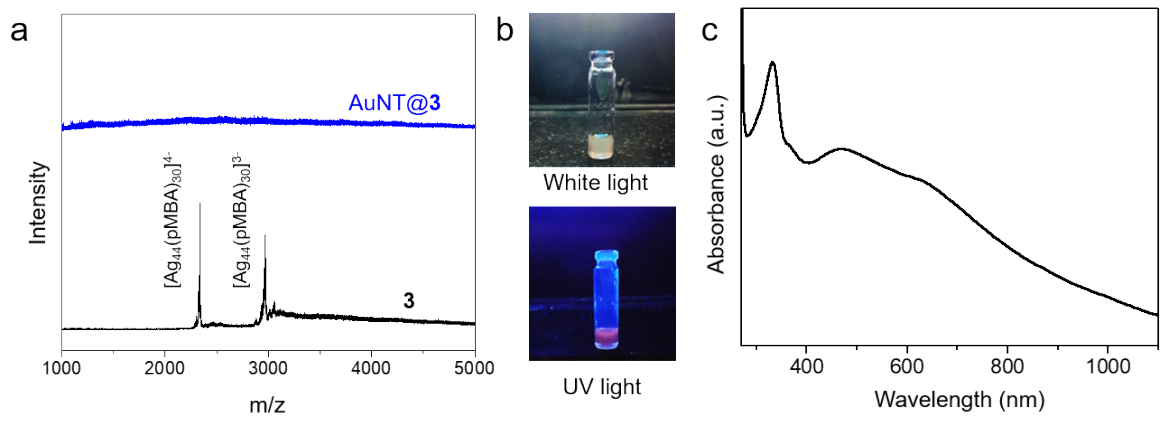
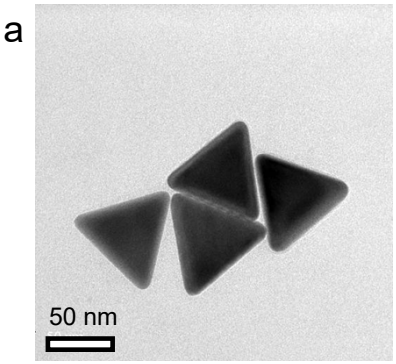



**Fig. S7** Characterization of reacted **3**: (a) ESI MS spectra of parent NC and that reacted with AuNTs showing that the two molecular ion peaks of the NC disappear upon reaction. (b) photograph of the reaction mixture showing luminescent by-product and (c) corresponding UV-vis absorption spectrum.




b

| Element | Weight % | Atom % |
|---|---|---|
| S | 0.68 | 4.05 |
| Au | 99.32 | 95.95 |
| Total | 100 | 100 |

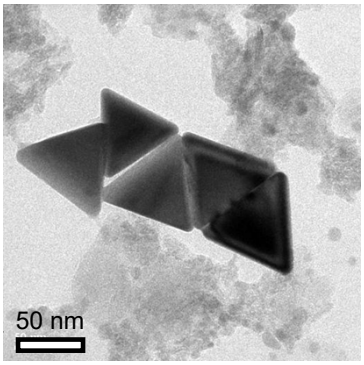



**Fig. S8** Characterization of AuNT@DMBT and AuNT@DMBT@**1**: (a) TEM image of AuNT@DMBT, (b) TEM EDS elemental analysis of AuNT@DMBT showing the presence of S on the nanoparticles, and (c) TEM image of AuNT@DMBT@**1** which shows no morphological changes.

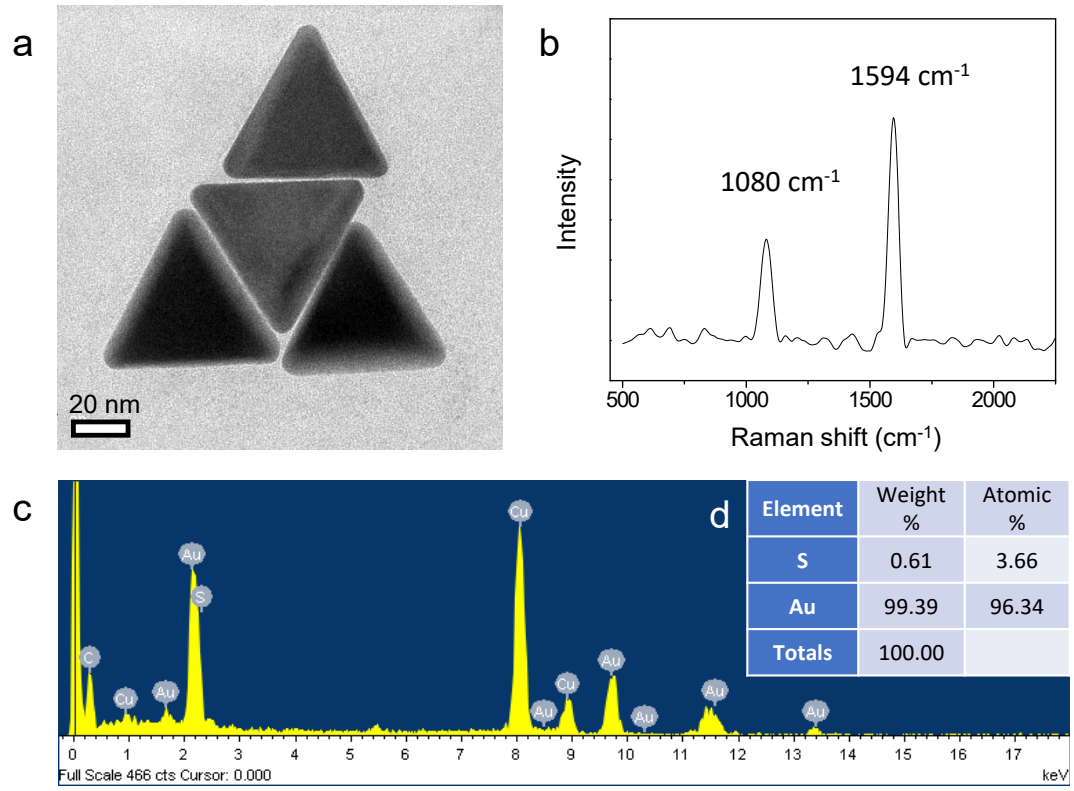
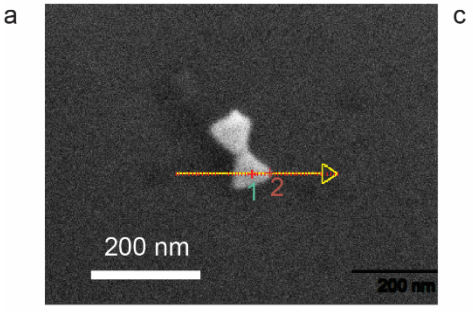
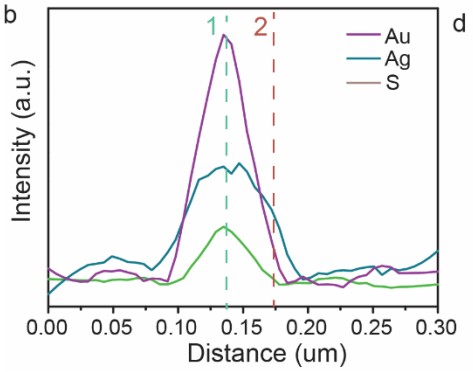



**Fig. S9** Characterization of AuNT@*p*MBA: (a) TEM image of the particles showing no change in the size and shape as compared to the parent AuNTs. (b) Raman spectrum of AuNT@*p*MBA showing two peaks at 1080 $cm^{-1}$ and 1594 $cm^{-1}$, the characteristic features of *p*MBA molecule, (c) TEM EDS spectrum and (d) corresponding elemental quantification showing the traces of S along the particles.




c

| Elements | Weight% | Atom% |
|---|---|---|
| Au | 81.78 | 61.79 |
| Ag | 14.22 | 19.62 |
| S | 4 | 18.59 |
| | 100 | 100 |

d

| Elements | Weight% | Atom% |
|---|---|---|
| Au | 40.33 | 22.24 |
| Ag | 52.24 | 52.59 |
| S | 7.43 | 25.17 |
| | 100 | 100 |

**Fig. S10** (a) FESEM image of AuNT@*p*MBA@**3**, (b) EDS line profile drawn along the yellow arrow in Figure (a) showing the distribution of Au, Ag, and S along a particle, (c) elemental quantification at the centre of the particle (position 1) and (d) that at the edge (position 2).

Video S1 and S2 are attached separately.