Electronic Supplementary Material (ESI) for RSC Advances.

Shape Controlled Synthesis of Multi-Branched Gold Nanocrystals Through a Facile One-Pot Bifunctional Biomolecular Approach

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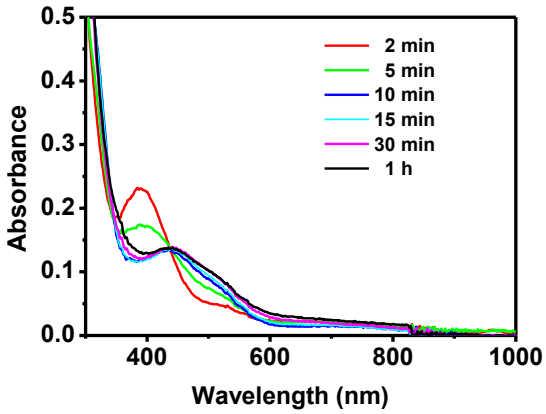

Figure S1. Time dependant absorption spectral changes of 0.2 mM $HAuCl_4$ solution after the addition of 0.2 mM L-DOPA (i.e. in the absence of NaOH).

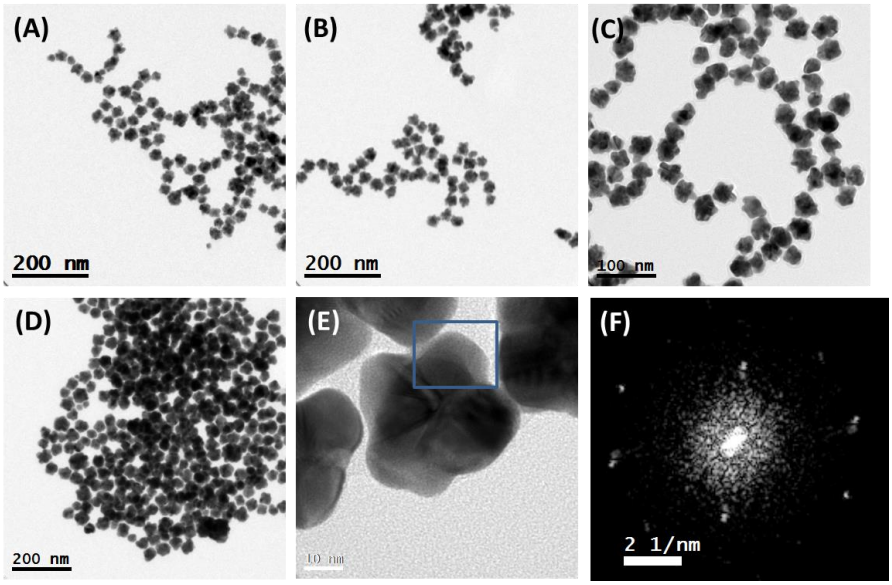

Figure S2. (A-E) Representative examples of TEM images at different magnifications of nanoparticles prepared in presence of 0.13 mM L-DOPA (F) shows the diffraction pattern obtained from one of the arms of nanostar.

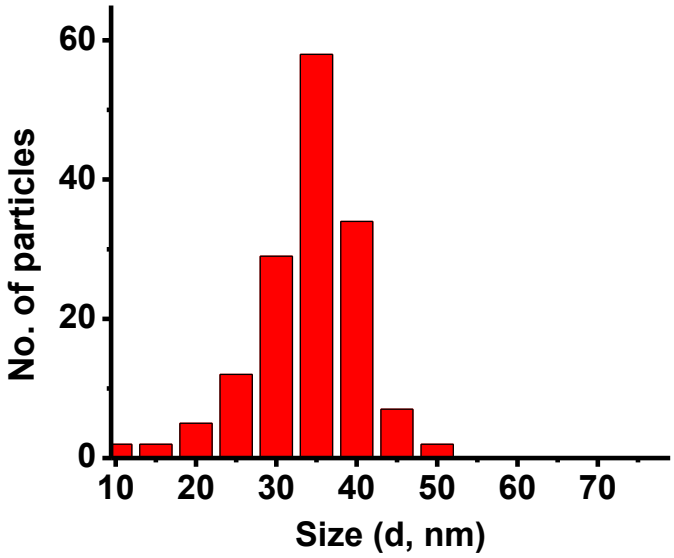

Figure S3. Graph showing size distribution analysis of the nanostars obtained in presence of 0.13 mM L-DOPA.

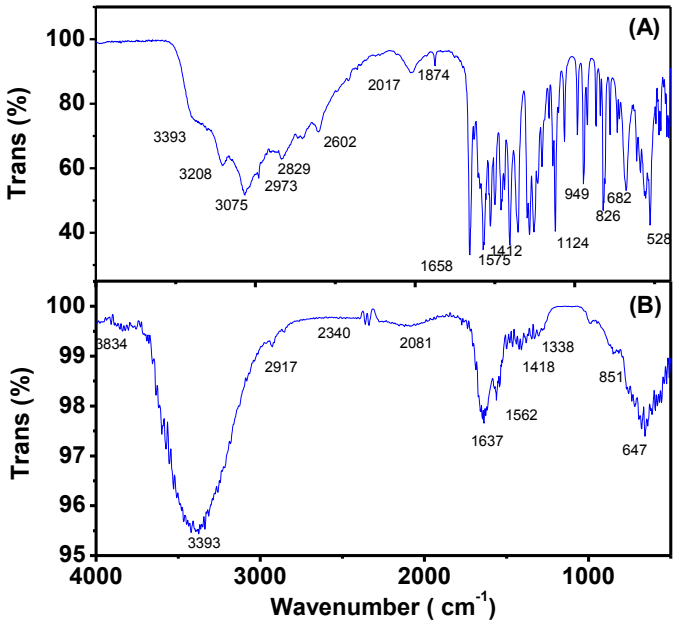

Figure S4. FTIR spectra of (A) L-DOPA and (B) Au nanostars (0.2 mM L-DOPA) recorded in KBr.

Table S1. Summary of variation of the optical properties, morphology and size of nanocrystals with varying amounts of L-DOPA

Sl. No.	$[HAuCl_4]$, mM	[L-DOPA], mM	[L-DOPA]/ $[HAuCl_4]$	Abs max, nm	morphology	Size, nm
1.	0.2	0.03	0.15	540	Spheroid	40
2.	0.2	0.05	0.25	530	spheroid	35, <10
3.	0.2	0.07	0.35	535, 620	Sphere+star	30-35, <10
4.	0.2	0.1	0.5	540, 660	Star+sphere	35,
5.	0.2	0.13	0.65	530, 710	star	35
6.	0.2	0.2	1	540, 800	Star+flower	40
7.	0.2	0.27	1.35	540, 930	flower	50

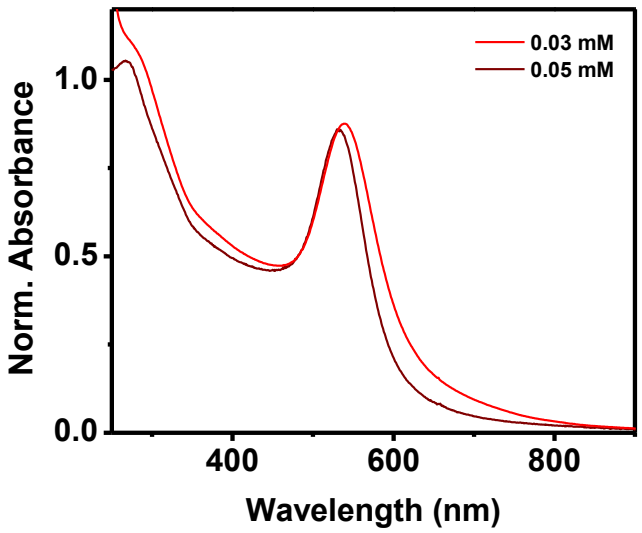

Figure S5. Normalized absorption spectra of gold nanoparticles prepared in presence of 0.03 mM (red) and 0.05 mM (wine red) concentration of L-DOPA.

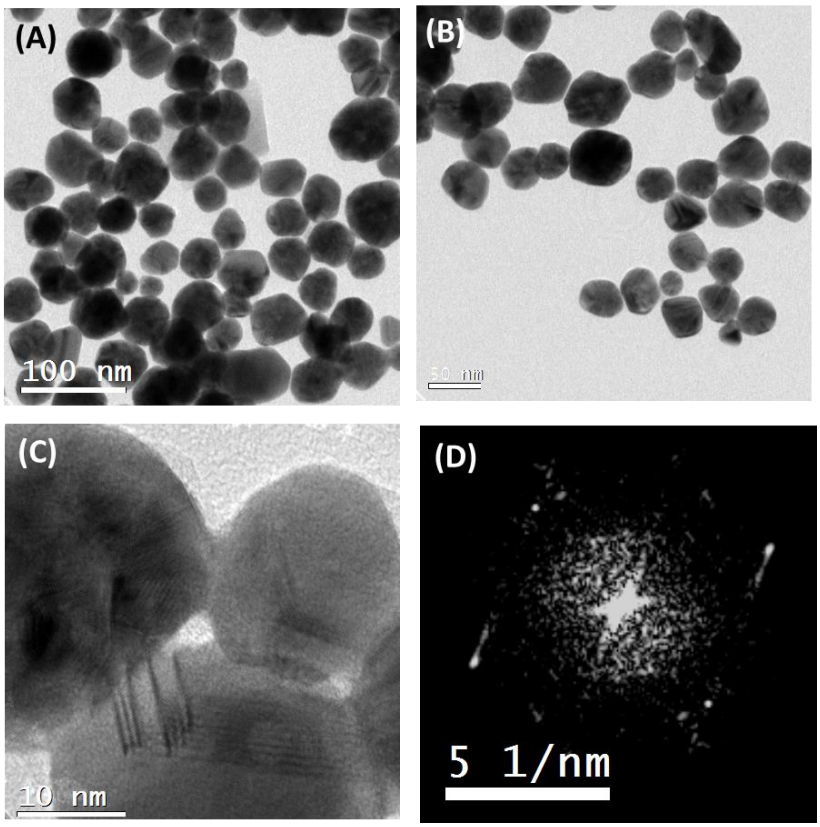

Figure S6. (A-C) Representative examples of TEM images at different magnifications of nanoparticles prepared in presence of 0.03 mM L-DOPA (D) shows the diffraction pattern obtained from image C.

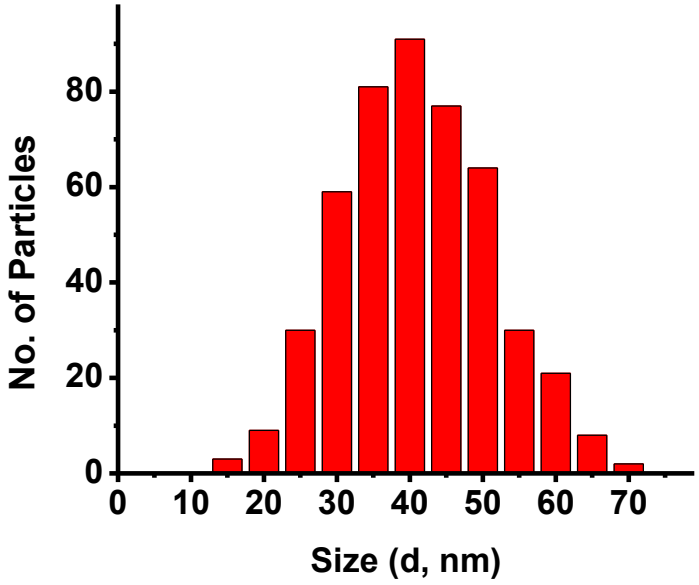

Figure S7. Graph showing size distribution analysis of the nanoparticles prepared in presence of 0.03 mM L-DOPA.

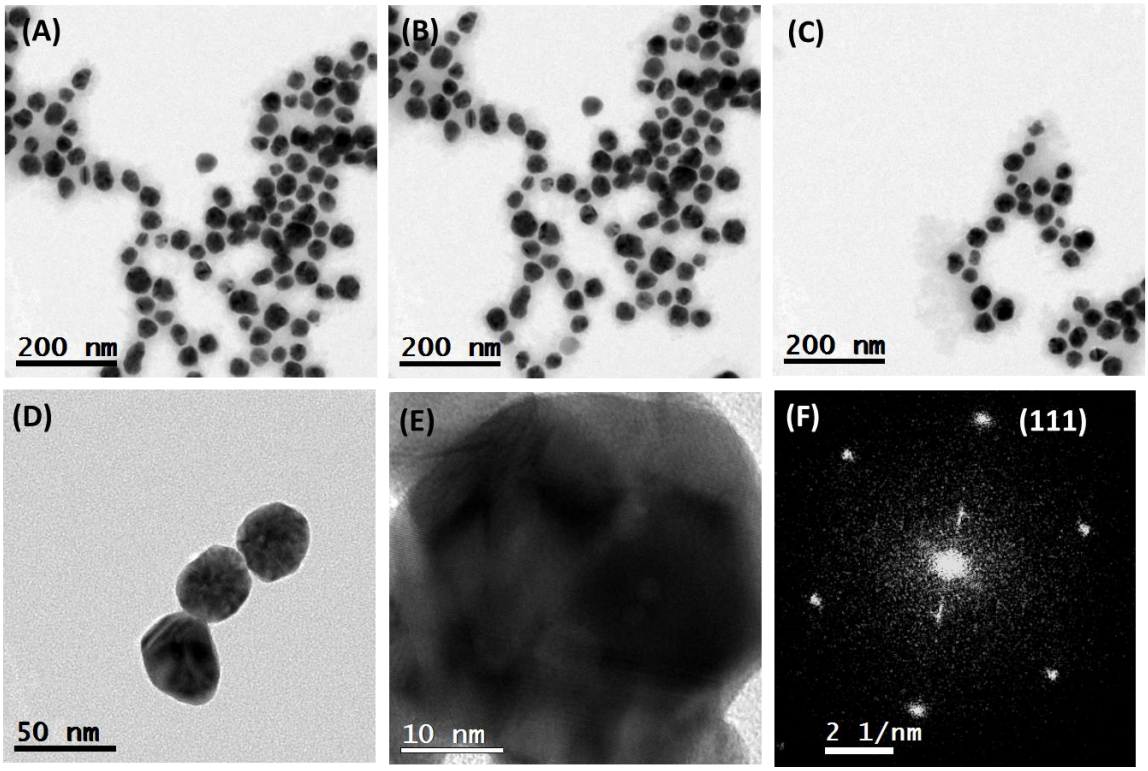

Figure S8. (A-E) Representative examples of TEM images at different magnifications of nanoparticles prepared in presence of 0.05 mM L-DOPA (F) shows the diffraction pattern obtained from the image E.

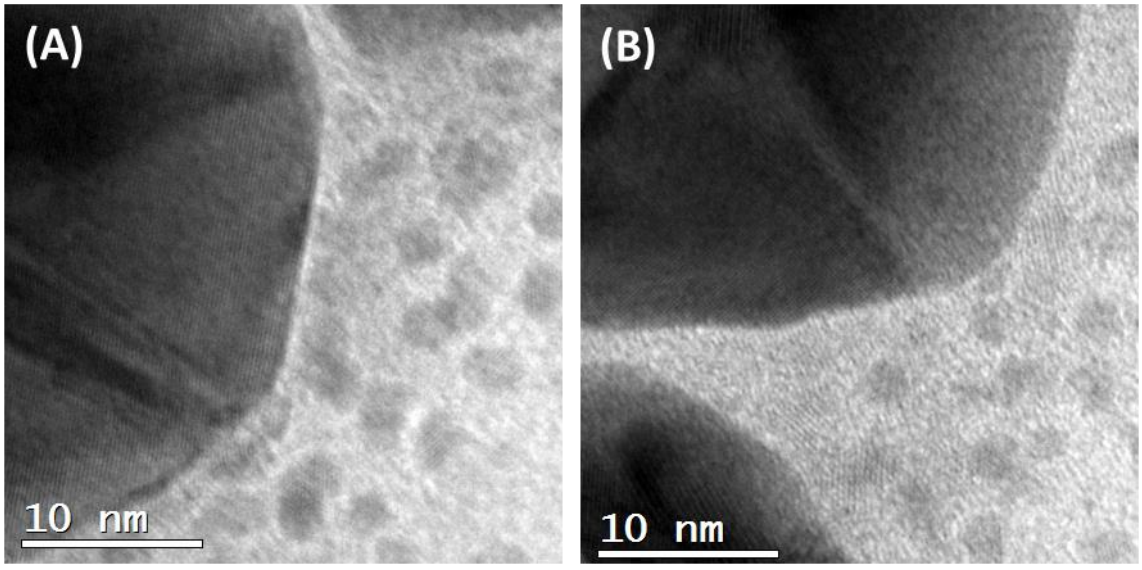

Figure S9. Representative examples showing the co-existance of small nanoparticles (size ~3 nm) when nanoparticles were prepared presence of 0.05 mM L-DOPA.

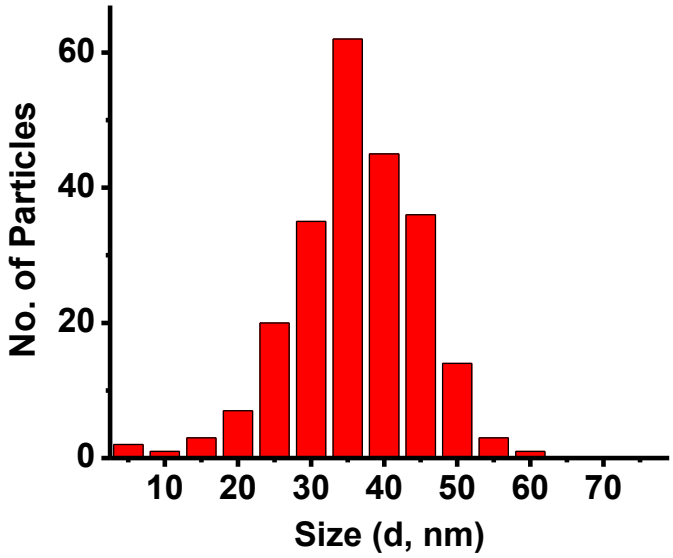

Figure S10. Graph showing size distribution analysis of the nanoparticles prepared in presence of 0.05 mM L-DOPA.

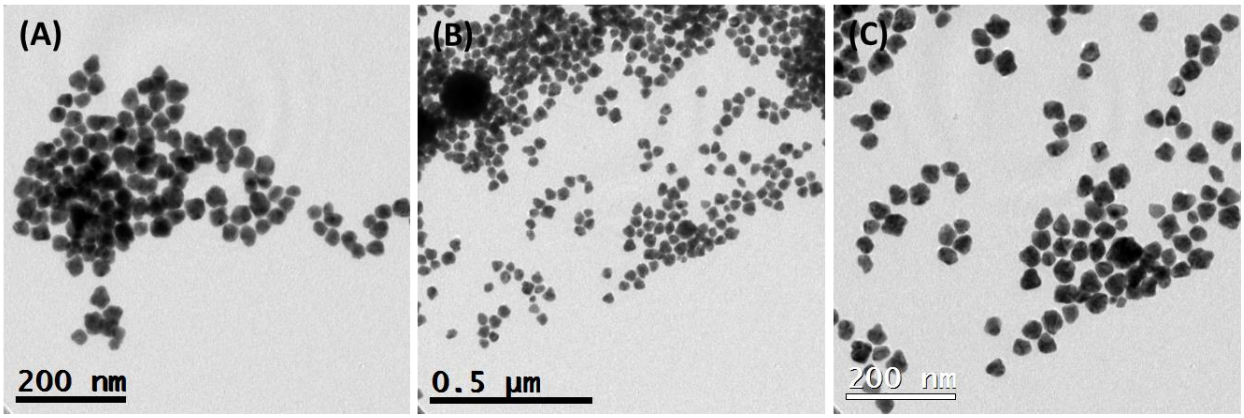

Figure S11. (A-C) Representative examples of TEM images at different magnifications of nanoparticles prepared in presence of 0.07 mM L-DOPA.

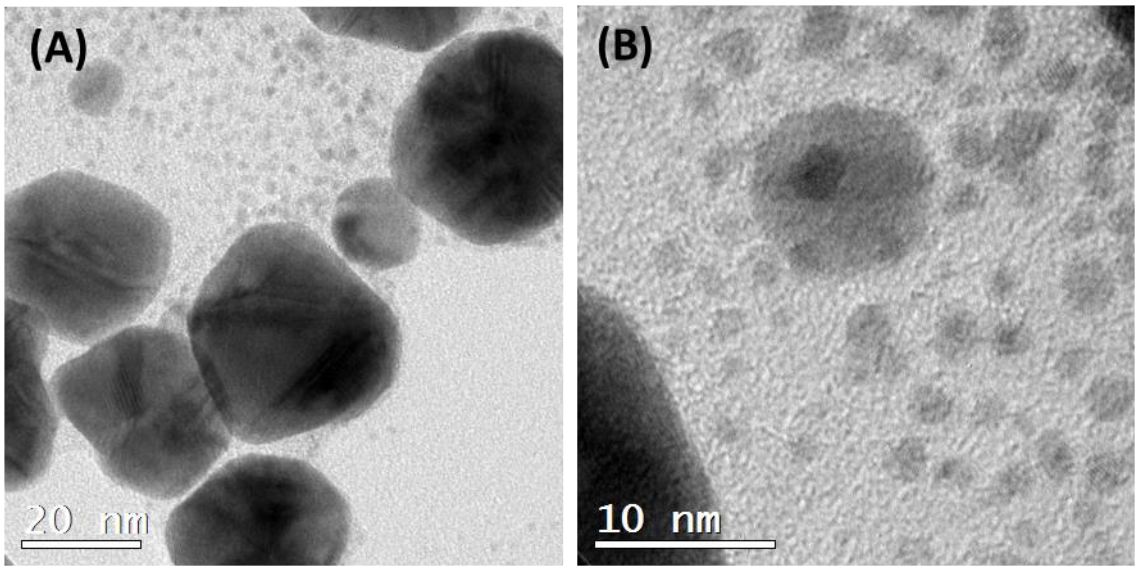

Figure S12. Representative examples of TEM images showing the presence of nanoparticles having size ~3-6 nm; [L-DOPA] = 0.07 mM.

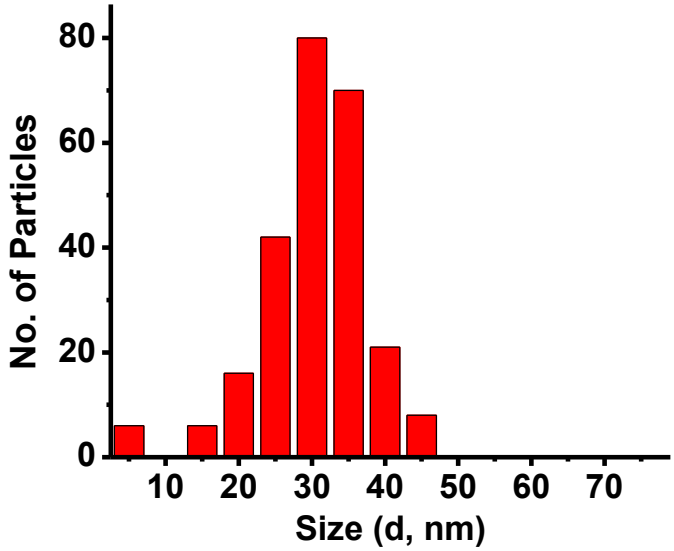

Figure S13. Graph showing the size distribution analysis of the spherical nanoparticles obtained in presence of 0.07 mM L-DOPA.

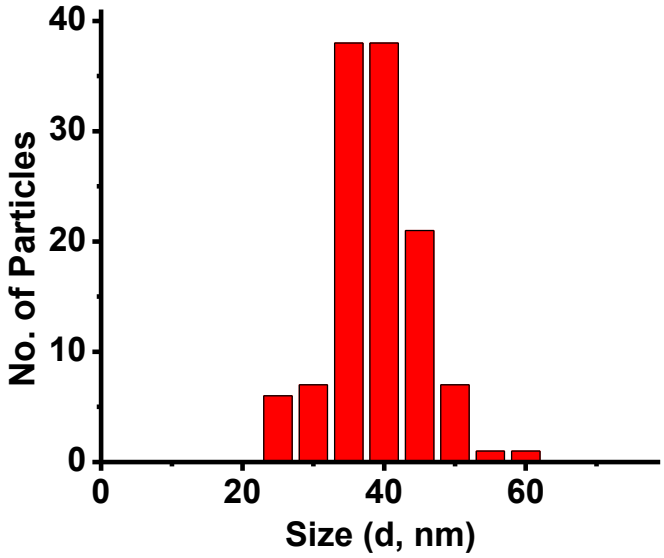

Figure S14. Graph showing size distribution analysis of the nanostars obtained in presence of 0.07 mM L-DOPA.

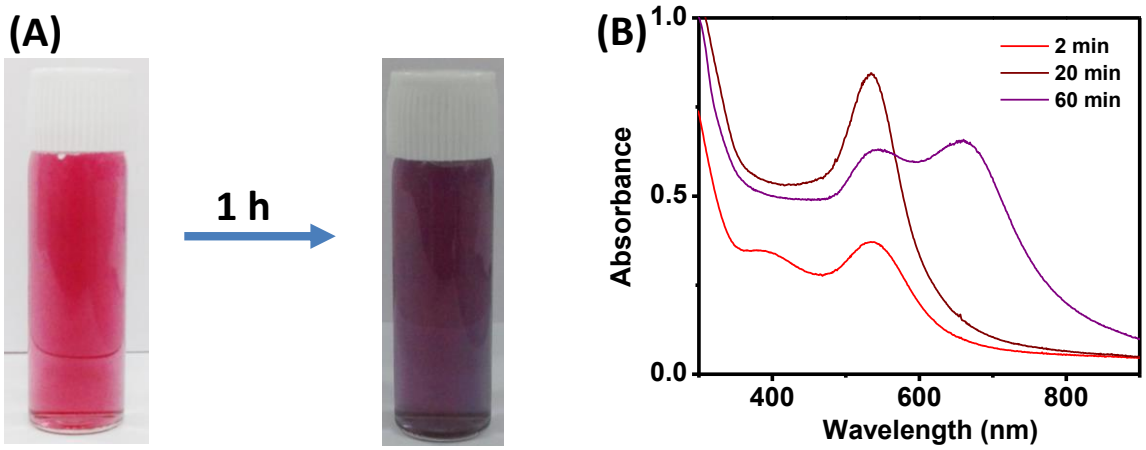

Figure S15. (A) colour photograph of the nanoparticle solution prepared in presence of 0.1 mM L-DOPA taken at 2 min and after 1 hour and (B) The corresponding absorption spectra recorded at 2 min, 3 min and 1h.

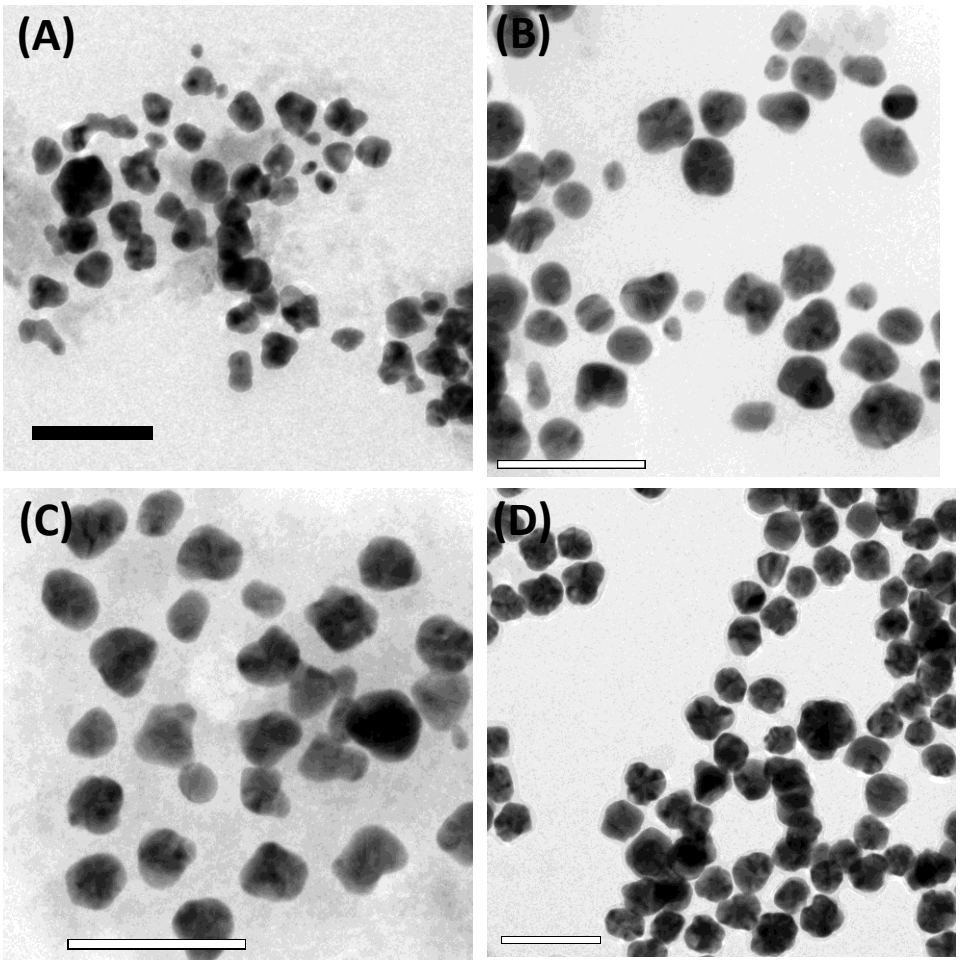

Figure S16. Representative examples of TEM images of nanoparticles prepared in presence of 0.10 mM L-DOPA.

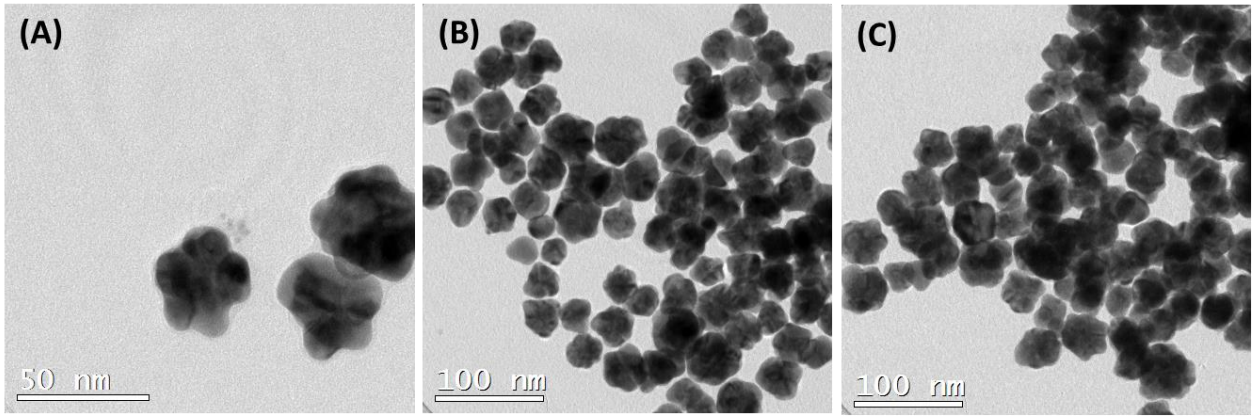

Figure S17. Representative examples of TEM images of nanoparticles prepared in presence of 0.20 mM L-DOPA.

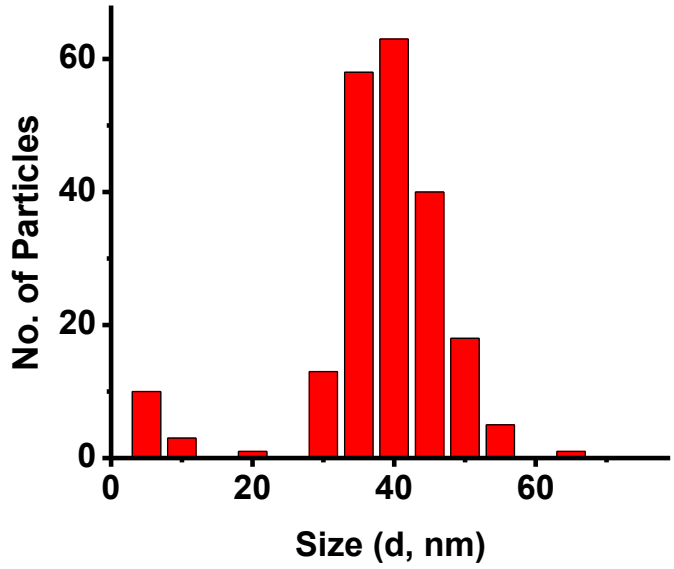

Figure S18. Graph showing size distribution analysis of the nanostars obtained in presence of 0.20 mM L-DOPA.

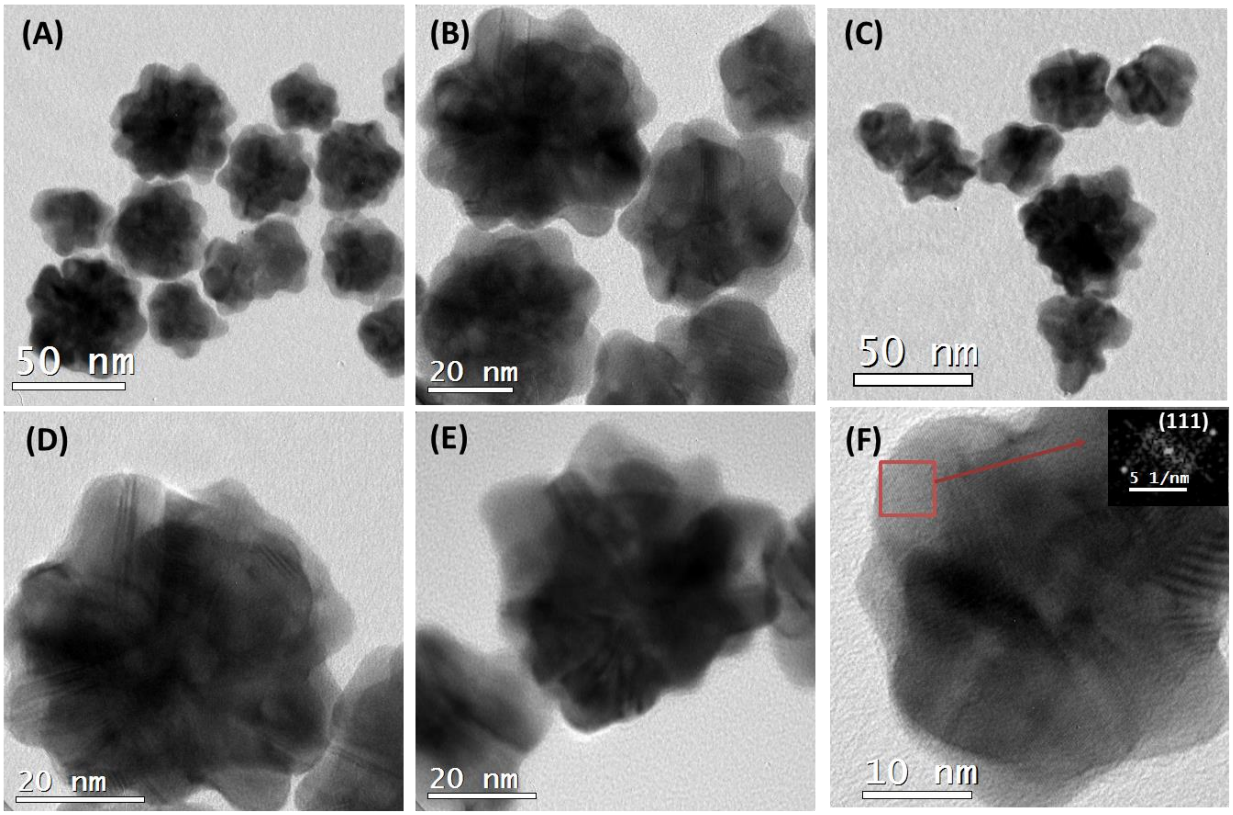

Figure S19. Representative examples of TEM images of nanoparticles prepared in presence of 0.27 mM L-DOPA; inset of (F) shows diffraction pattern obtained from the one of the arms.

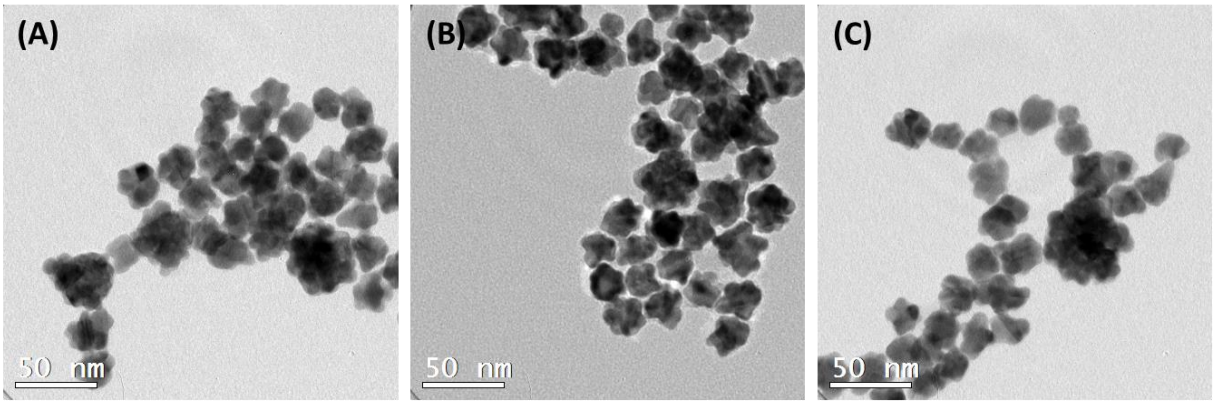

Figure S20. Representative examples of TEM images of nanoparticles prepared in presence of 0.33 mM L-DOPA.

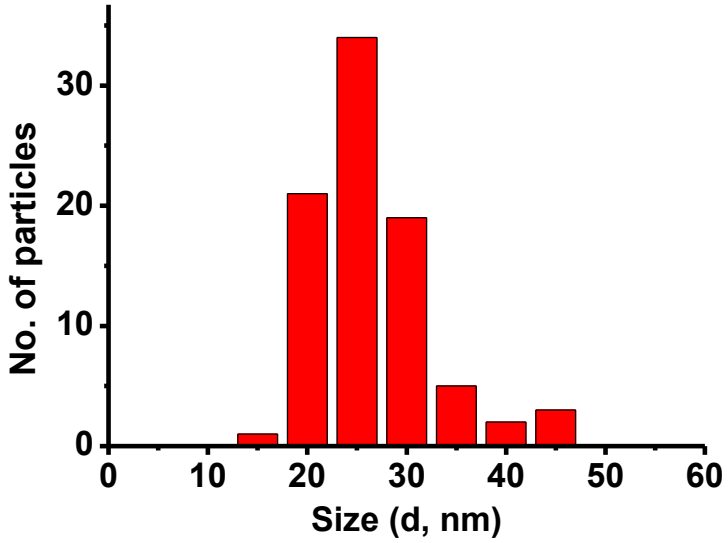

Figure S21. Graph showing size distribution analysis of the nanostars obtained in presence of 0.33 mM L-DOPA.

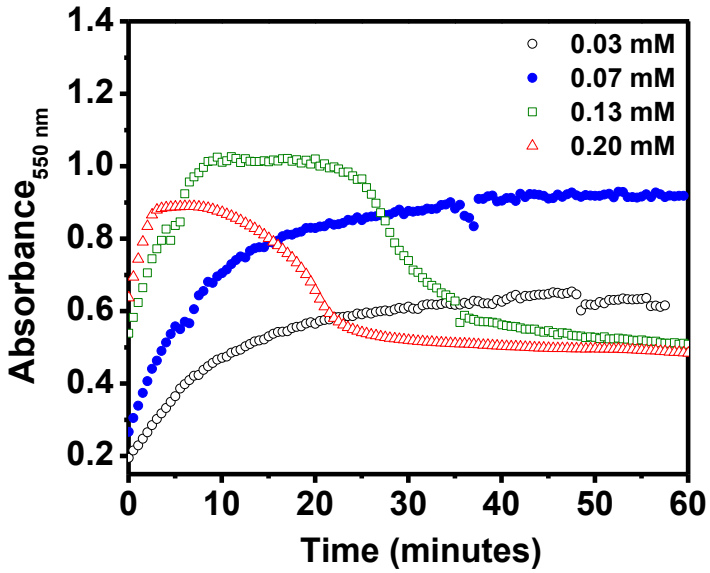

Figure S22. Evolution of the plasmon absorption at 550 nm of gold nanoparticles prepared in presence of varying amounts of L-DOPA; [L-DOPA] = 0.03 mM (black), 0.07 mM (blue), 0.13 mM (green) and 0.2 mM (red).

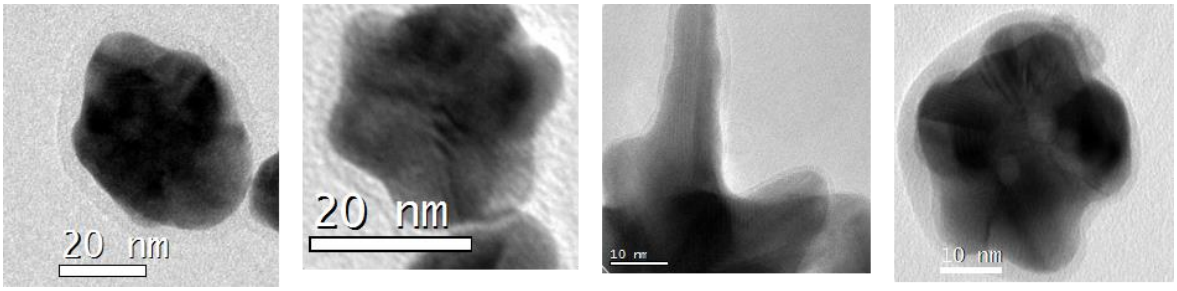

Figure S23. Representative TEM images displaying the presence of polymeric shell around nanomaterial.

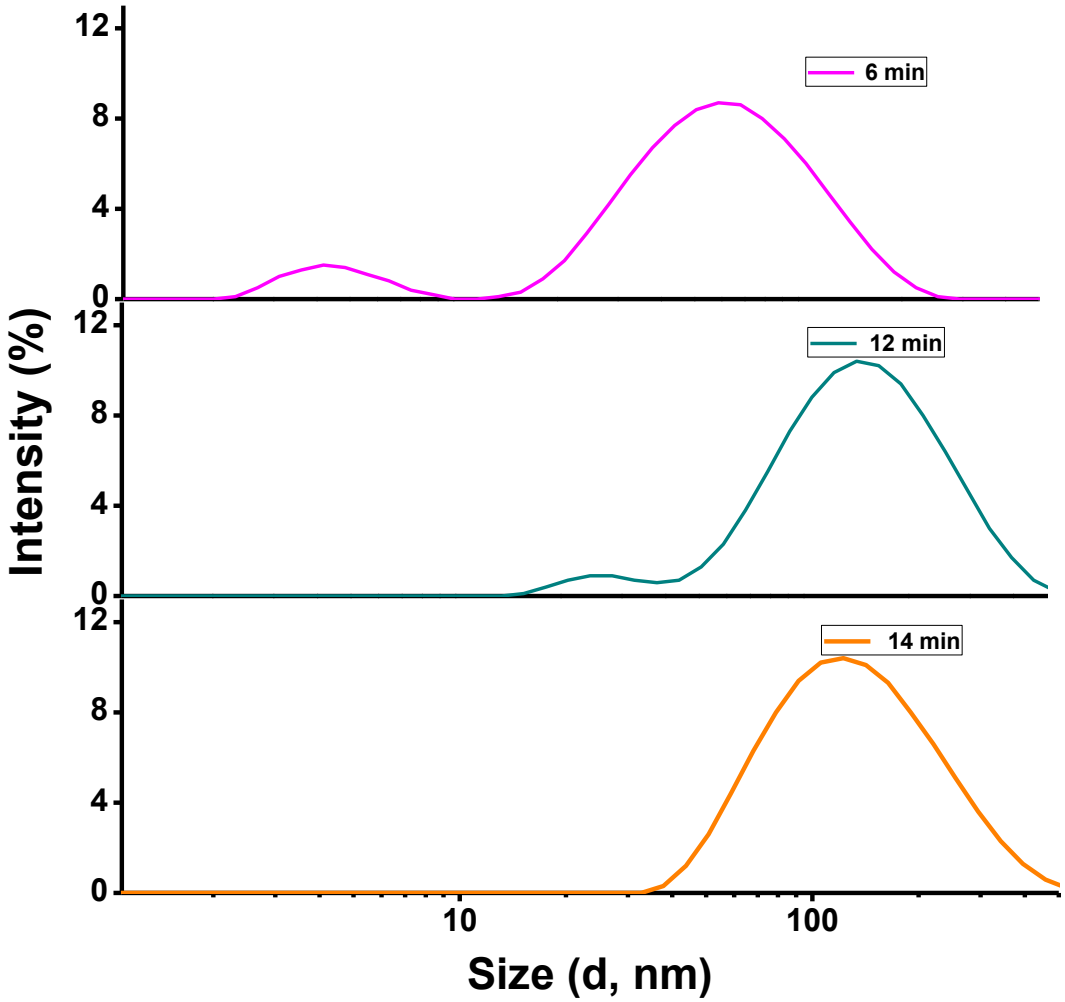

Figure S24. DLS data showing the variation of particle size during the evolution of LSPR band. [L-DOPA] = 0.2 mM.