Supplementary material

Note S.1

Nanoparticles fabrication experimental setup

Dolan-Jenner Fiber-lite Mi-150 LED, with dimensions of 6 in. L x 8.5 in. W x 5.3 in. H 15.3 cm L x 21.6 cm W x 13.5 cm H, is a 150 Watt quartz halogen fiber optic illuminator, equipped with self-supporting gooseneck fiber optic cable. Each fiber optic contains LH759 lens. It carries a lamp of 21V, which was replaced after every 200 h of operation. The AC power cord is at the rare end of the instrument, which was inserted into AC outlet. The wavelength was adjusted using optical bandpass filters (Intor Inc) ranging from 400 to 750 nm. The reaction mixture in a 21 mL glass vial was placed under the optical fiber angling from the top with the maintained 1 cm distance throughout the experiment as shown in the Figure S1.

Anisotropic AgNP were fabrication by irradiating an aqueous solution containing 600 µL of $AgNO_3$ (0.01 M), 600 µL BSPP (0.01 M), 500 µL trisodium citrate (0.1 M) and 1 mL sodium hydroxide (0.1 M) in 19 mL DI water. Triangular silver nanoparticles (Ag-Tri), silver nano cubes (Ag-cub) and silver nano rods (Ag-Rod) were selectivel fabricated by plasmon-mediated synthesis. Briefly, the 21 mL glass vial containing the reaction mixture was irradiated with halogen lamp for 16 to 24 h, at wavelength ranging from 400 nm to 450 nm for Ag-Cub, 500 nm, 550 nm and 600 nm for Ag-Tri and 650 nm, 700 nm and 750 nm for Ag-Rod. The distance between the lamp and the reaction mixture was kept at 1 cm, while the intensity of the lamp was maintained at 0.04 W, measured by optical power meter. All experiments were conducted at room temperature without utilizing any external heat source. Samples of the mixture were taken out periodically at different intervals to analyze the conversion of spherical seed to triangles, cubes and rods at different stages. The NPs were purified by centrifugation at 12000 r/min for 15 min for three time with DI water. The original concentration of the stock solution and the dilution factors were set for the determination of the concentrations of different types of anisotropic AgNP.

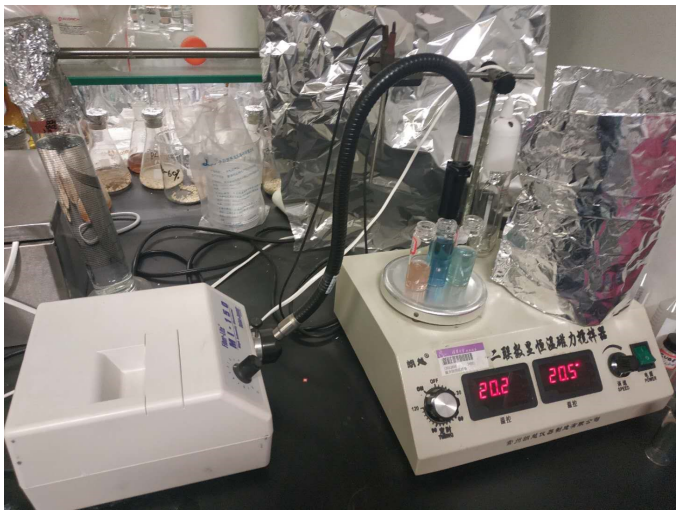

Figure S1*. Anisotropic Silver nanoparitcles fabrication setup employed to produce three different shapes of AgNP (triangular, cubes and rods)*

Table S 1 *Anisotropic silver nanoparticles fabrication optimization parameters*

Nanoparticles fabrication operational parameters							
NP shape	**Excitation Wavelength (nm)**	**Resultant morphology**	**NP size range (nm)**	**Average size (nm)**	**Reaction time (h)**	**Solution pH**	**Max NP yield**
Ag-Cub	400	Cube	32 - 55	37	20	11	
	450	Cube	50 - 84	55	20	11	✓
	450	Cube	74- 102	93	24	11	
	Above 450	MC*	-	-	20	11	
Ag-Tri	500	Triangle	26 - 60	35	20	11	
	550	Triangle	54 - 82	58	20	11	
	600	Triangle	77 - 98	89	20	11	✓
	Above 600	MC*	-	-	20	11	

Ag-Rod	650	Rod	35 - 64	42	20	11	
	700	Rod	52 - 96	61	20	11	
	750	Rod	91- 138	101	20	11	✓
	Above 750	MC*	-	-	20	11	

Note S.2

Size distribution using dynamic light scattering

Dynamic light scattering was used to study the particles size distribution and zeta potential. The uniform suspension of all anisotropic NP was obtained by taking the NP size range from ~30 to ~100 nm. To do so, a colloidal cocktail was made by collecting each anisotropic NP size range (obtanined from varying excitaion wavelength) after centrifugation and washing with ethanol and was subjected to Zetasizer nano (ZS90) at a 90^{o} angle at 25 ^{o}C. Every sample was measured for multiple runs (20 runs each). Figure 3.10 illustrates size distribution of Ag-Tri, Ag-Cub and Ag-Rod respectively.

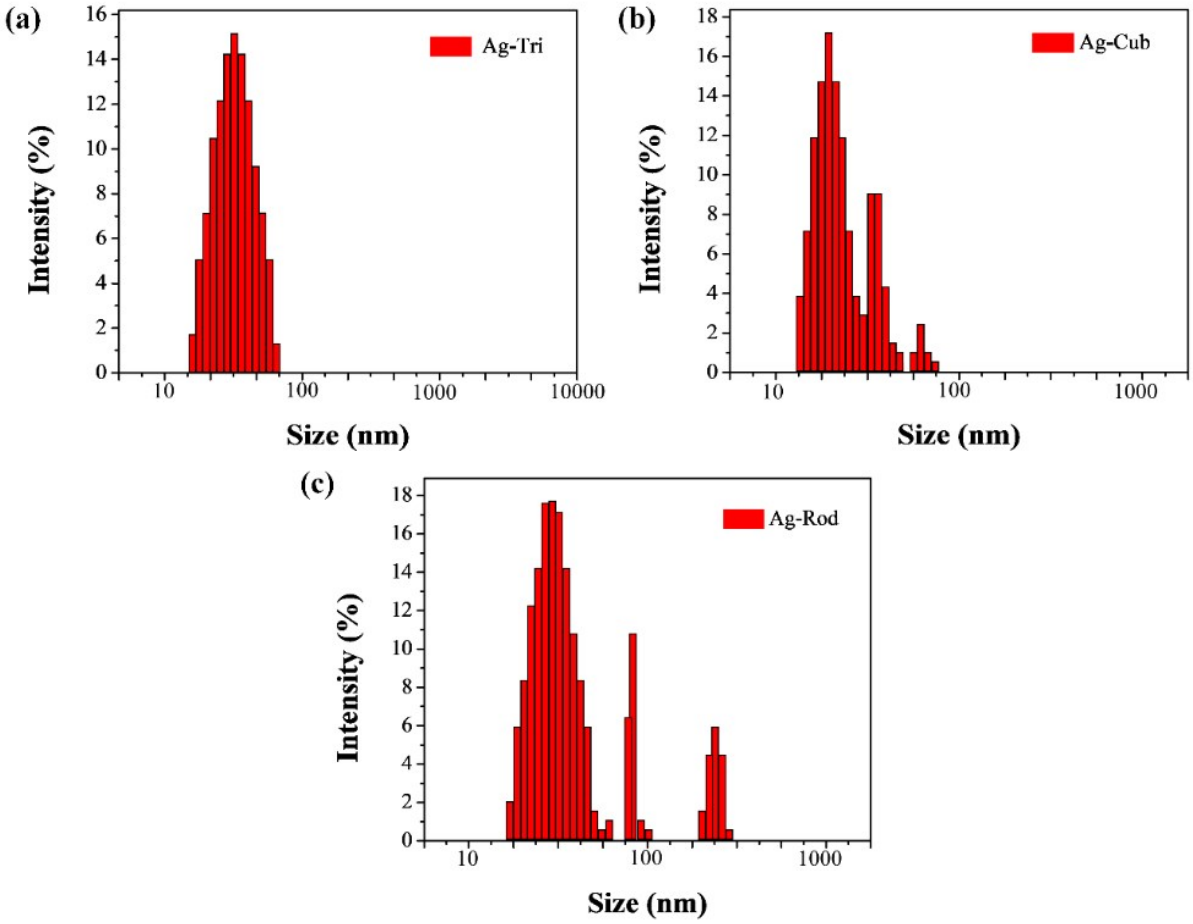

Figure S2. *DLS data showing size distrbution of anisotropic AgNP*

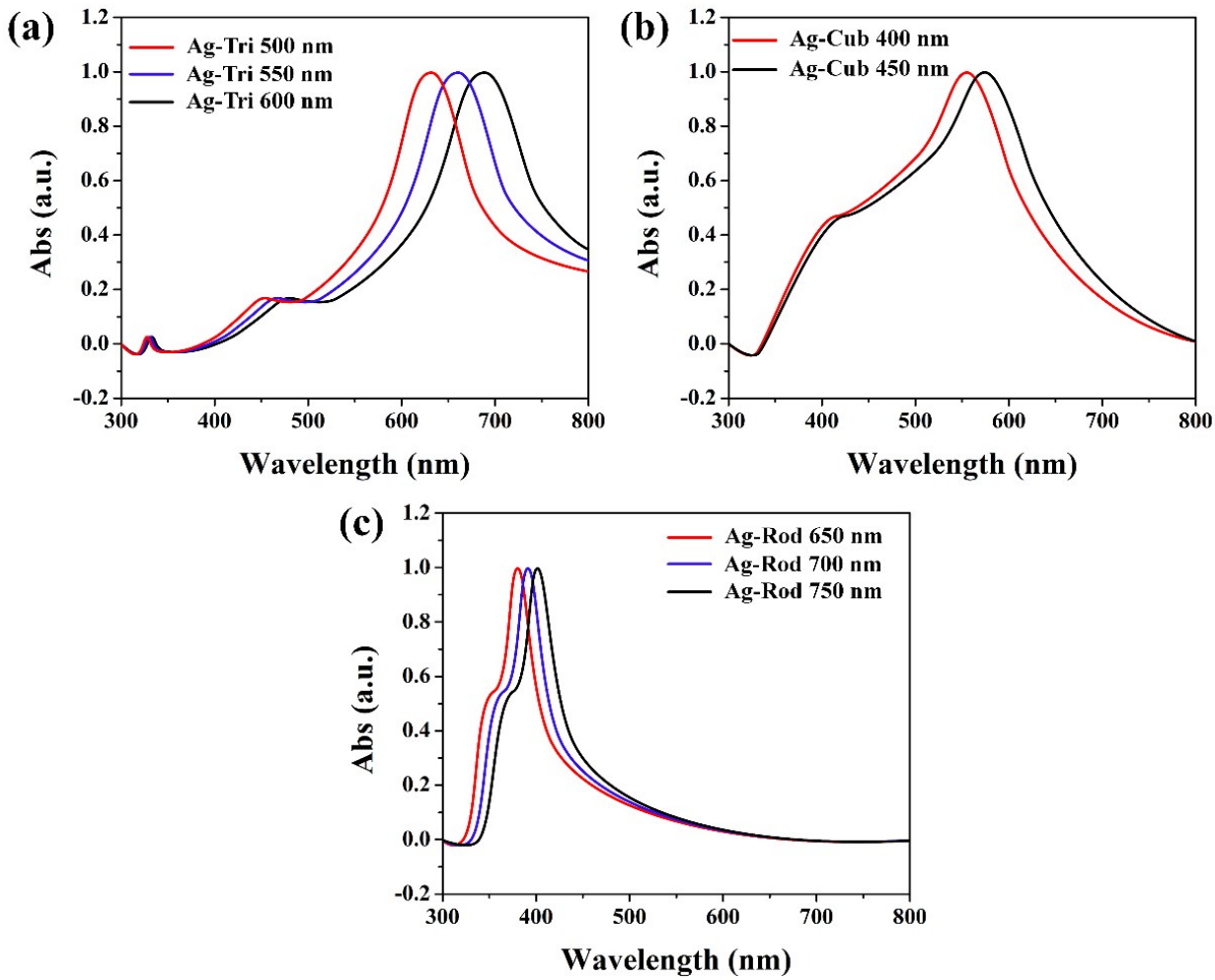

Figure S3. *UV-Vis spectral red shift upon increased excitation wavelength (a) Ag-Tri (b) Ag-Cub (c) Ag-Rod*

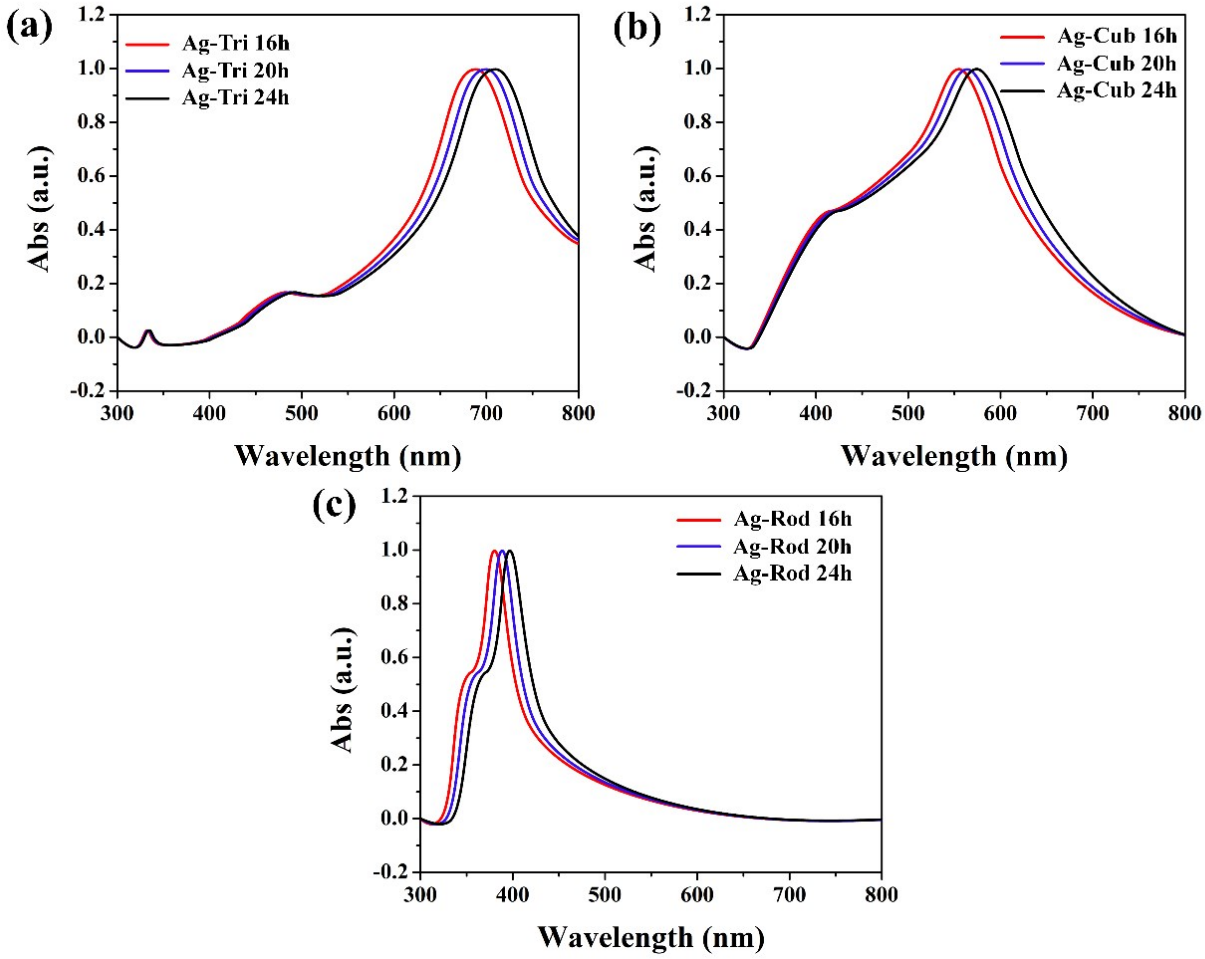

Figure S4. *UV-Vis spectral red shift upon increased excitation time (a) Ag-Tri (b) Ag-Cub (c) Ag-Rod*