Electronic Supplementary Material (ESI) for Nanoscale.
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Synthesis of AuAg/Ag/Au open nanoshells with optimized magnetic plasmon resonance and broken symmetry for enhancing second-harmonic generation†

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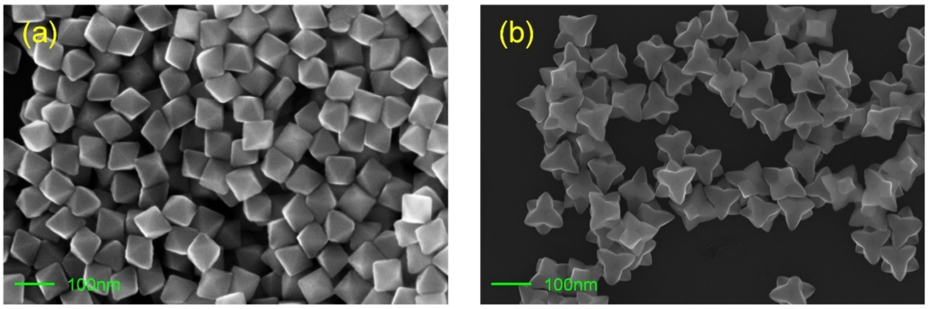

Figure S1. SEM images of PbS templates. (a) PbS nanooctahedron with an average side length of 66.5 ± 2.5 nm. (b) PbS nanostar with an average side length of 316.2 ± 8.8 nm.

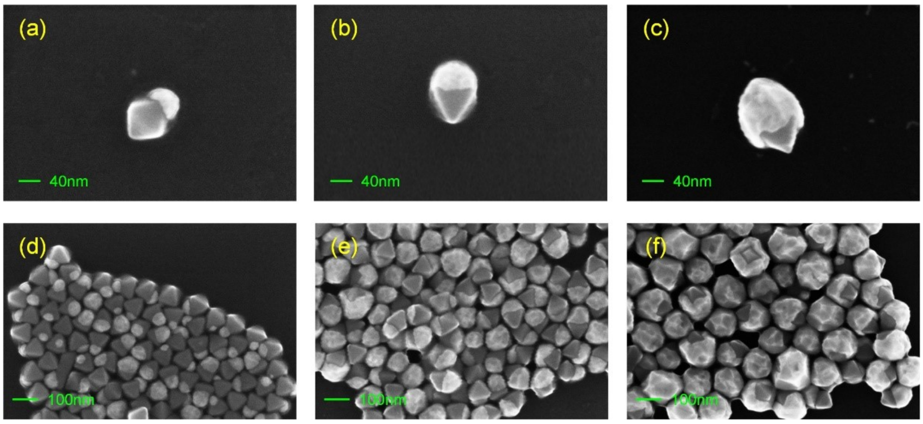

Figure S2. SEM images of Au nanocups grown on PbS nanooctahedron. The corresponding amount of Au (V_{Au1}) is 60 μL (a, d), 200 μL (b, e) and 800 μL (c, f).

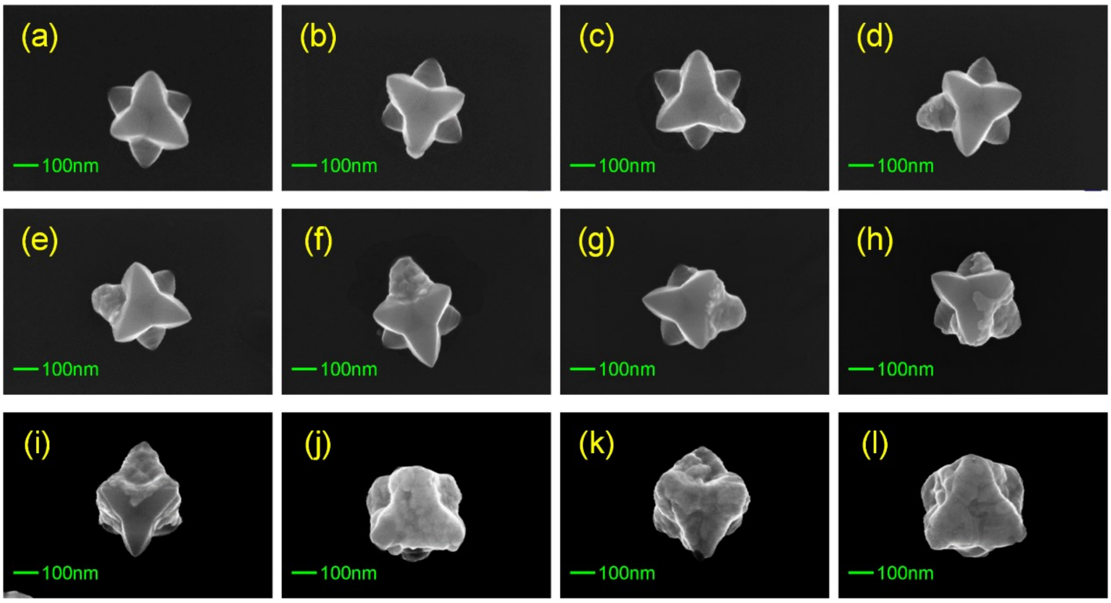

Figure S3. SEM images of Au nanoshell grown on a single PbS nanostar. The corresponding amount of Au (V_{Au1}) is 0 μL (a), 10 μL (b), 40 μL (c), 60 μL (d), 80 μL (e), 100 μL (f), 200 μL (g), 400 μL (h), 500 μL (i), 800 μL (j), 900 μL (k), and 1200 μL (l).

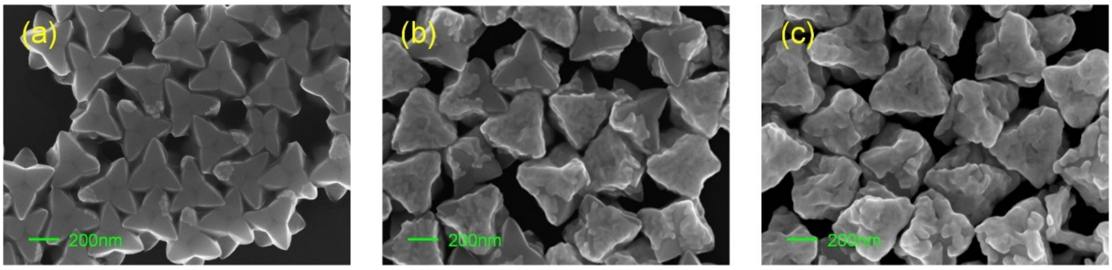

Figure S4. Large-scale SEM images of Au nanoshells grown on PbS nanostars overgrowth with Au open nanoshells. The corresponding amount of Au (V_{Au1}) is 20 μL (a), 500 μL (b) and 900 μL (c).

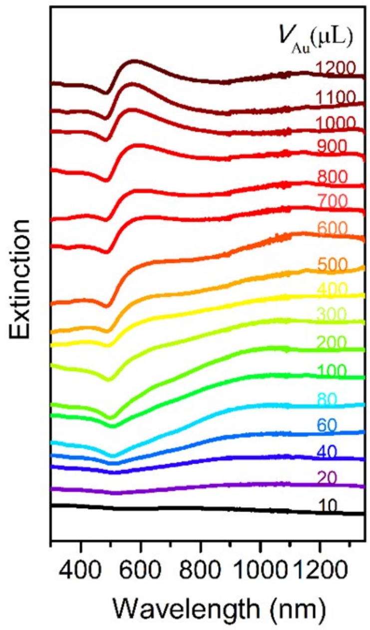

Figure S5. Extinction spectra of Au open nanoshells recorded after dissolving off PbS templates.

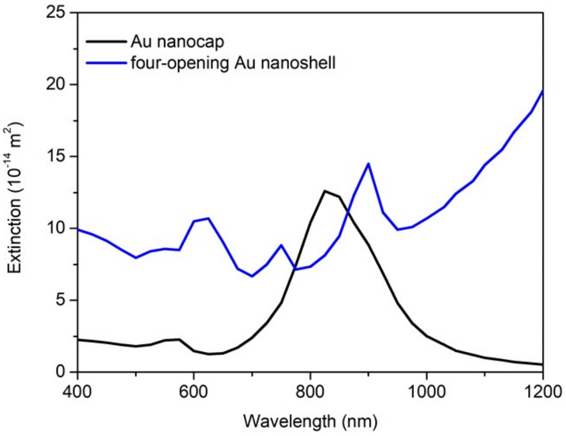

Figure S6. Calculated extinction cross sections of the Au nanocap and four-opening Au nanoshell.

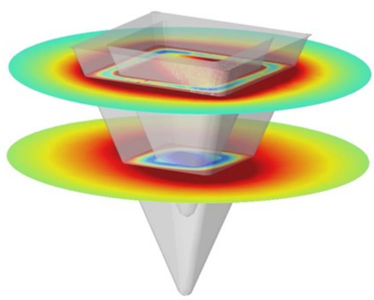

Figure S7. The magnetic field intensity around the nanocap. The magnetic field is mainly at the outer boundary of the nanocap.

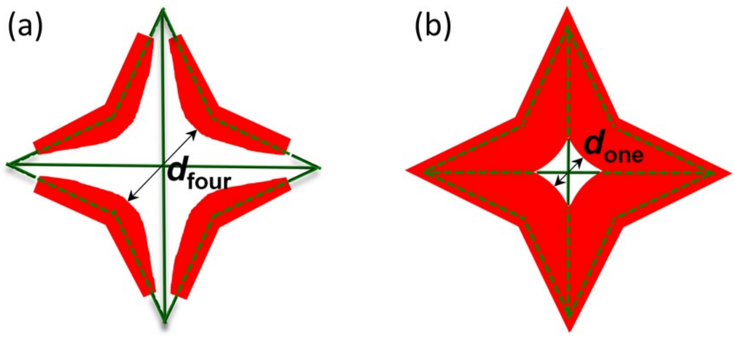

Figure S8. Bottom-view illustrations of the four-opening (V_{Au1} = 500 µL, d_{four} = 185.6 ± 26.8 nm) and one-opening (V_{Au1} = 900 µL, d_{one} = 69.3 ± 12.0 nm) Au nanoshells.

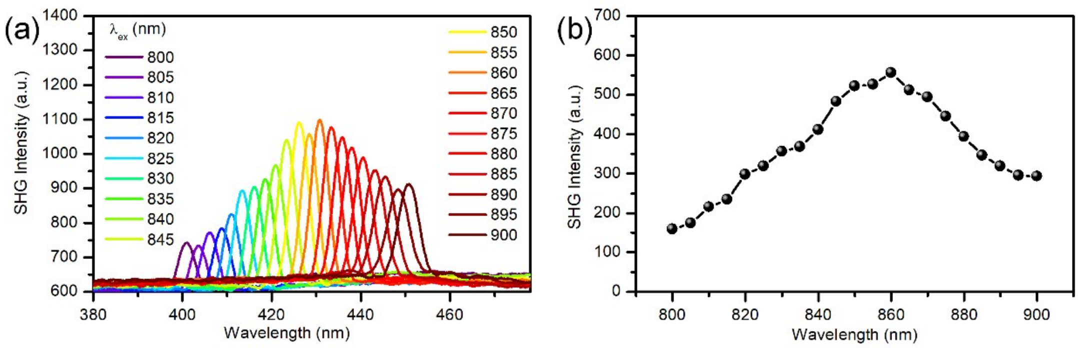

Figure S9. Morphology-dependent SHG of the Au open nanoshells. (a) SHG spectra of the Au open nanoshells (V_{Au1} = 1000 µL) with varied excitation wavelength. (b) SHG excitation spectra with V_{Au1} = 1000 µL.

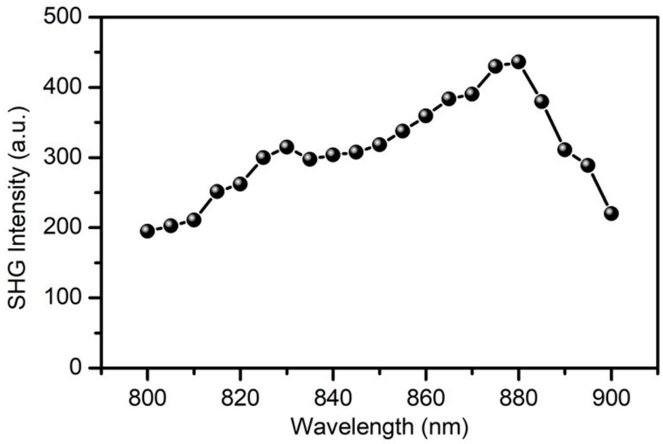

Figure S10. SHG excitation spectra of the Au nanocaps with V_{Au1} = 80 μL. The law of the SHG excitation spectra of the Au nanocaps are similar to those of the four-opening and one-opening Au nanoshells.

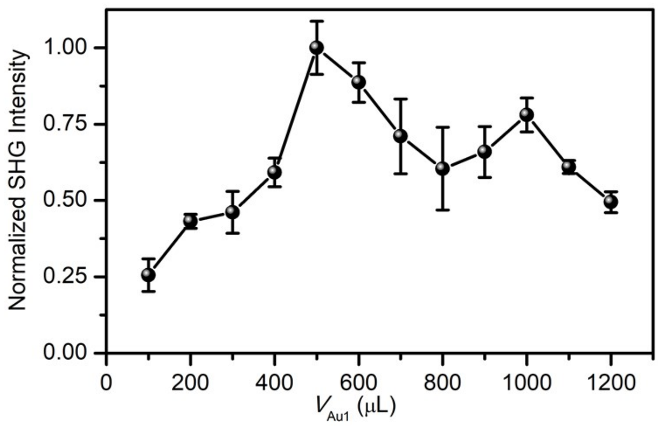

Figure S11. Normalized SHG intensity as a function of V_{Au1}. The excitation wavelength is 880 nm.

Table S1. The Au and Ag atomic content of Au and Ag/Au open nanoshells in the EDX measurement.

Samples \ Atomic content	Au (At%)	Ag (At%)
Au open nanoshells	100	0
Ag/Au open nanoshells (V_{Ag} = 300 μL)	78.85	21.15