Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Self-assembly of high-index faceted gold nanocrystals to fabricate tunable coupled plasmonic superlattices

Haibin Zhang, Chunlin Guan, Ning Song, Yuanyuan Zhang, Hong Liu and Jingzhong Fang

Supplementary Information

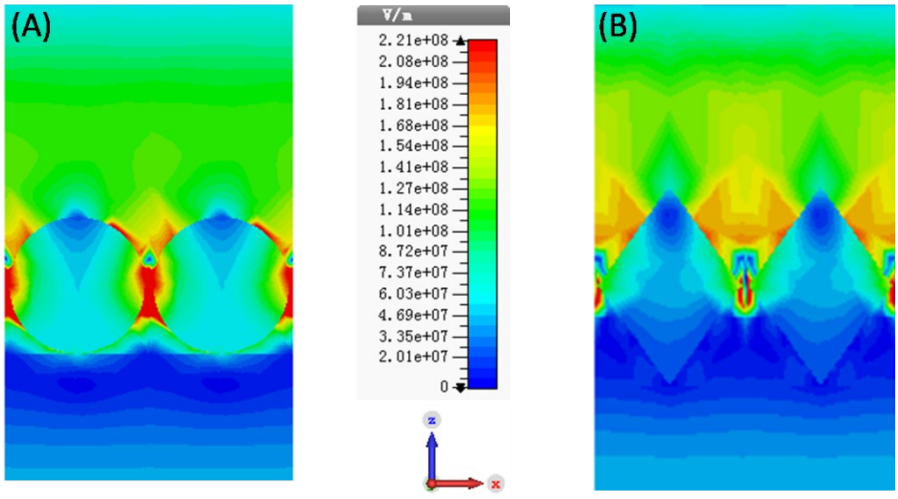

Figure S1. E-field amplitude ($|E|$) patterns for two adjacent gold nanosphere (A) and octahedron (B). The size (the diameter or the edge length) of gold nanosphere and octahedron was both 85 nm. Their gap distance was 5 nm. The same XZ planes were plotted.

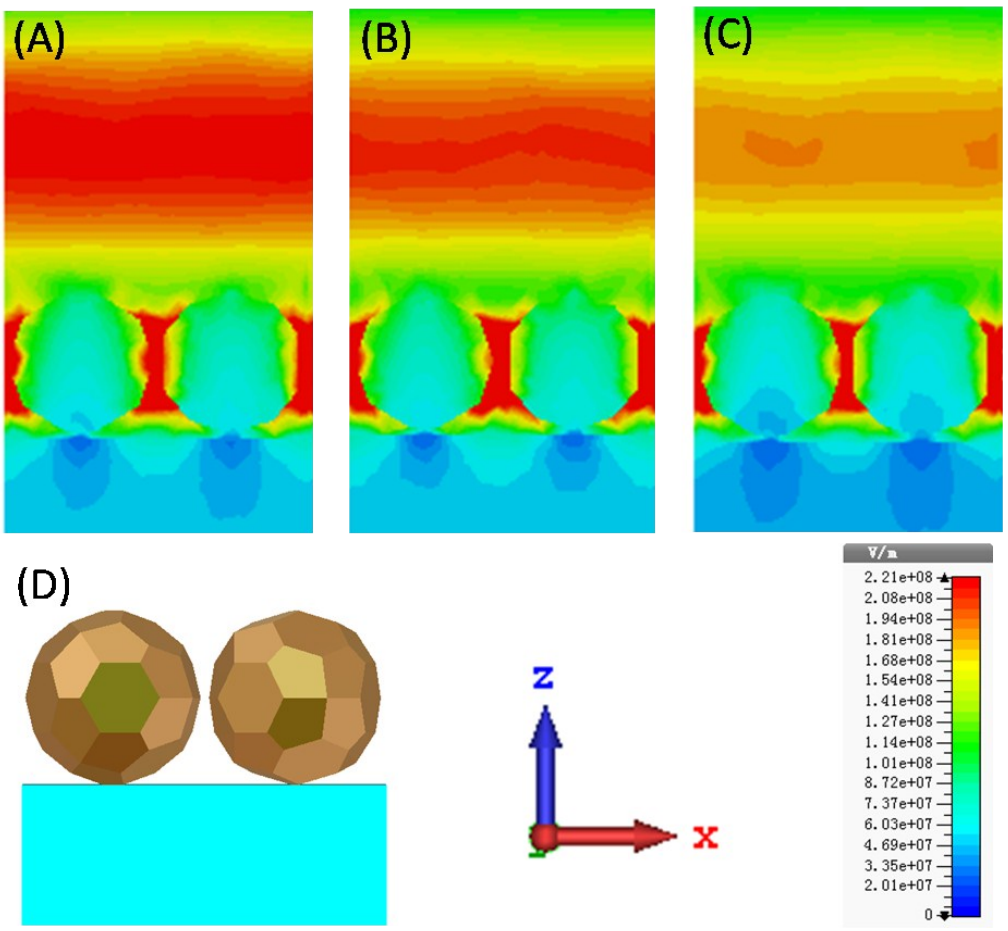

Figure S2. E-field amplitude ($|E|$) patterns for two randomly close-packed icosidodecahedral NBBs sampled with a gap distance of (A) 3 nm, (B) 5 nm and (C) 10 nm, respectively. The orientation between them are disordered (D). ZX plane was plotted.

In Figure S2 A to C, we provide the E-field amplitude patterns for two randomly close-packed icosidodecahedral NBBs sampled with a gap distance of 3 nm, 5 nm and 10 nm, respectively. The orientation between them are disordered (Figure S2. D). ZX plane was plotted and the same absolute value with the unit V/m of Figure 4 was presented. It is clear that the hot spots also occurred at the gap region and the upper surfaces of the two neighbouring NBB, and, the smaller gap distance resulted a larger enhancement of the electric field. While there is no noticeable discrepancy to the simulated areas of hot spots in 3 nm- and 5 nm-gap distance, suggesting that plasmonic coupling behavior in this two structures would be similar (the red and yellow traces shown in Figure 8).

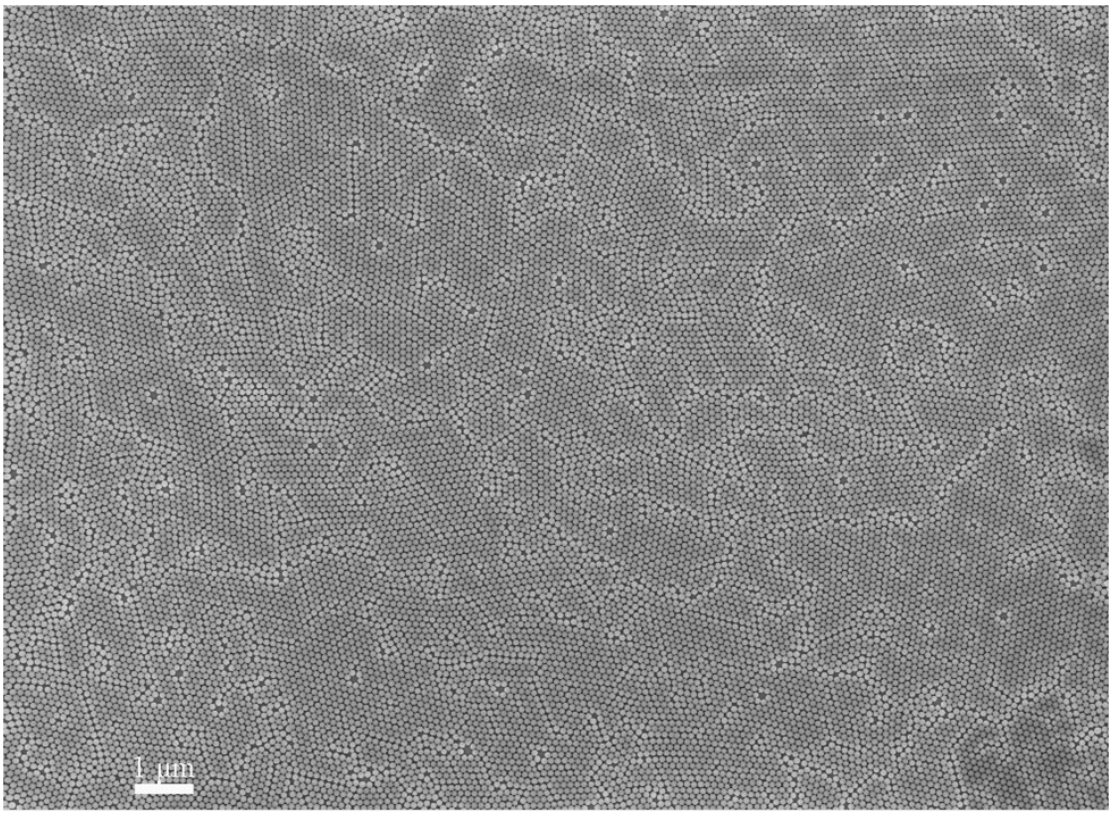

Figure S3. Low-magnification SEM image of self-assembled plasmonic Au superlattice composed of 98 nm-icosidodecahedral NBBs.

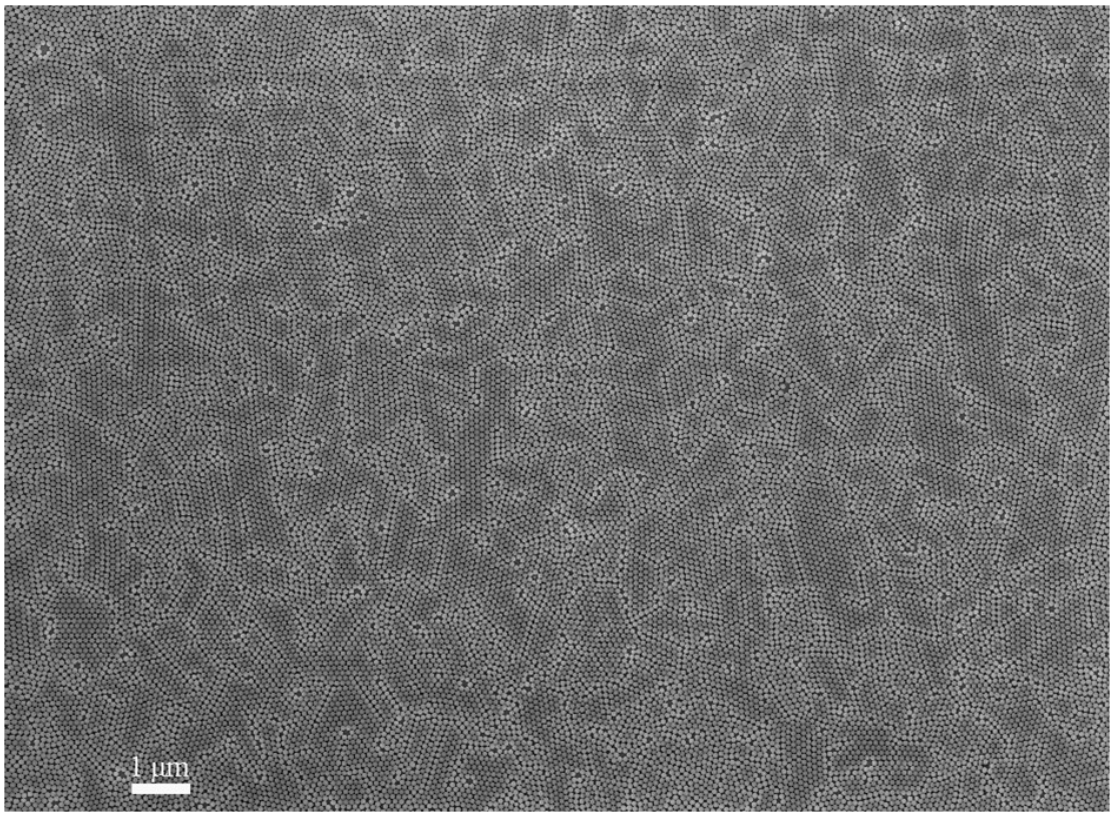

Figure S4. Low-magnification SEM image of self-assembled plasmonic Au superlattice composed of 64 nm-icosidodecahedral NBBs.

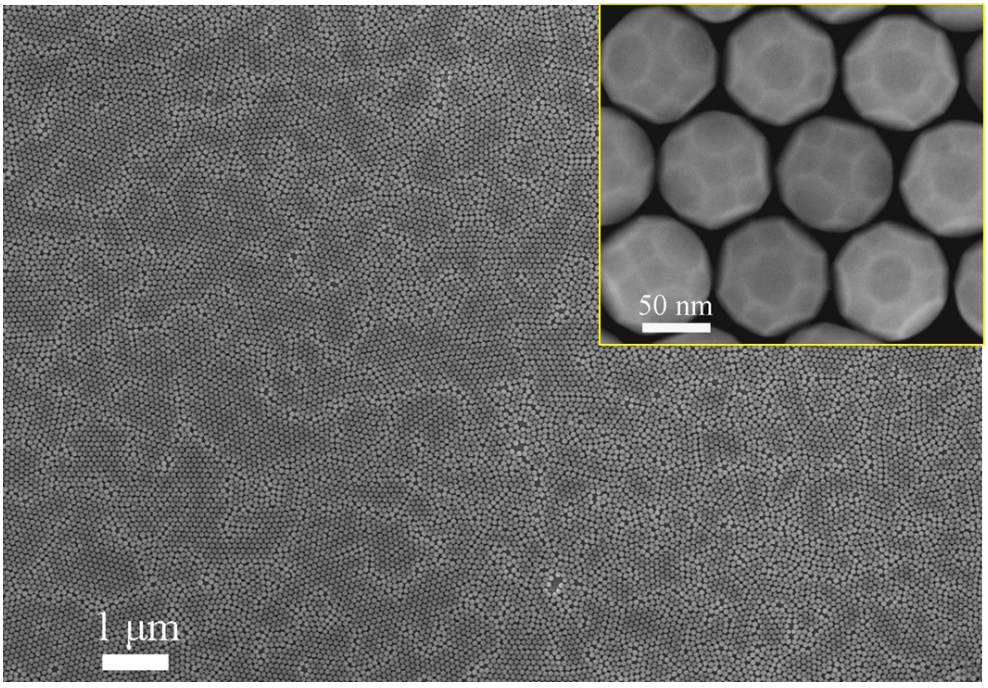

Figure S5. SEM image of the self-assembled gold superlattice composed of icosidodecahedral NBBs with size of 85 nm via a lower speed of dip coating (0.3 mm/min). The inset is the enlarged SEM image.

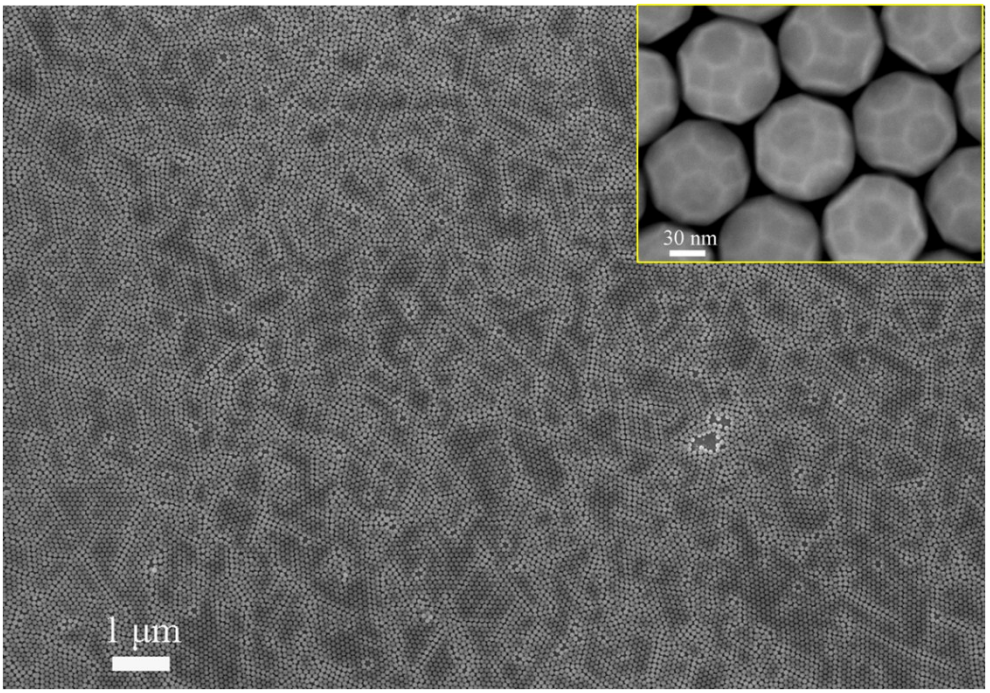

Figure S6. SEM image of the self-assembled gold superlattice composed of icosidodecahedral NBBs with size of 85 nm via a limiting speed of dip coating (0.1 mm/min). The inset is the enlarged SEM image.

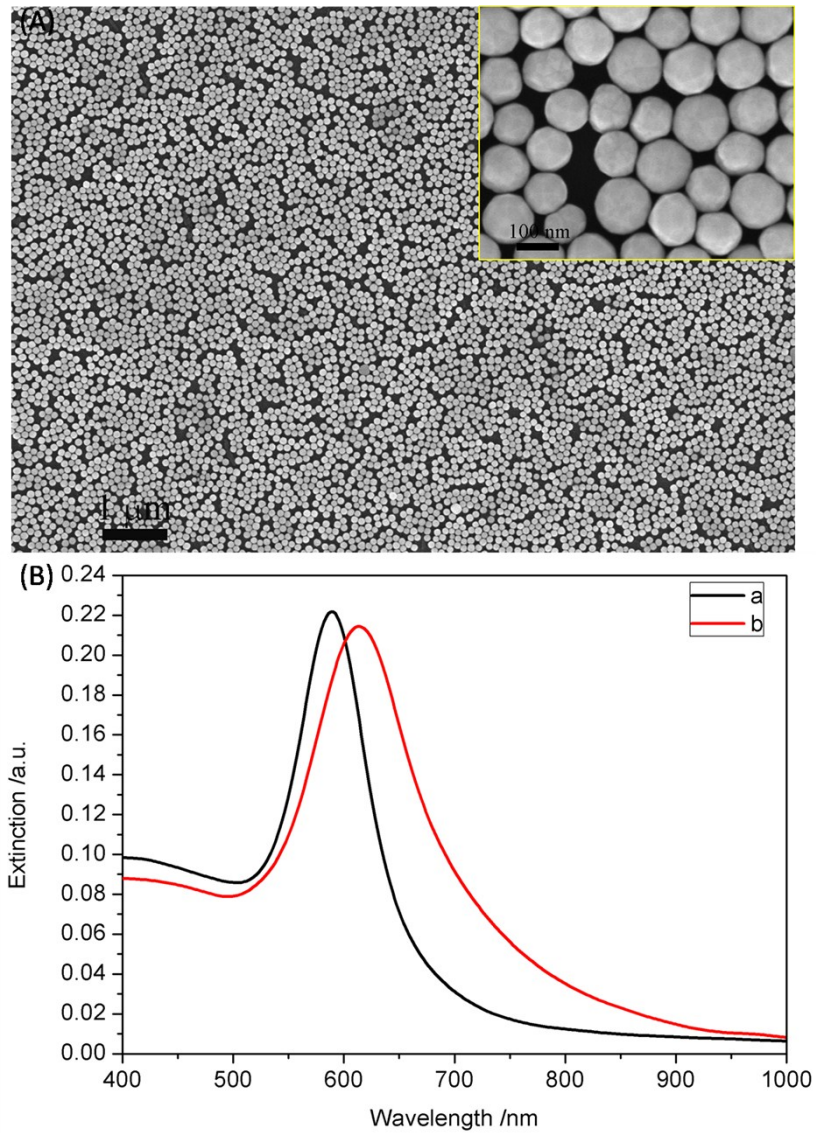

Figure S7. (A) SEM image of the self-assembled Au monolayer structure composed of nonuniform gold NPs with size of ~ 110 nm. The speed of dip coating is 0.5 mm/min. The inset is the enlarged SEM image of local area. (B) Measured extinction spectra of nonuniform gold NPs dispersed in a water solution (black trace) and the corresponding self-assembled monolayer structure immobilized on a glass substrate (red trace).