Supporting Information

Interface-Induced Nucleation and Growth: a New Route for Fabricating Ordered Silver Nanohole Arrays

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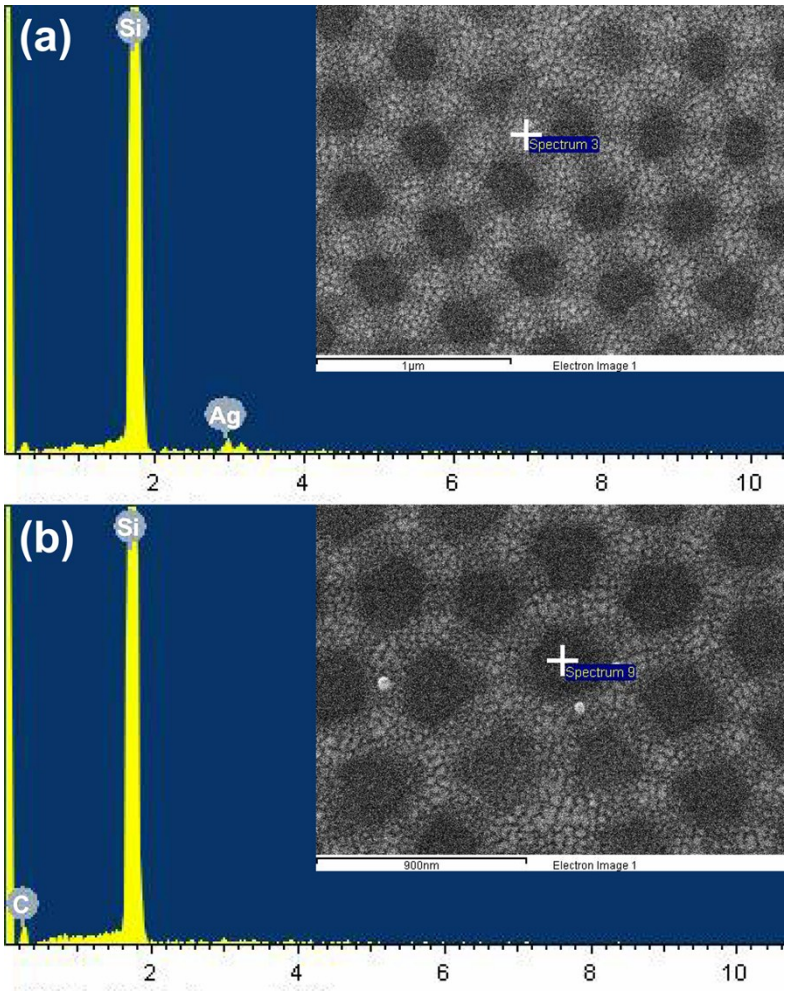

Fig. S1 Energy dispersive X-ray spectroscopies (EDS) of a Ag nanohole array on silicon substrate. (a) EDS carried out on the ridge, and (b) at the bottom of the hole. The insets in (a) and (b) are the corresponding electron images indicating the positions where the EDS were carried out.

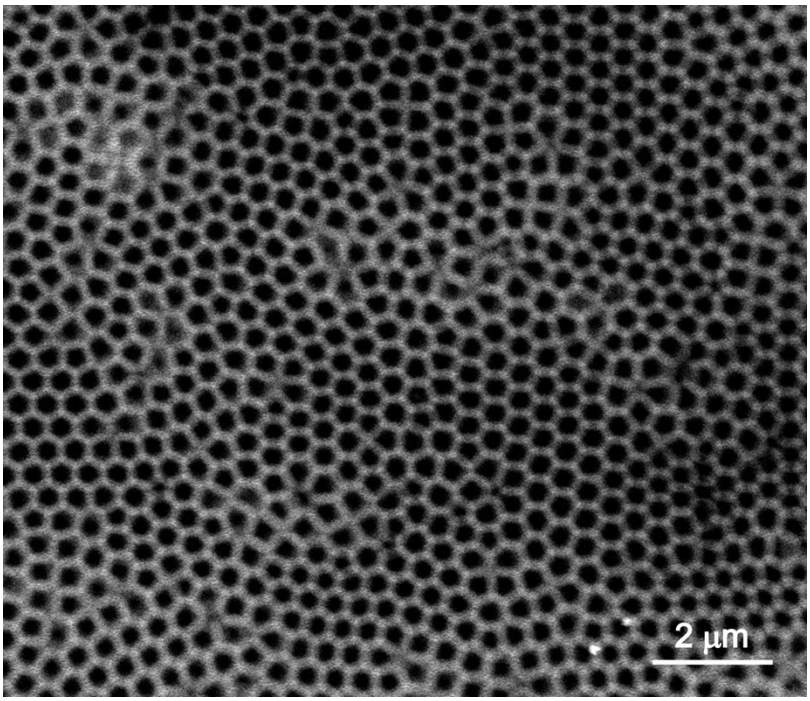

Fig. S2 SEM image of a Ag nanohole array. The array was prepared using Template I with nominal Ag deposition thickness of 50 nm, the average hole diameter is approximately 303 nm.

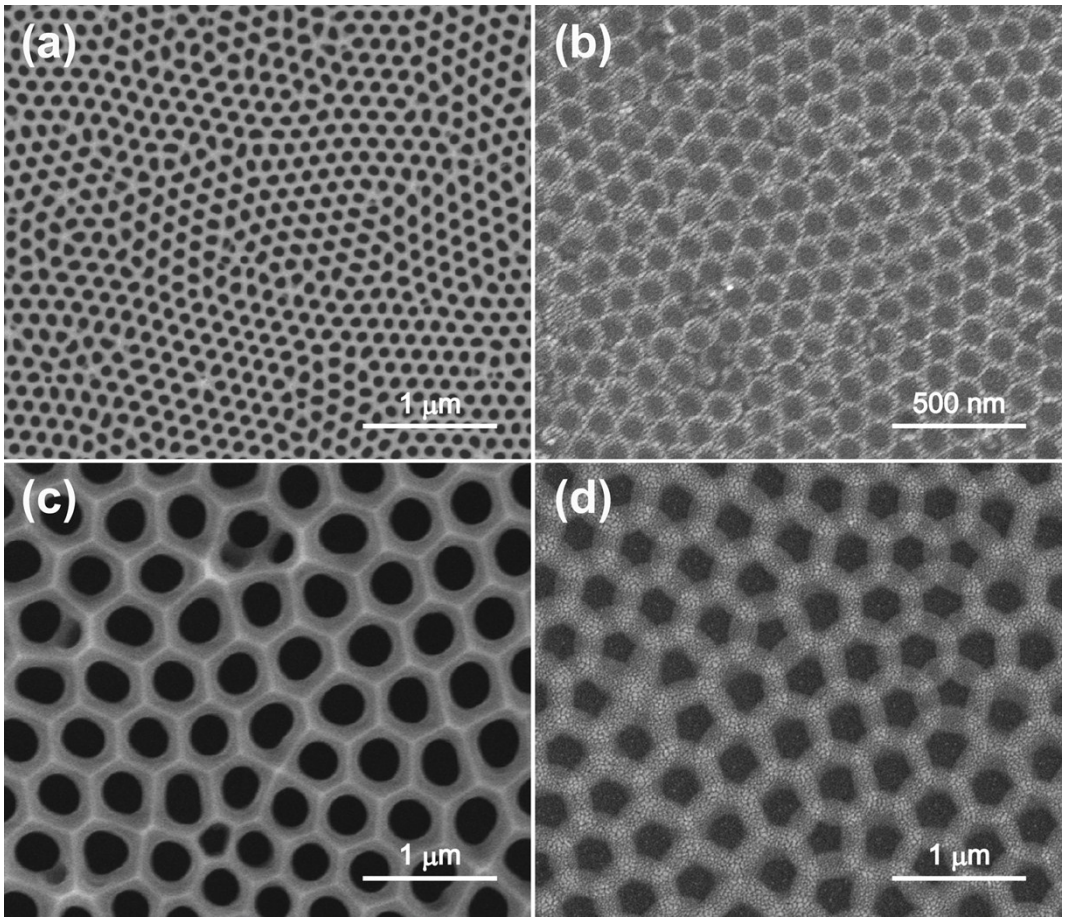

Fig. S3 SEM images of Ag nanohole arrays and AAO templates used. (a) SEM image of Template III, and (c) Template II. (b) SEM image of Ag nanohole array prepared using Template III, and (d) Template II with 50 nm Ag deposition.

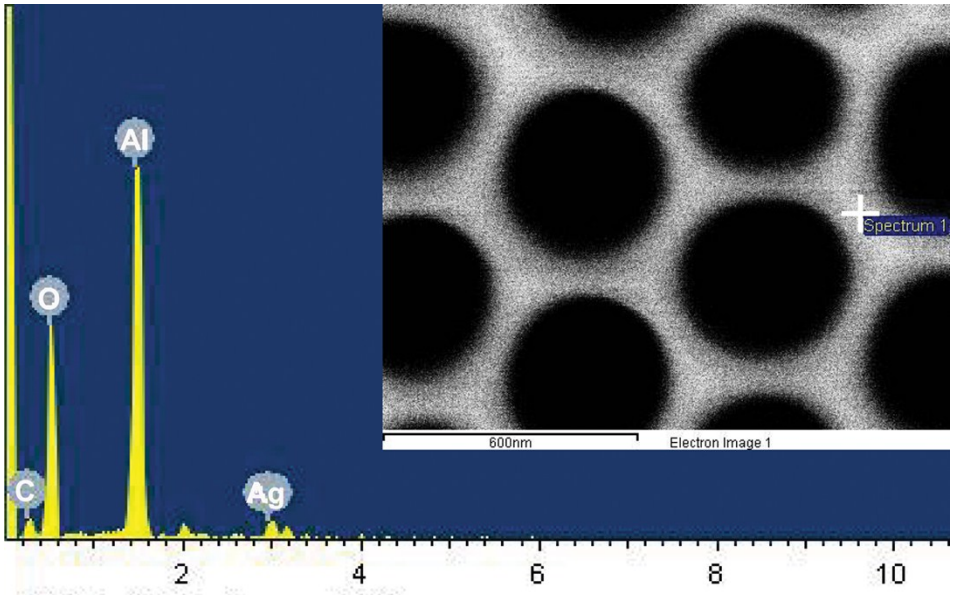

Fig. S4 EDS spectrum of a peeled AAO template. EDS was carried out on the inner surface (face to substrate) of the peeled AAO template, revealing the existence of Ag. The inset is the corresponding electron image indicating the position where EDS was carried out.

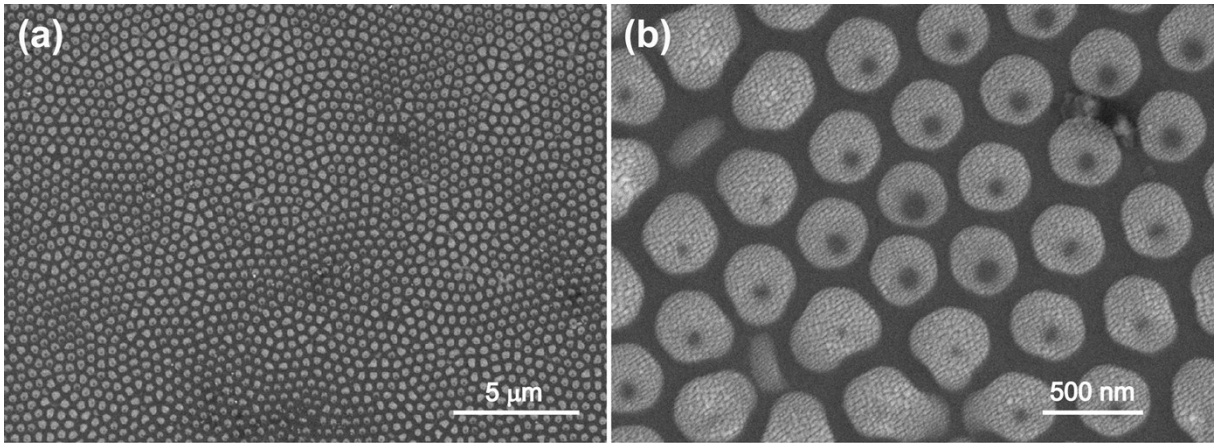

Fig. S5 SEM image of a Ag nanoring array. (a) SEM image of the ring-like Ag nanoparticle array on silicon substrate. (b) High-resolution SEM image corresponding to (a), revealing the presence of ring-like and disk-like nanoparticles.

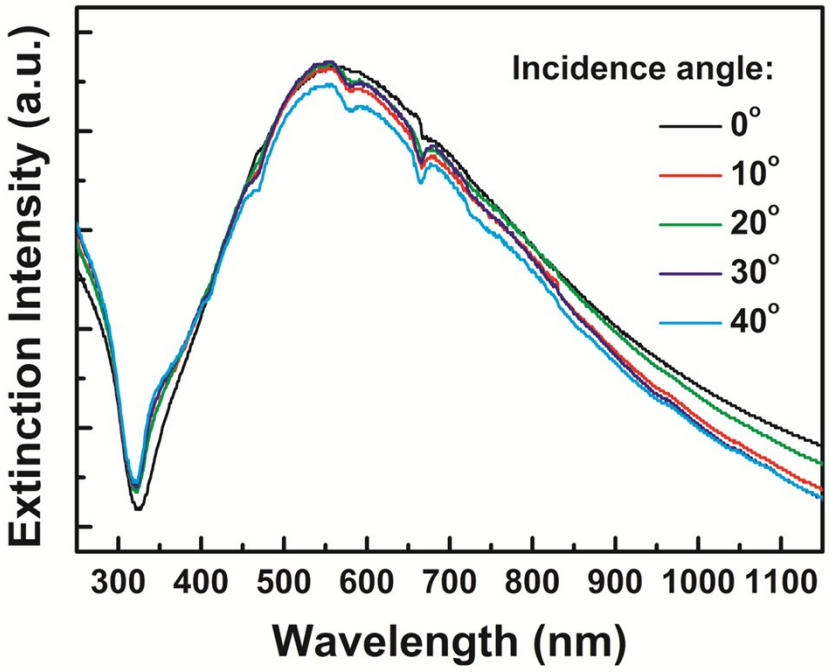

Fig. S6 Angle-dependent extinction spectra of the Ag nanohole array. The array was prepared using Template I with 50 nm Ag deposition. The extinction spectra were measured with the incident angle varying from 0° to 40°.

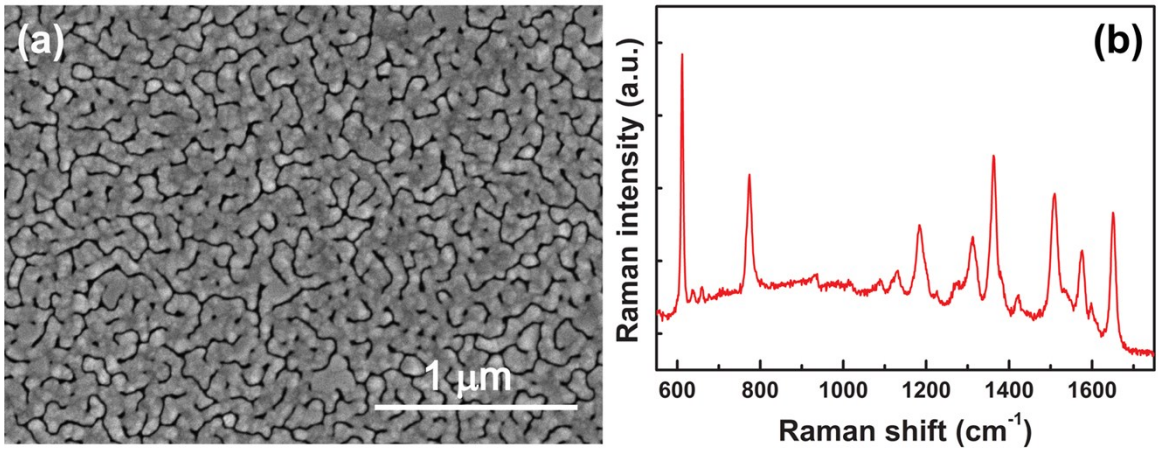

Fig. S7 SERS effect of a rough Ag film. (a) SEM image of the rough Ag film, and (b) Raman scattering spectrum of 10^{-4} M R6G absorbed on this Ag film. The Ag film was prepared on silicon substrate without using AAO template.

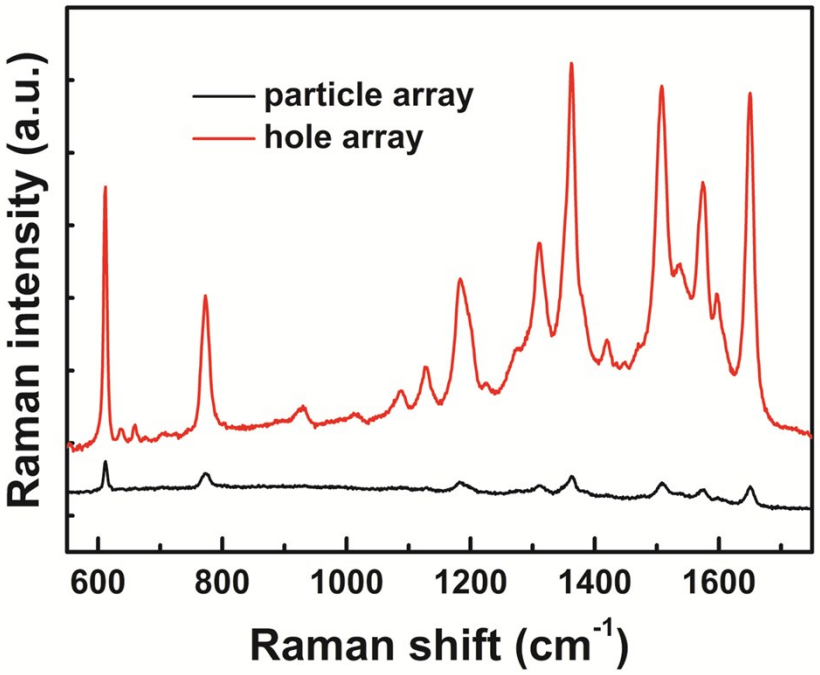

Fig. S8 Comparison of the SERS effect of Ag nanohole array and nanoparticle array. These two arrays have similar Ag filling ratio (~ 0.6). For SERS measurement, 10^{-4} M R6G was absorbed on these two arrays. The Ag nanoparticle array was prepared using Template III (P126A98) without substrate rotation, the periodicity (P) and the diameter (D) of the array are approximately identical with the template. The Ag filling ratio can be expressed as $\pi D^2 / 2\sqrt{3}P^2$, it approximately equals 0.58, comparable to the Ag filling ratio in the optimized nanohole array (~ 0.6).