Electronic Supplementary Material (ESI) for Journal of Materials Chemistry


**Supporting Information**

# Dual length-scale nanotip arrays with controllable morphological features for highly sensitive SERS applications

**Hwan Chul Jeon, Sung-Gyu Park, Soojeong Cho and Seung-Man Yang***

***E-mail address: smyang@kaist.ac.kr

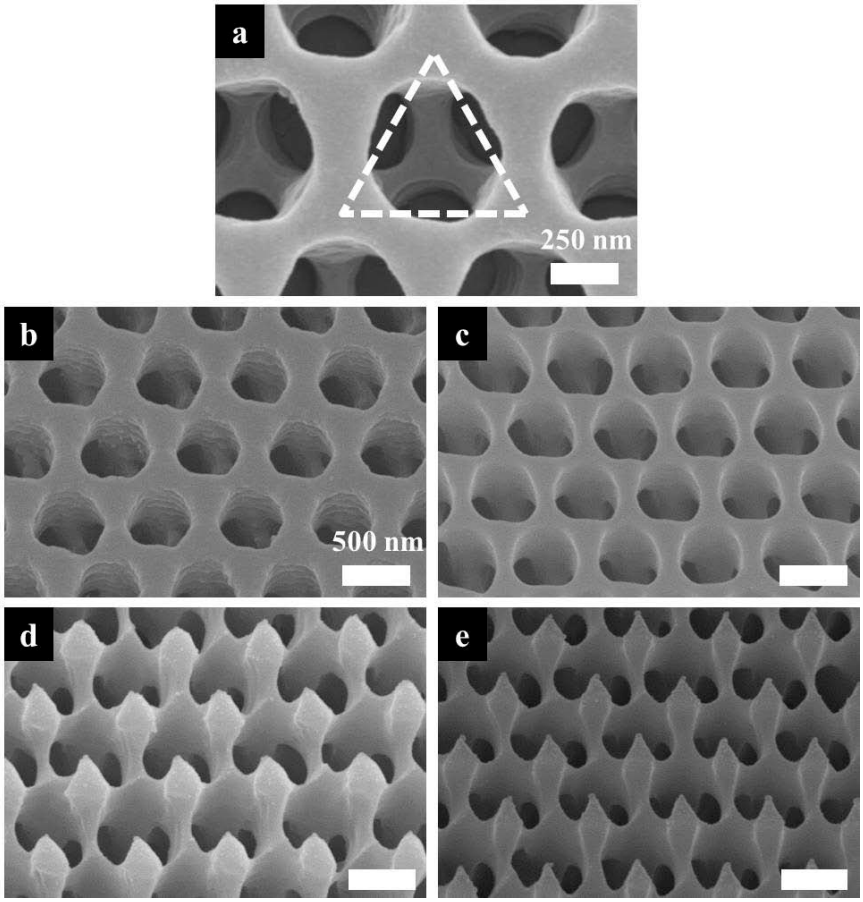


**Figure S1.** (a) SEM image of the fabricated 2-layer FCC structure showing polymeric density distribution. (b-e) 30° tilted SEM images of the feature-controlled periodic nanostructure arrays produced using FCC photonic crystals under various $SF_6$ RIE conditions, with etching durations of (b) 0 min, (c) 2 min, (d) 4 min, and (e) 6 min.

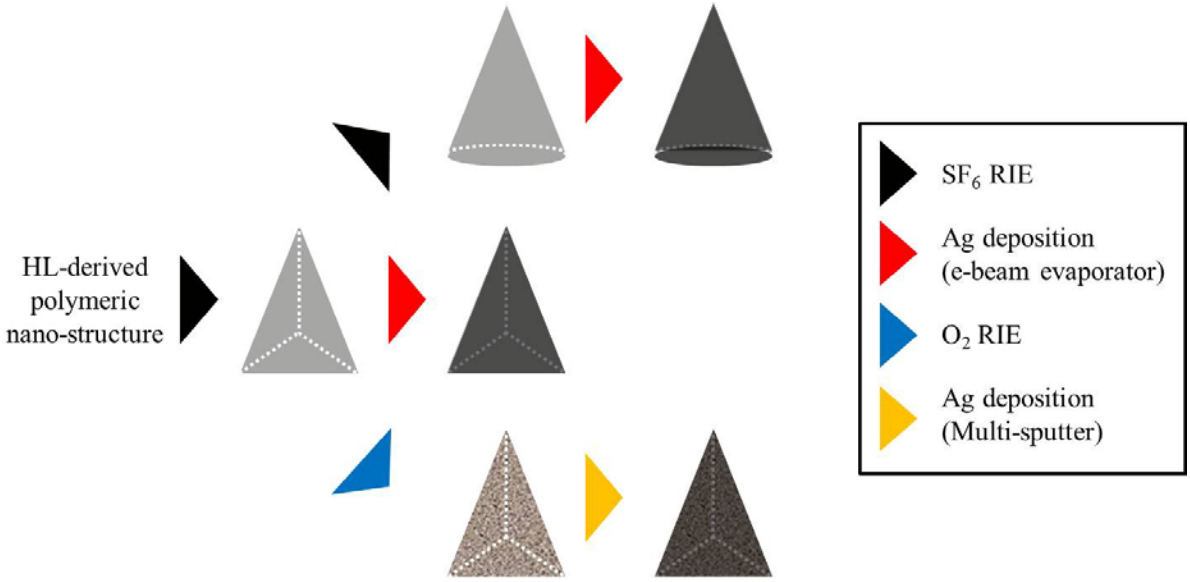


**Figure S2. P**rocess flow diagram for fabricating dual length-scale nanotip arrays with controllable morphological features under different fabrication conditions.

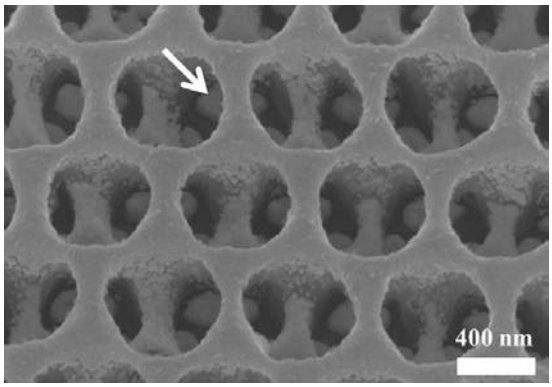


**Figure S3.** 25° tilted SEM image of the fabricated nanostructure arrays after the directional Ag-deposition step, using 2 min-etched 2-layer FCC structures.

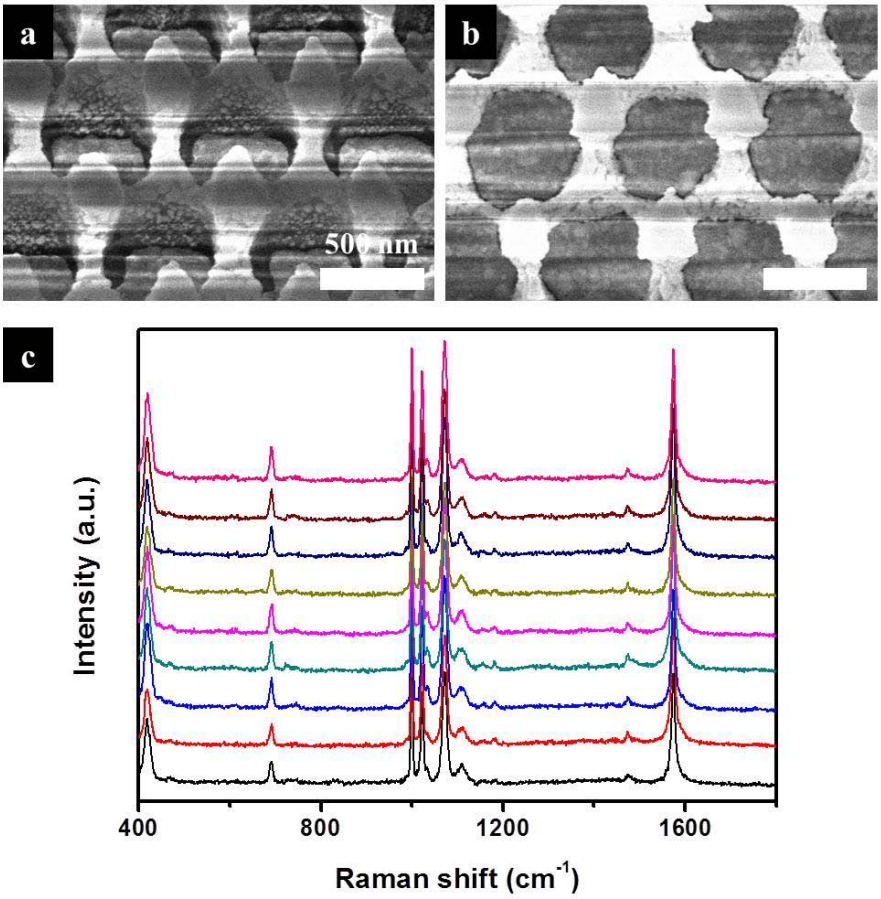


**Figure S4.** (a) 30° tilted, and (b) top view SEM images of the resulting triangular pyramid-shaped nanotip arrays after the directional Ag (25 nm)-deposition step using 3 min-etched 2-layer FCC structures, respectively. (c) SERS spectra of BT obtained from nine randomly selected spots on the triangular pyramid-shaped nanotip arrays. The laser power on samples was 75 mW, and data acquisition involved 5 sec accumulation.

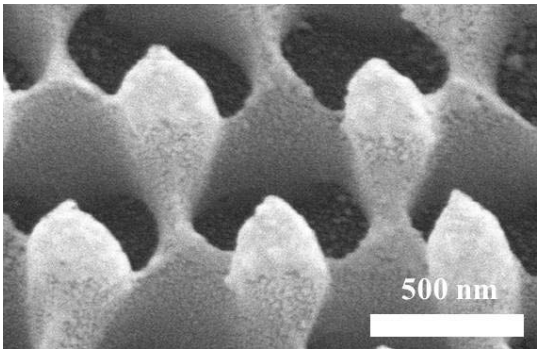


**Figure S5.** 30° tilted SEM image of the triangular pyramid-shaped nanotip arrays without nanoroughness, after the isotropic Ag thin film (10 nm)-deposition step.

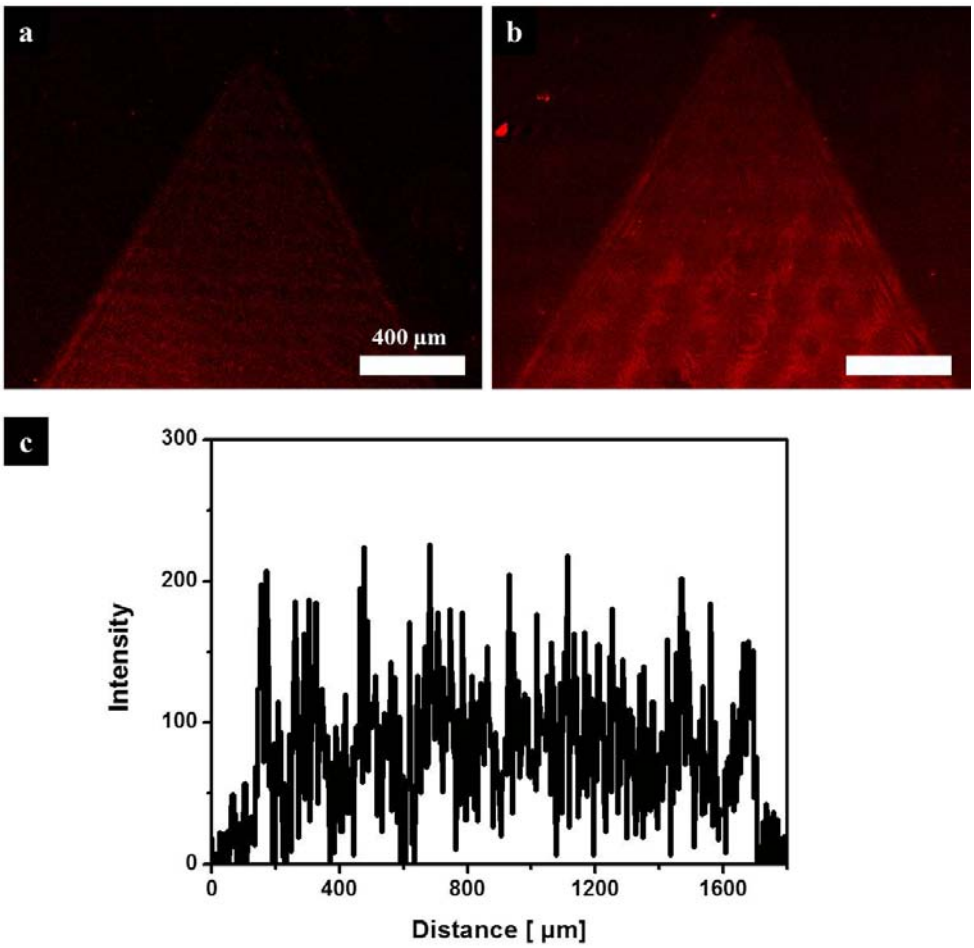


**Figure S6.** Comparison between the confocal microscope images measured for R6G adsorbed on metallic nanotip arrays (a) without and (b) with nanoscale roughness at the same experimental conditions. (c) Fluorescent intensity derived from R6G-adsorbed dual length-scale nanotip arrays under 15 min He-Ne laser irradiation.