

Electronic Supplementary Information

Hierarchical Silicon Nanostructured Arrays via Metal-Assisted Chemical Etching

**Hao Lin,^{a,†} Ming Fang,^{a,†} Ho-Yuen Cheung,^b Fei Xiu,^{a,d} SenPo Yip,^{a,d} Chun-Yuen Wong,^b
Johnny C. Ho*^{a,c,d}**

^a Department of Physics and Materials Science, City University of Hong Kong, 83 Tat Chee Avenue,
Kowloon Tong, Kowloon, Hong Kong

^b Department of Biology and Chemistry, City University of Hong Kong, 83 Tat Chee Avenue,
Kowloon Tong, Kowloon, Hong Kong

^c Centre for Functional Photonics (CFP), City University of Hong Kong, 83 Tat Chee Avenue,
Kowloon Tong, Kowloon, Hong Kong

^d Shenzhen Research Institute, City University of Hong Kong, Shenzhen, China

† These authors contributed equally to this work.

Corresponding author:

Electronic mail: johnnyho@cityu.edu.hk

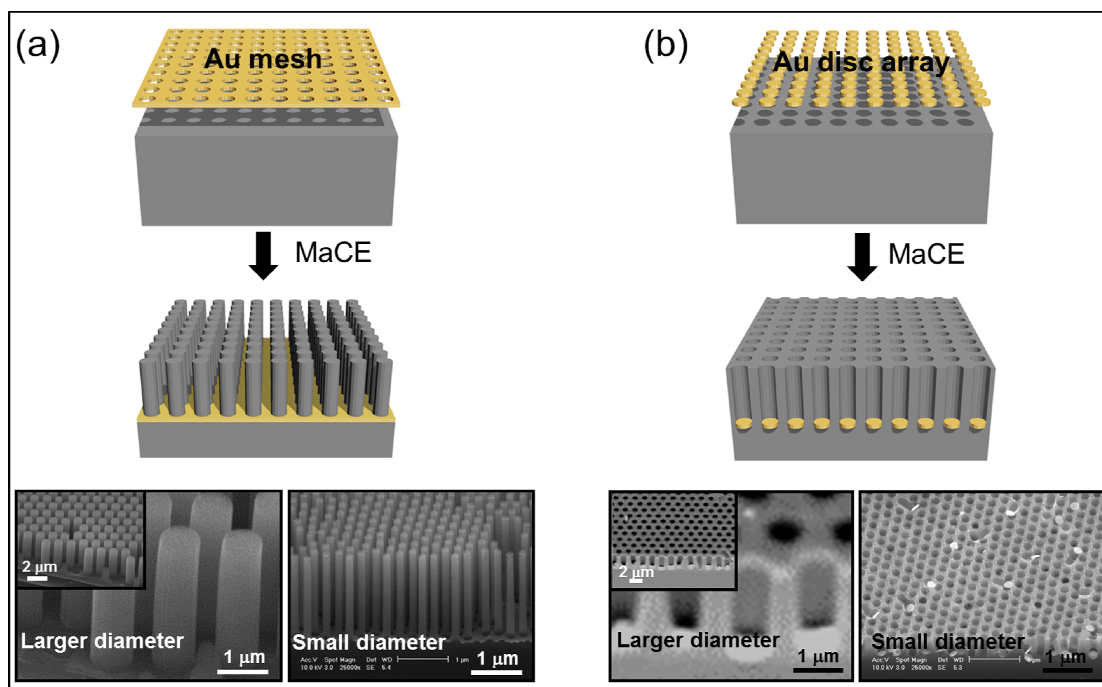


Figure S1. Fabrications of basic nanostructures. (a) nanopillars and (b) nanoholes.

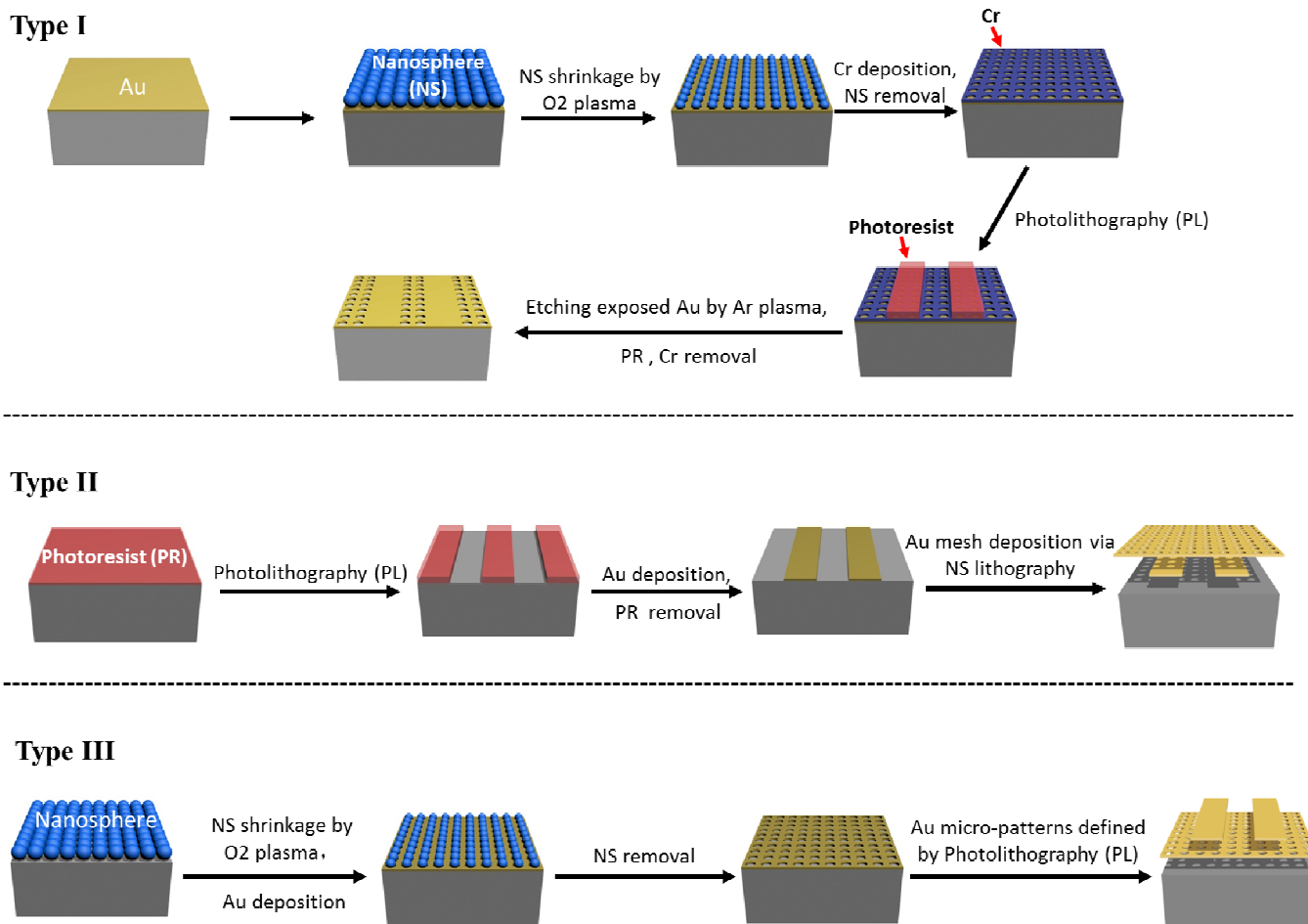


Figure S2. Schematic demonstration of fabrications of 3 different types of metal patterns in Figure 1. The metal nanomeshes can be fabricated by the well-know nanosphere lithography process. Polystyrene (PS) nanospheres were assembled into a close-packed monolayer on the substrates by the Langmuir–Blodgett (LB) method. The diameter and spacing of the spheres were further manipulated by oxygen plasma etching. Utilizing these spheres as the mask, a metal mesh can be deposited through electron beam evaporation and subsequent PS removal. The photoresist (5206E, AZ) micropatterns were fabricated by using the standard photolithography, and the metal micropatterns were obtained by vacuum deposition of the metal through the photoresist pattern and lift-off the photoresist in acetone.

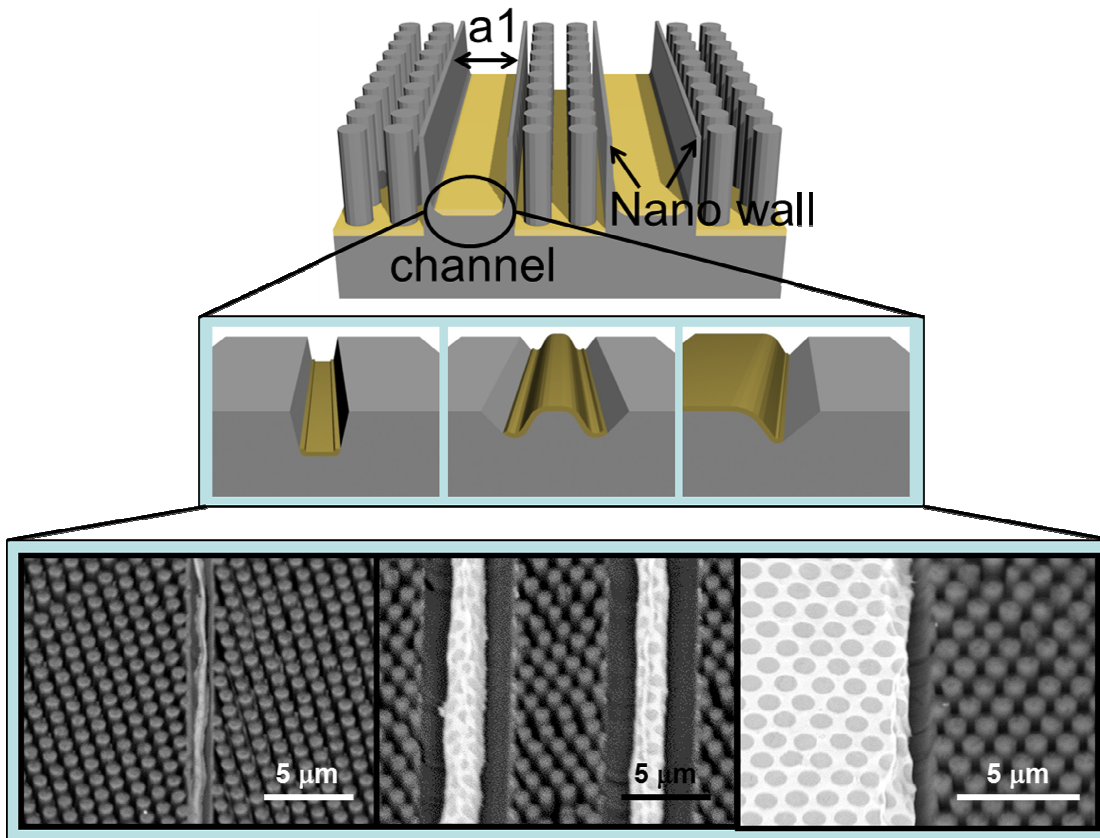


Figure S3. Dependence of the obtained morphology on the width of micropatterns when type II catalyst were used.

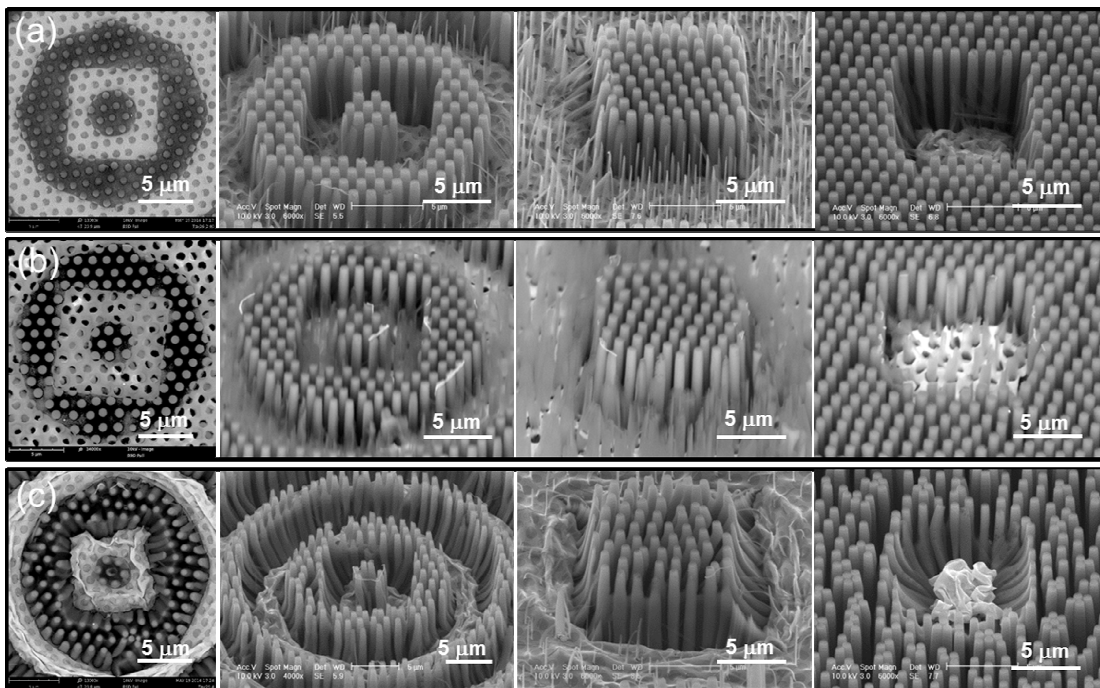


Figure S4. The influence of thickness of the two metal layers in type III catalyst. The thickness of the 1st and the 2nd Au layer for image (a), (b) and (c) are (20 nm, 20 nm), (20 nm,10 nm) and (15 nm,20 nm), respectively.