

Supporting information:

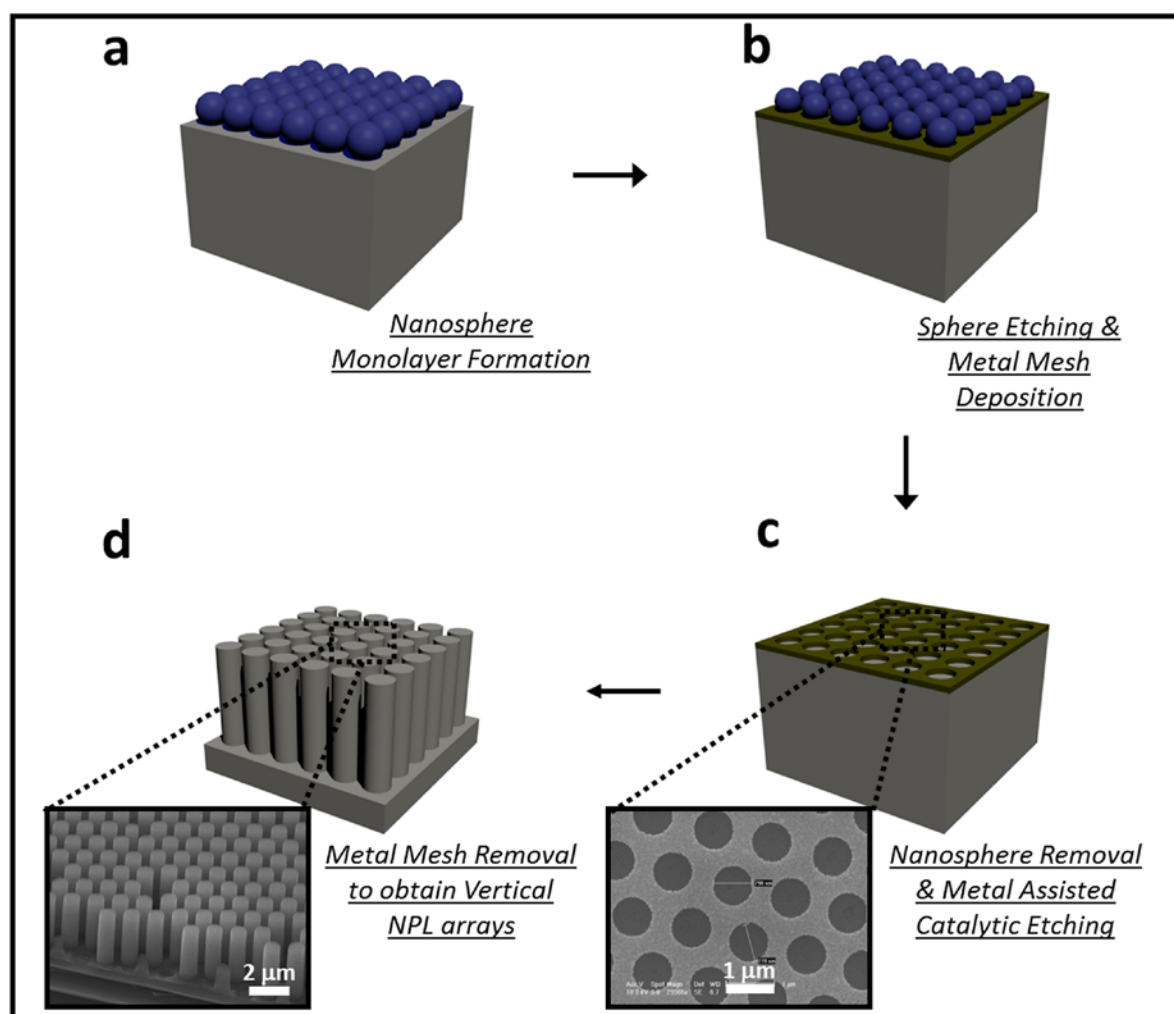


Figure S1. Process schematics for the formation of Si nanopillar template via the nanosphere lithography process followed by the metal assisted chemical etching.

In specific, the nanospheres were removed by immersing the Si substrate pieces into chloroform for 15 min with ultrasonication. After that, the pieces with the Au metal mesh were catalytically etched in 25 ml of the chemical mixture consisting of HF (4.8 M) and H₂O₂ (0.2 M) for 20 min, followed by the removal of Au metal mesh in 25 ml of the neat solution consisting of HCl and HNO₃ in the ratio of 3:1 for 15 s. Eventually, nanopillars with a uniform height of ~2 to 3 μm were obtained. Notably, distilled water washing was introduced after each process step and all chemical reactions were taken place at room temperature.

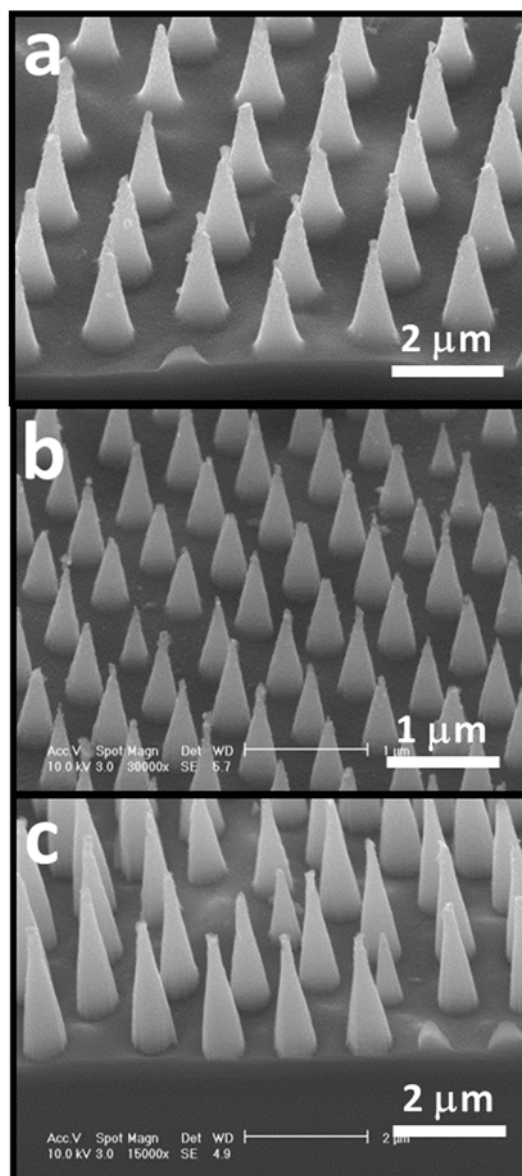


Figure S2. SEM images of various nanocone arrays studied in the optical reflectance measurement. (a) nanocone 1: pitch = 1.3 μm , base = 0.65 μm , aspect ratio = 2. (b) nanocone 2: pitch = 0.6 μm , base = 0.3 μm , aspect ratio = 2. (c) nanocone 3: pitch = 1.3 μm , base = 0.65 μm , aspect ratio = 3.