Ionic liquid-assisted synthesis of thorned gold plates comprising three-branched nanotip arrays

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Supporting information

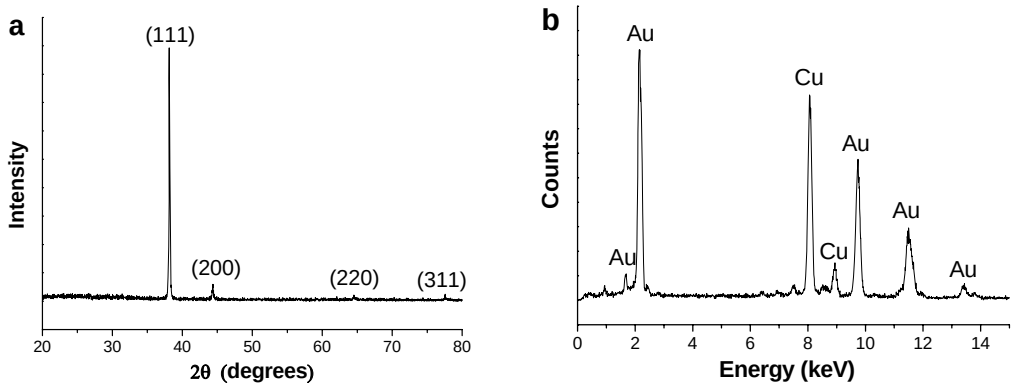

Fig. S1 XRD pattern (a) and EDS spectrum (b) of thorned gold plates with three-branched nanotips. The Cu signals in (b) arise from the carbon-covered copper grid supporting the thorned plates.

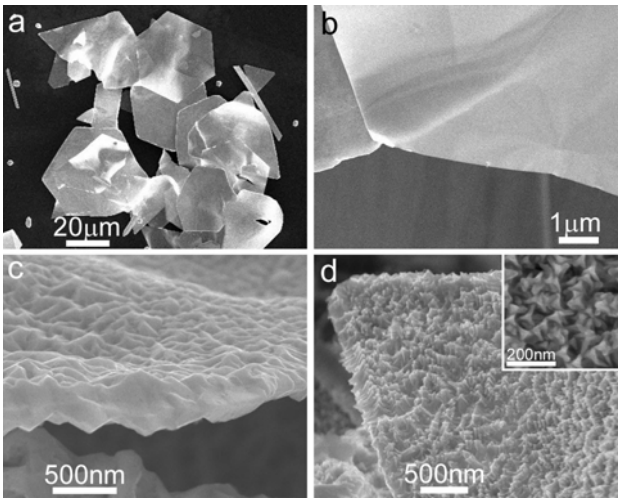

Fig. S2 SEM images of smooth gold sheets before (a,b) and after (c,d) immerging in the [BMIM][PF_6]/formamide growth solution at 95 ºC for different times: c) 2.5 h; d) 24 h. Inset shows the enlarged image. The smooth gold sheets were fabricated through a polyol process following the procedure reported in the literature (C. Li, W. Cai, B. Cao, F. Sun, Y. Li, C. Kan and L. Zhang, *Adv. Funct. Mater.*, 2006, **16**, 83).

Measurements of Raman spectra

Raman spectra were measured with a Renishaw System 1000 Raman imaging microscope (Renishaw plc, U.K.) equipped with a 25mW (632.8 nm) He-Ne laser (model 127-25RP, Spectra-Physics, USA) and a Peltier-cooled CCD detector (576 pixels×384 pixels). A 50× objective (NA＝0.80) mounted on an Olympus BH-2 microscope was used to focus the laser onto a spot approximately 1 μm in diameter and collect the back-scattered light from the sample. For the preparation of SERS samples, the p-aminothiophenol (PATP) molecules were assembled on the surface of thorned gold plates or smooth gold sheets by immersing in 2 mM PATP solution for 24 h to ensure a saturated coverage of PATP, i.e., formation of a complete self-assembled film of PATP. Then, the products were collected and rinsed thoroughly with ethanol, followed by redispersing in ethanol by sonication. Finally, one drop of the suspension was dropped onto the surface of a silicon wafer that had been patterned with registration marks and dried in an atmosphere of nitrogen. The Raman scattering intensity was measured by focusing the laser spot ~ 1 μm in diameter on the central part of individual thorned plate or smooth sheet.