Supporting Information

kinked gold nanowires and their SPR/SERS properties

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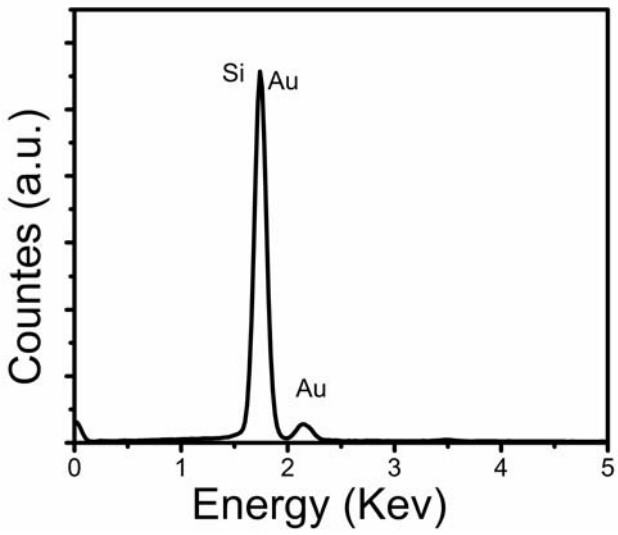
Experimental Details

Synthesis: All the reagents used in this work, including $HAuCl_4 \cdot 4H_2O$, $CuCl_2 \cdot 2H_2O$, octadecylamine (ODA), 4-mercaptopyridine (4-Mpy), ethanol and cyclohexane, were of analytical grade obtained from the Beijing Chemical Factory of China and were used without further purification. In a typical synthesis of kinked Au nanowires, 0.01 g $HAuCl_4 \cdot 4H_2O$ and 0.01 g $CuCl_2 \cdot 2H_2O$ were added into 10 ml ODA at 100 °C. After 2h of magnetically stirring, 10 ml ethanol was added, the solution was kept at 100°C for another 30 min without stirring.

Characterization: Powder X-ray diffraction patterns were recorded with a Bruker D8 Advance X-ray powder diffractometer with Cu Kα radiation (λ = 1.5406 Å). The morphology of as-synthesized samples was determined by using a Hitachi model H-800 transmission electron microscope, a JEOL JSM-6301F scanning electron microscope, and a JEOL 2010F high-resolution transmission electron microscope. The energy dispersive spectroscopy was recorded to determine the composition of the products. UV-Vis spectra of dilute solutions of the samples were collected using a Shimadzu UV-Vis-NIR spectrophotometer (Solidspec-3600DUV).

Surface-Enhanced Raman Scattering (SERS) Measurements: For the preparation of SERS substrates, the Au nanowires as prepared were washed with ethanol several times. SERS substrates were prepared by dropping 20 μL of Au NWs solution on a 4mm x 4mm glass and left to dry in air. For SERS measurement, 4-Mpy was diluted to different concentrations from 10^{-3} M to 10^{-7} M with methanol. Then the substrates were immersed in the solution of 4-Mpy for 0.5 h. The samples were then taken out, rinsed with ethanol, and dried in air. The Raman instrument used in this study was in confocal configuration (RM2000) excited by 633 nm laser, and the laser beam was focused on the sample at a size of about 2 um. The acquisition time was 30 s for each spectrum. For each measurement, 5 different points were selected to detect the 4-Mpy probes, and the average value was used as the final result.

Supplementary Figures



FigureS1. EDS analysis of the Au nanowires. The Si signal was from the Si wafer.

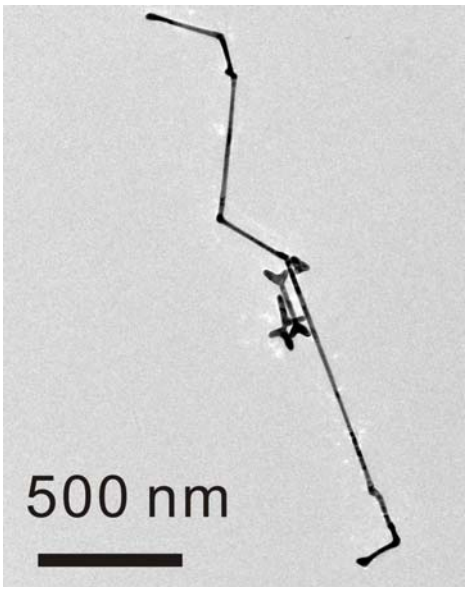


Figure S2. TEM image of a multiple bending nanowire.

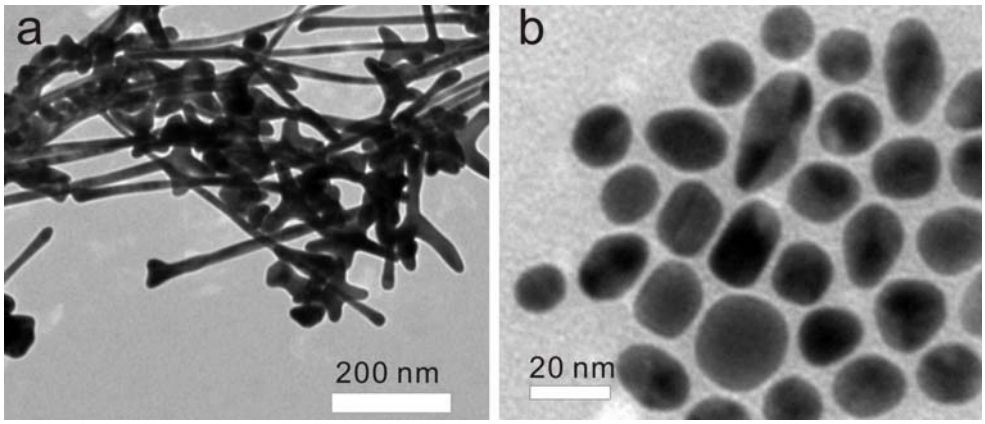


Figure S3. TEM images of the samples prepared via control experiments: (a) added 0.02g $HAuCl_4 \bullet 4H_2O$ with ethanol in the second step. (b) ethanol was added in the first step.

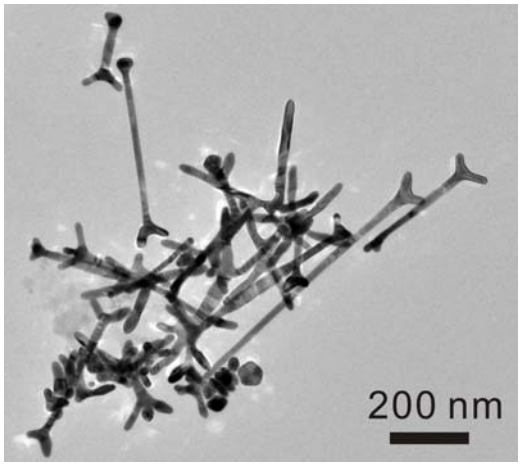


Figure S4. TEM image of the sample prepared via control experiments: the reaction time is 15 min after adding ethanol in the second step.

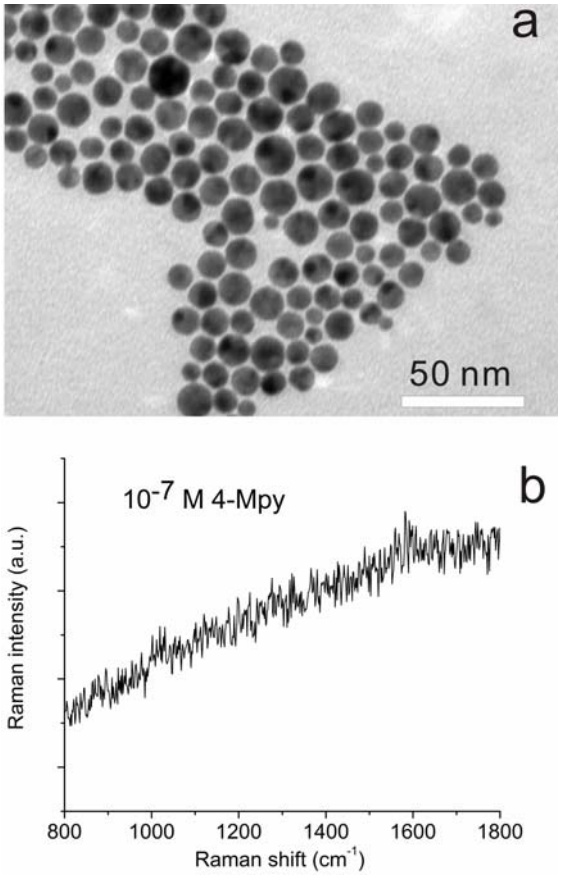


Fig S5. (a) TEM image of the products obtained with the same parameters as the sample shown in Figure 1 except without $CuCl_2$. (b) Raman spectra of 10^{-7} M 4-Mpy@Au nanoparticles.