

Supporting Information for:

In situ template synthesis of one-dimensional gold nanoparticle arrays in organic nanowires

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Experimental

Materials

Chloro(triphenylphosphine) gold(I), acetic acid, chloroform, hexadecyl trimethyl ammonium bromide (CTAB), and potassium hydroxide were purchased from Wako Chemical Co. (Japan) and used as received. Porous alumina templates with different pore diameter were prepared by standard anodic oxidation of aluminum plate (99.99 %).¹

Synthesis of composite nanowires

Chloro(triphenylphosphine) gold(I) and acetic acid were mixed in chloroform in 1:1 molar ratio and stirred for 3 hours followed by filtration of precipitate (AgCl) and drying of remaining solution in vacuum to obtain chlorine-free gold(I) complex (CH₃COO-Au-TPP). Porous alumina templates (0.5 × 0.5 cm²) were immersed into 5wt.% chloroform solution (1 ml) of the CH₃COO-Au-TPP and dried in an ambient. After removal of unwanted precipitate of the complex deposited on the template surface by scotch tape, the porous alumina filled with the complex were annealed in vacuum (1.0×10⁻³ Pa) at appropriate temperature for 10 min. In order to remove composite nanowires from the template, the film was dissolved into 100 mM aqueous potassium hydroxide solution for 1 hour. The composite nanowires were obtained by centrifugation (2500 rpm, 15 min, 5 times) using 1% aqueous CTAB solution.

Characterization

Morphology of composite nanowires was observed by transmission electron microscope (TEM) operated at 120 kV using JEOL JEM-1400 electron microscope. UV-VIS absorption spectra of samples were measured using JASCO V-550 spectrophotometer. Chemical structure of the obtained composites was characterized by infrared spectroscopy using JASCO FTIR-670 and x-ray photoelectron spectroscopy using JEOL JPS-9010MC.

Reference

1 H. Masuda, K. Fukuda, *Science*, 1995, 268, 1466.

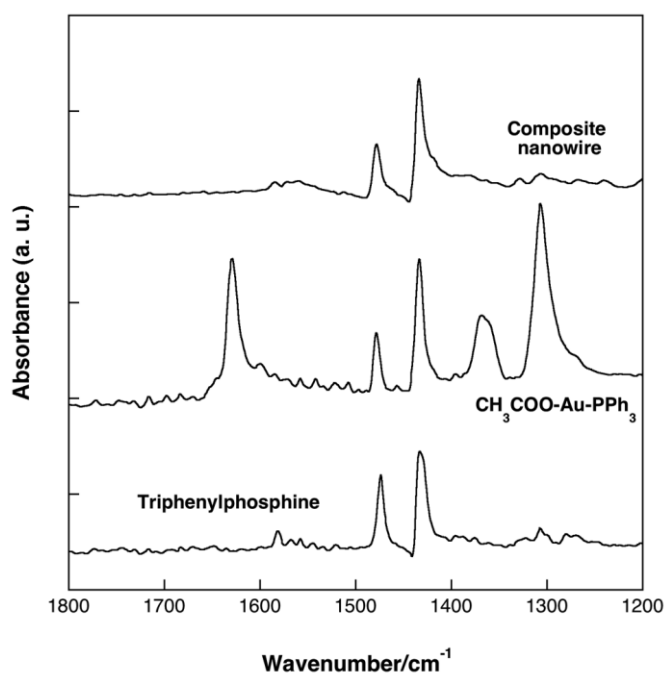


Fig. S1 FT-IR spectra of the composites obtained before and after heat treatment at 180 °C and triphenylphosphine.

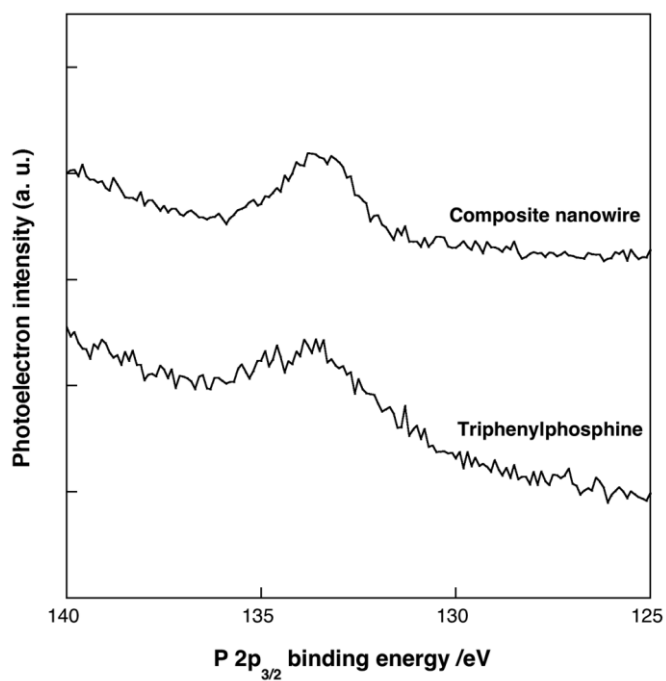


Fig. S2 X-ray photoelectron spectra of the composites obtained after heat treatment at 180 °C and triphenylphosphine.