

Supporting Information for

**Iodide Ions Control Galvanic Displacement Growth of Uniform
Rhodium Nanotubes at Room Temperature**

Yingpu Bi ^{a,b} and Gongxuan Lu ^{a*}

^a State Key Laboratory for Oxo Synthesis and Selective Oxidation, Lanzhou Institute of Chemical Physics, Chinese Academy of Sciences, Lanzhou, 730000, P. R. China.

^b Graduate School of the Chinese Academy of Sciences, Beijing, 100039, P. R. China.

*To whom correspondence should be addressed.

E-mail: gxlu@lzb.ac.cn Tel/Fax: +86-931-4968178

Experimental Section

1 Synthesis of Ag nanowires

The Ag nanowires were prepared by a modified polyol process. In a typical synthesis, 1,3-butylene glycol (1, 3 BG, 10mL) that contained poly (vinyl pyrrolidone) (PVP, $M_w \approx 50000$, 150 mM as calculated in terms of the repeating unit) was placed in a 25-mL vial, capped, and heated with stirring in an oil bath at 160 °C for 1 h. 1 mL Na₂S solution (1 mM in 1, 3 BG) was then quickly added. After 5 min, AgNO₃ (0.15 M solution in 1, 3 BG) were added with drop by drop to the stirring solution. The vial was then capped and heated at 160 °C for 30 min. After injection of the AgNO₃ solution, the color of reaction mixture changed from dark to blue, then to light yellow, and ocher color. The samples for morphology and structure analysis were washed with acetone and water to remove excess ployols and PVP via centrifugation, finally was dissolved in the ethanol.

2 Synthesis of Rh nanotubes

In a typical Rh nanotube synthesis, the reaction mixture containing the as-synthesized Ag nanowires (10 mg) solution was added to 20 mL saturated NaI aqueous solution. Aqueous RhCl₃ (0.02M) was slowly added dropwise to the Ag nanowires solution. The resulting mixture was maintained at the room temperature until its color became brown. Vigorous stirring was employed throughout the synthesis. The obtained samples for morphology and structure analysis were washed with water and ethanol removes AgI precipitation and NaI via centrifugation. HNO₃ solution treatment was performed in order to remove the remnant Ag. Finally, the obtained Rh

samples were dissolved in the ethanol.

3 Activity tests

In all catalytic activity of experiments, 1.5 wt % HCHO + 4 wt % NaOH solution was added to the sealed flask and given amount of catalyst (5 mg), then the reaction was started while the solution was stirred vigorously. The volume of hydrogen gas evolved was measured by a gas chromatograph system equipped with a thermal conductivity detector (TCD).

4 Characterizations

The transmission electron microscopy (TEM) images were obtained on a transmission electron microscope (JEM1200-EX, JEOL) with an accelerating voltage of 80 kV. A drop of the solution containing nanoparticles was put onto a carbon-supported copper mesh, which was dried at room temperature. High-resolution electron microscopy (HR-TEM) images were obtained on a transmission electron microscope (JEM2010, JEOL) with an accelerating voltage of 200 kV. SEM images were taken using a scanning electron microscope (JSM-5600LV, JEOL) operated at an accelerating voltage of 10–20 kV. FE-SEM images were taken using a field-emission scanning electron microscope (JSM-6701F, JEOL) operated at an accelerating voltage of 5 kV. The X-ray diffraction spectra (XRD) measurements were performed on a Philips X'pert MPD instrument using Cu K α radiation (50 kV). The XRD patterns were recorded from 10° to 90° with a scanning rate of 0.067°/s. UV/Vis absorption spectra were taken at room temperature on a Hewlett Packard 8453 spectrometer.

Additional Figures

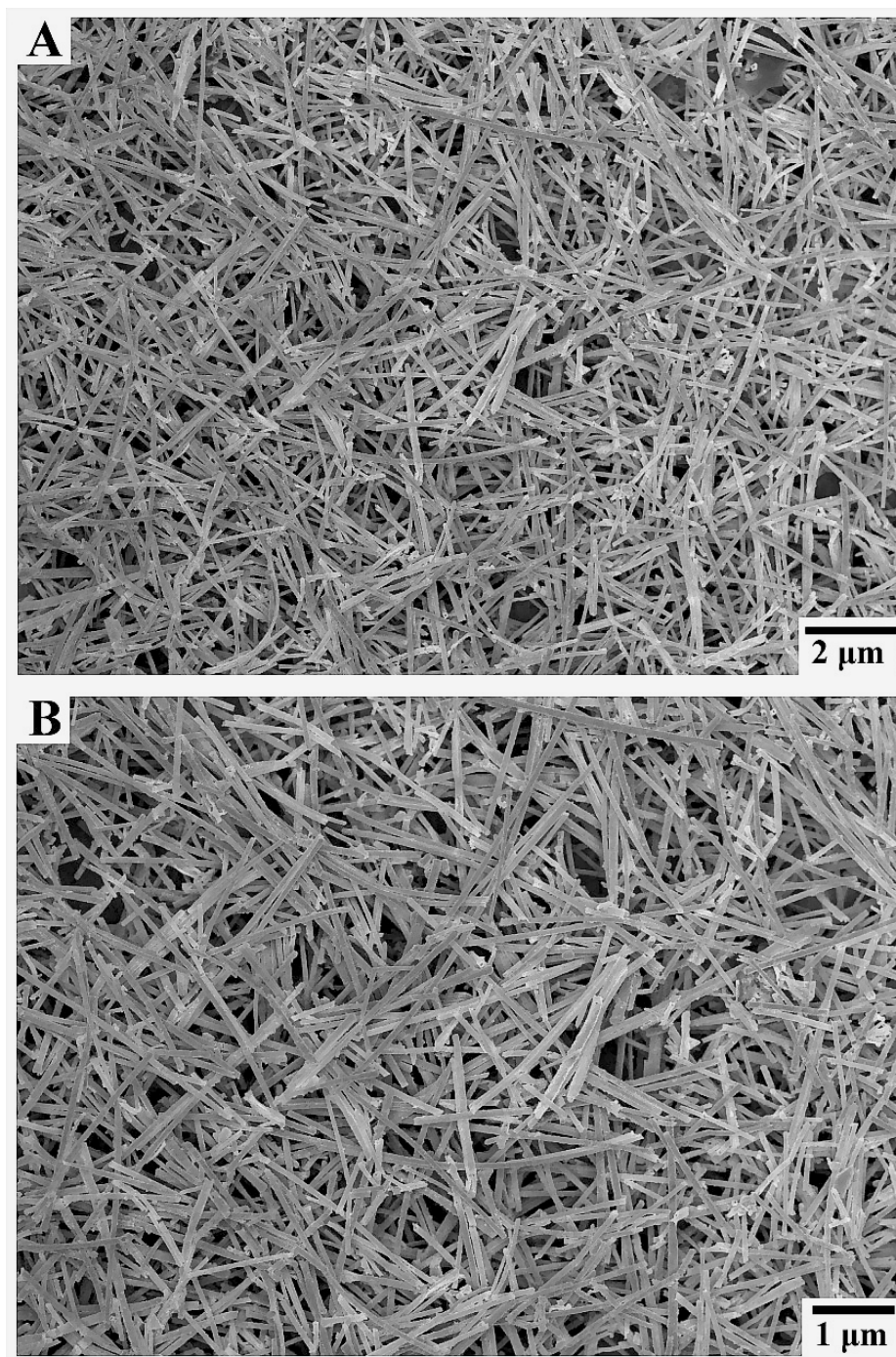


Fig. S1. (A-B) SEM images of Rh nanotubes.

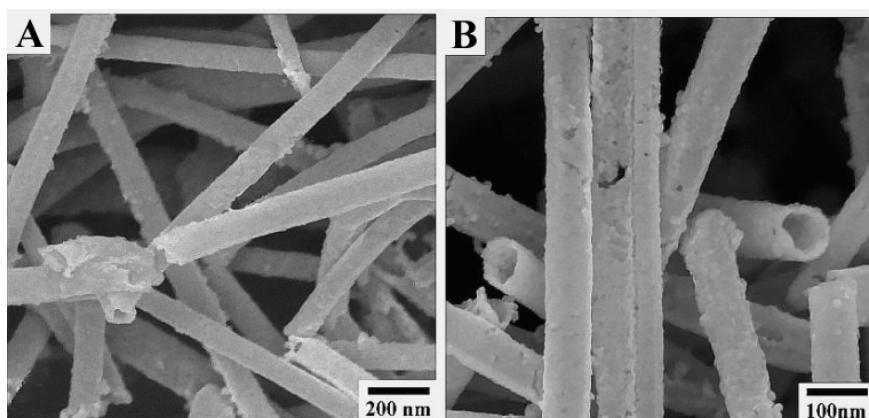


Fig. S2. (A-B) FE-SEM images of Rh nanotubes.

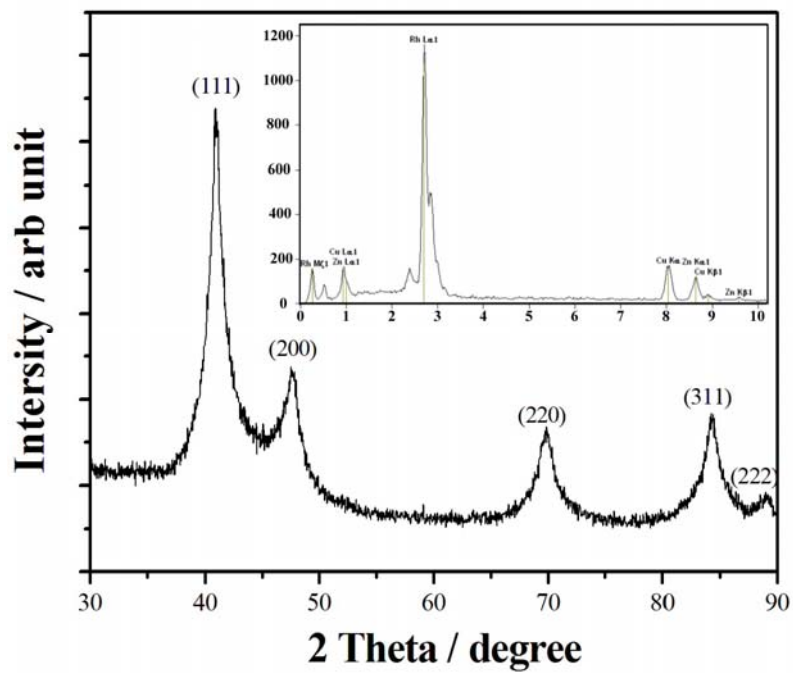


Fig. S3. XRD and EDS patterns of Rh nanotubes.