

Electronic Supplementary Information

The role of twinning in shape evolution of anisotropic noble metal nanostructures

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1. Experimental

1.1 Synthesis of gold colloids by a modified polyol process

Gold nanostructures were synthesized by reducing in air chloroauric acid trihydrate ($\text{HAuCl}_4 \cdot 3\text{H}_2\text{O}$); ACS reagent grade; Aldrich) in 1,2,3-Propanetriol (Glycerin; $\geq 99\%$; Fisher Chemicals) in the presence of poly-diallyl dimethyl ammonium chloride (PDDA; MW= 450,000; 20 wt. % in H_2O ; Aldrich). A solution of Au precursor was prepared by adding 1 g of $\text{HAuCl}_4 \cdot 3\text{H}_2\text{O}$ to 50 mL of deionized water. All the materials were used without any further treatment. In a typical synthesis, approximately 9.5 mL of glycerin and 1.4 mL of the PDDA solution were refluxed in a 50 mL three-necked flask at either 160 °C or 200 °C with vigorous stirring for about 60 minutes. A silicon oil bath was used to heat the solutions and the temperature was maintained within $5 \pm \text{C}$. After that, 5 mL of the Au precursor solution were injected drop-wise at a rate of 0.1875 mL/min into the reaction flask. The flask was then resealed and contents were allowed to react for approximately another hour, letting then the product to cool to room temperature. The reaction product was diluted in deionized water (5 times in volume) and purified by centrifugation. The last procedure was conducted at least two times.