# Supplementary Materials: A Comparison Reduction of 4-Nitrophenol by Gold Nanospheres and Gold Nanostars

**Tao Ma, WenshuoYang, Simin Liu, Haijun Zhangand Feng Liang**

**Table S1.** Concentration of Au/Ag atoms in different colloidal solution of Gold nanostructures[a].

| Gold Nanostructures | Concentration of Au Atoms (mg/L) | Concentration of AgAtoms (mg/L) |
|---|---|---|
| 4 nm Au-NPs | 45.23 | -[b] |
| 16 nm Au-NPs | 147.27 | - |
| 40 nm Au-NPs | 53.61 | - |
| 40 nm Au-NSs | 33.34 | 2.18 |
| 117 nm Au-NSs | 42.20 | 2.76 |
| 117 nm Au-NSs+CB[7] | 42.20 | 2.76 |

[a]Au contents were measuredby inductively coupled plasma optical emission spectroscopy (ICP-OES, IRIS Advantage Duo ER/S spectrometer, Thermo Jarrell Ash, MA, USA). Regular nanoparticles samples were suspended in freshly prepared aqua regia (trace metal grade 70% nitric acid $HNO_3$:36% hydrochloric acid HCl, 1:3/*v:v*) and heated until completely dissolved, and then diluted with doubledistilled water; [b] Not determined. Au-NP: gold nanosphere; Au-NS: gold nanostar; CB[7]: cucurbit[7]uril.

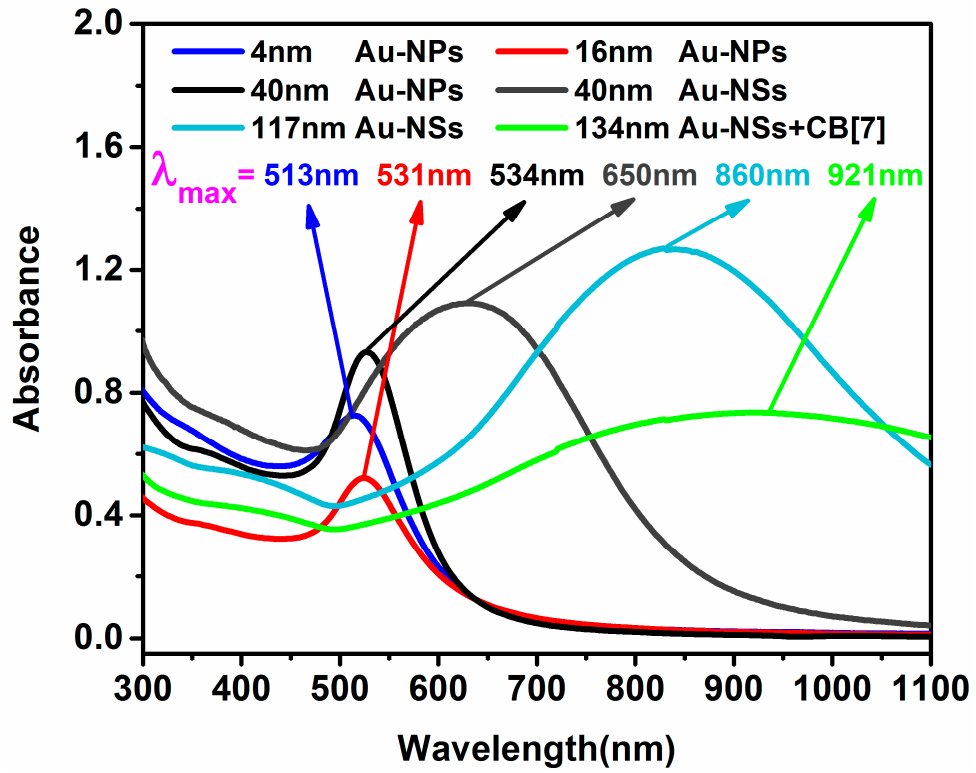


**Figure S1.** UV-vis-NIR (ultraviolet–visible–near infrared) absorption spectra of gold nanoparticles in this work. The absorption spectra were acquired with a UV-3600 UV-vis-NIR spectrometer (Shimadzu, Kyoto, Japan).

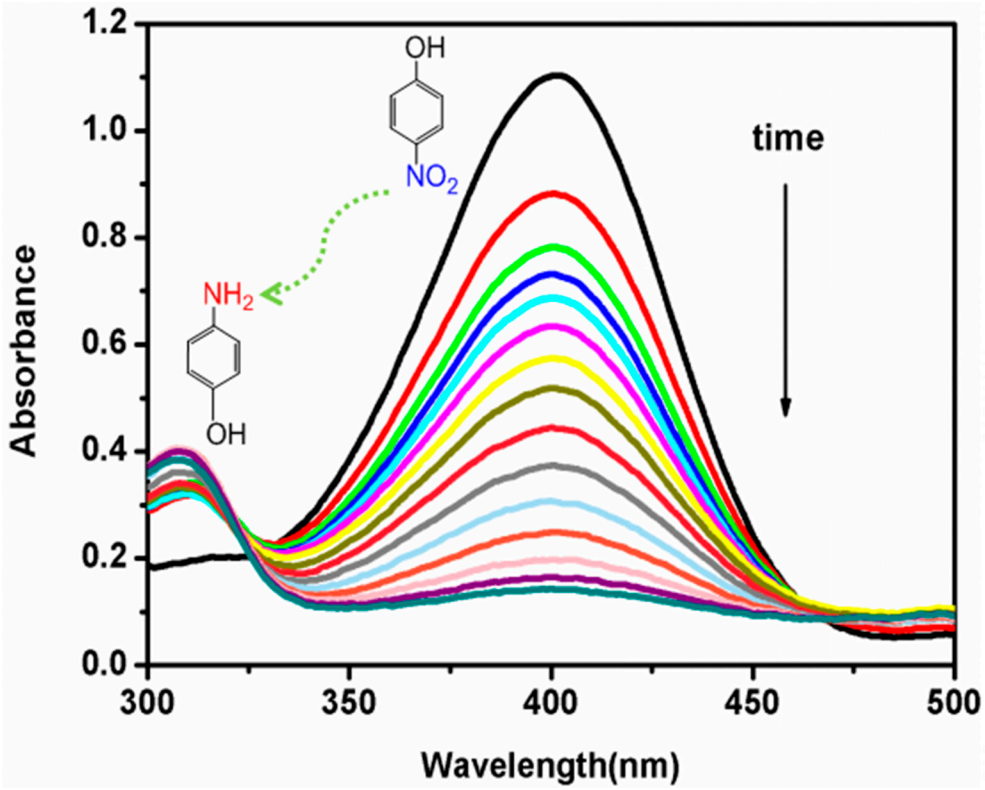


**Figure S2.** Typical UV-vis absorption spectra of the systems containing 4-NP and $NaBH_4$ in the presence of gold nanostructures for various durations. The absorption spectra were acquired with a UV-3600 UV-vis-NIR spectrometer (Shimadzu, Kyoto, Japan).

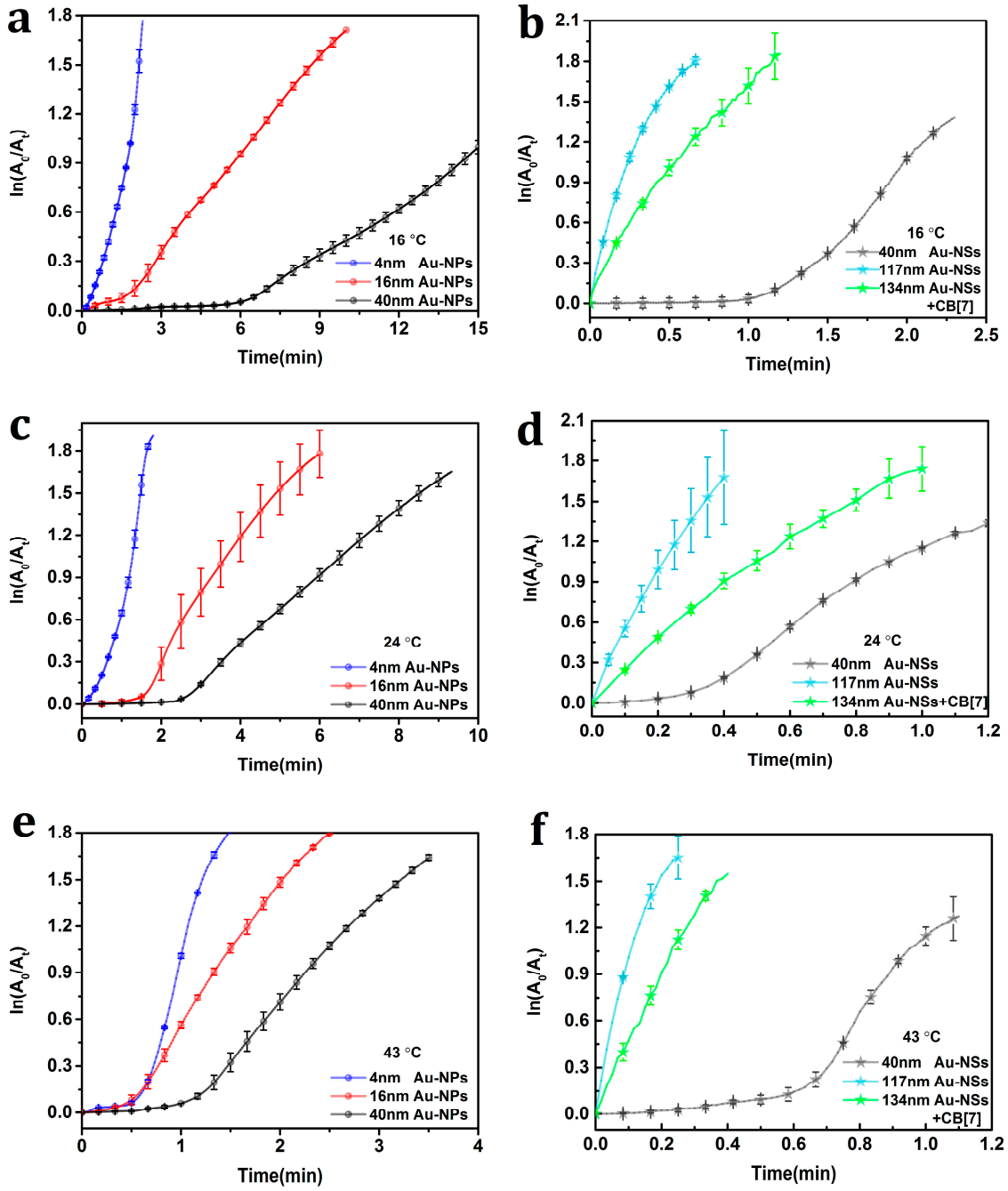


**Figure S3.** The relationships between ln($A_0/A_t$) and the reaction time at three different temperatures in the presence of: (**a**) Au-NPs at 16 °C; (**b**) Au-NSs at 16 °C; (**c**) Au-NPs at 24 °C; (**d**) Au-NSs at 24 °C, (**e**) Au-NPs at 43 °C, and (**f**) Au-NSs at 43 °C. The error bars represent standard deviations obtained from three or more trials. These plots were then used to determine the apparent reaction rate constant ($k_{app}$).

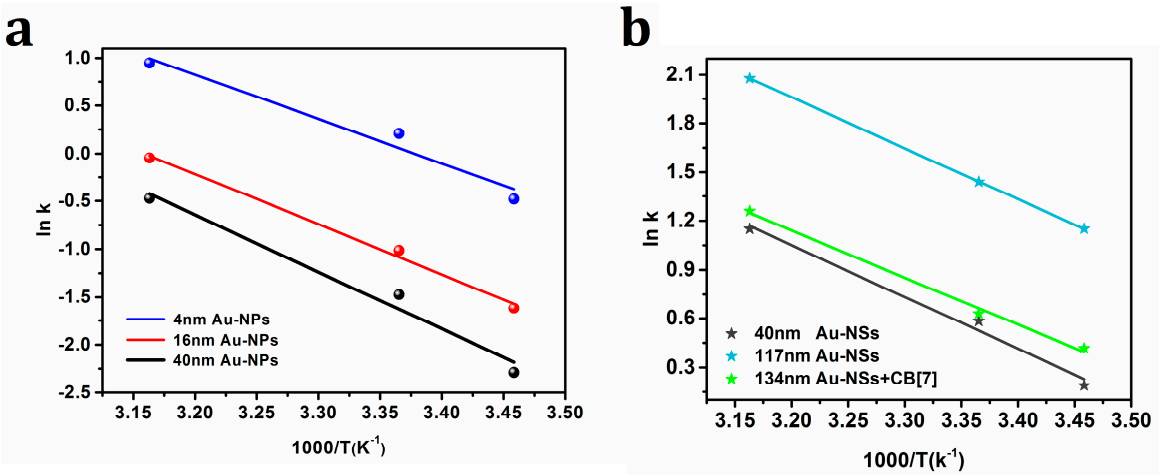


**Figure S4.** The Arrhenius plots for reactions catalyzed by (**a**) Au-NPs; (**b**) Au-NSs. The apparent activation energy (*Ea*) can be calculated from the slope of the linear fitting in each case.

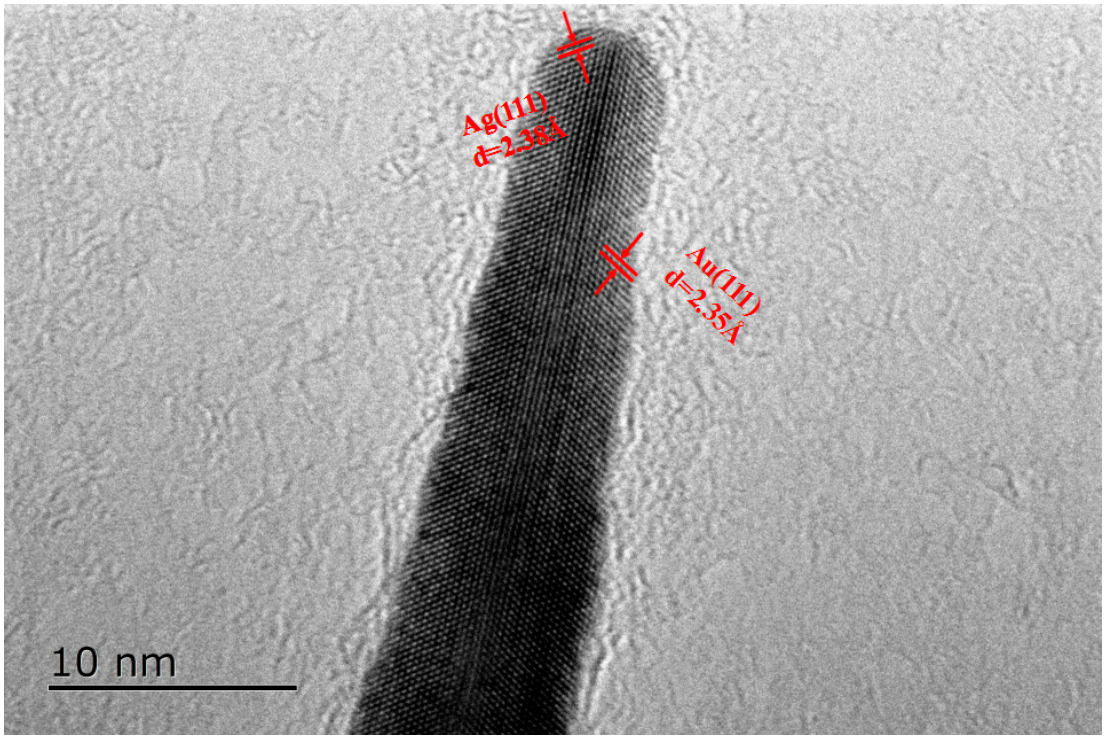


**Figure S5.** Representative high-resolution transmission electron microscopy (HRTEM) image of gold nanostars (Au-NSs), which clearly shows the presence of Au and Ag atoms.