Supplementary Information for

High Catalytic Performance of Raspberry-Like Gold Nanoparticles and Enhancement of Stability by Silica Coating

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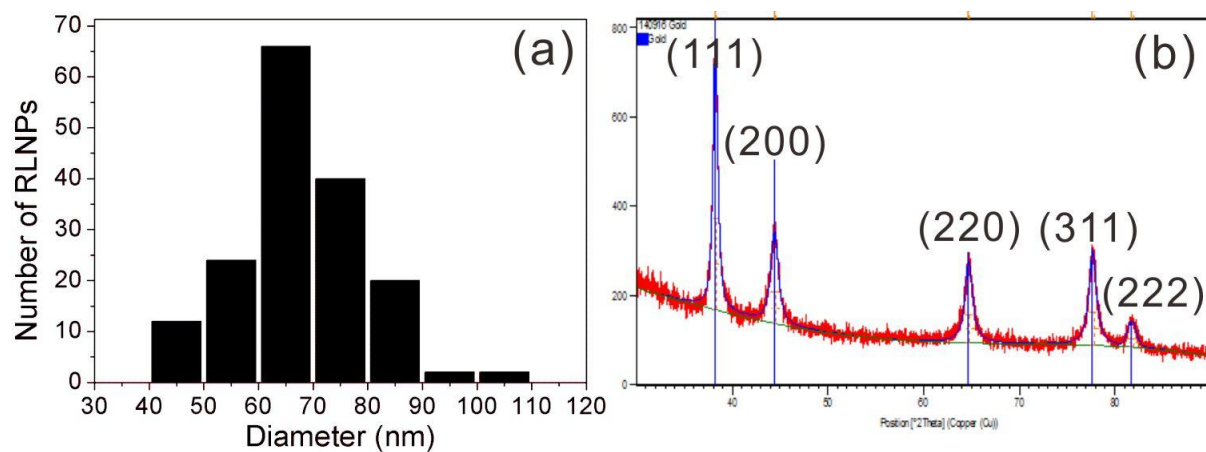E-mail address: hyojong@hallym.ac.kr (H. Yoo).

Figure S1. (a) Size distribution of Au RLNPs; (b) Powder X-ray diffraction (PXRD) pattern of Au RLNPs (red line) and the pattern of fcc structure of metallic gold (JCPDS card No. 04-0784, blue line)
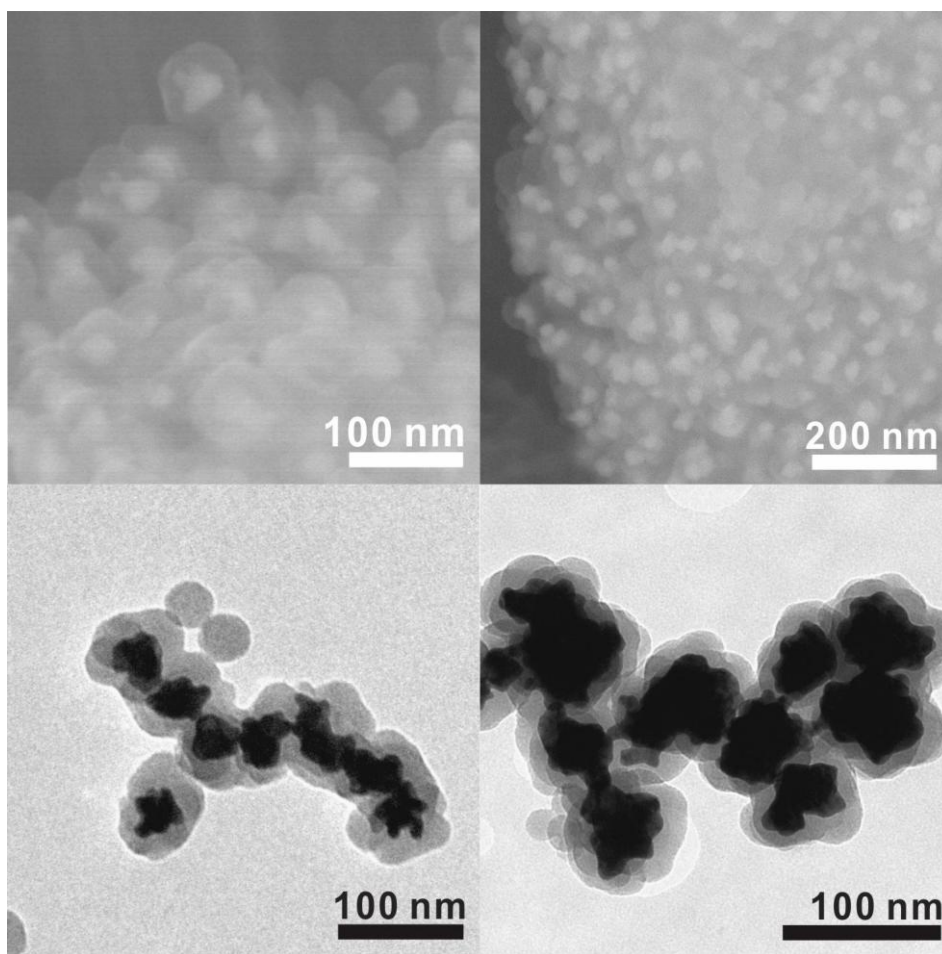
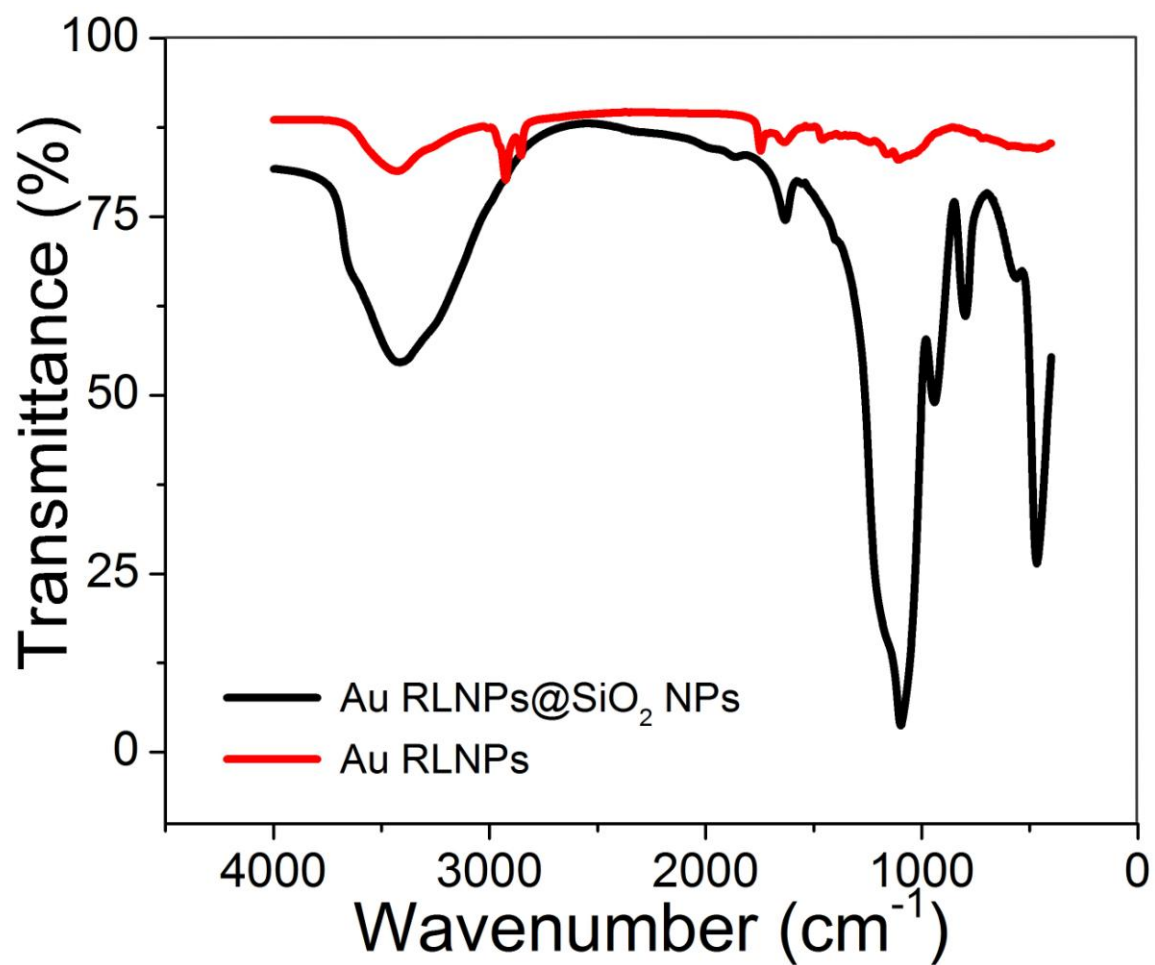**Figure S2.** SEM (up) and TEM (down) images of Au RLNPs@SiO$_2$ NPs

Figure S3. FT-IR spectra of (i) Au RLNPs and (ii) Au RLNPs@SiO$_2$ NPs in KBr pellets.
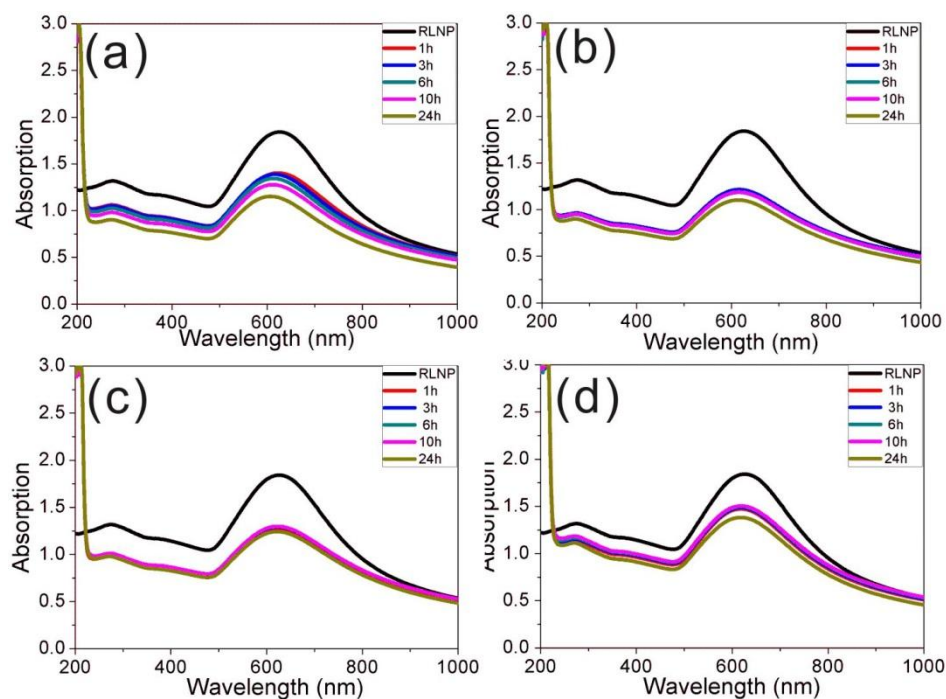
Figure S4. UV-Vis spectral changes of Au RLNPs before (black) and after the addition of (a) 200, (b) 100, (c) 50, and (d) 10 mM of CTAB (*aq*) (100 µL) into the dispersion of as-synthesized Au RLNPs in nanopure water (1 mL) corresponding to each reaction time.
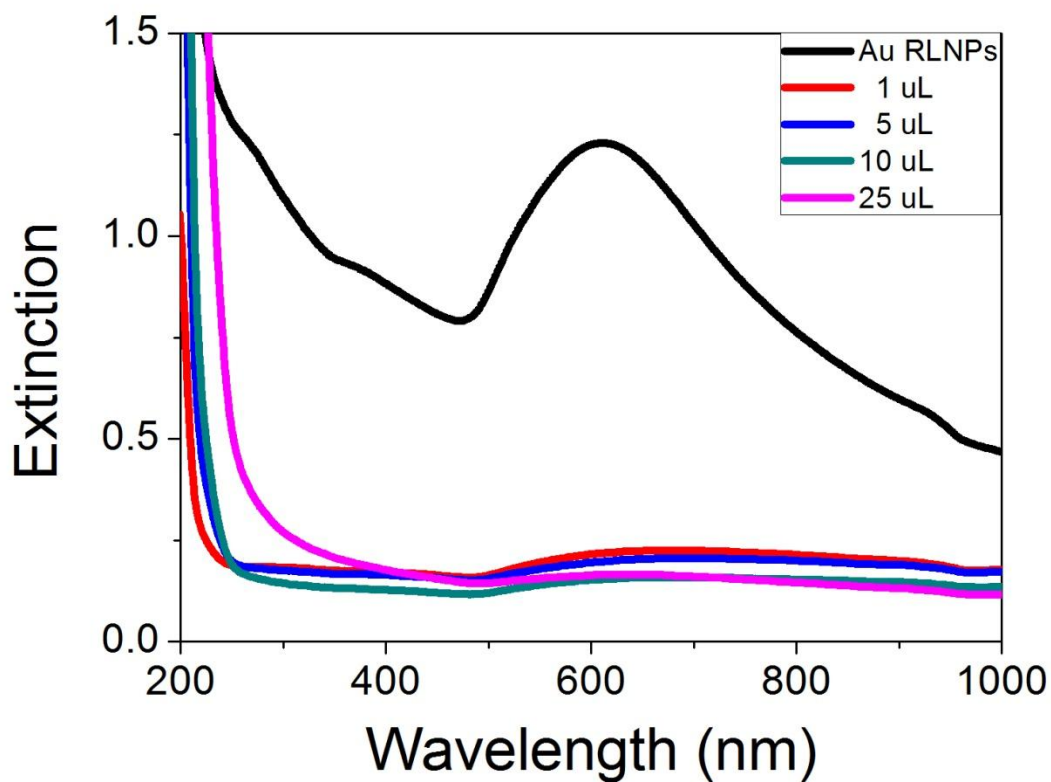
Figure S5. UV-Vis spectral changes of Au RLNPs before (black) and after the addition of 1, 5, 10, and 25 µL of mercaptosiliane (MPTS) (95 %) into the dispersion of as-synthesized Au RLNPs in ethanol (1 mL). (UV-Vis spectra were observed in water after 24 hours reactions.)
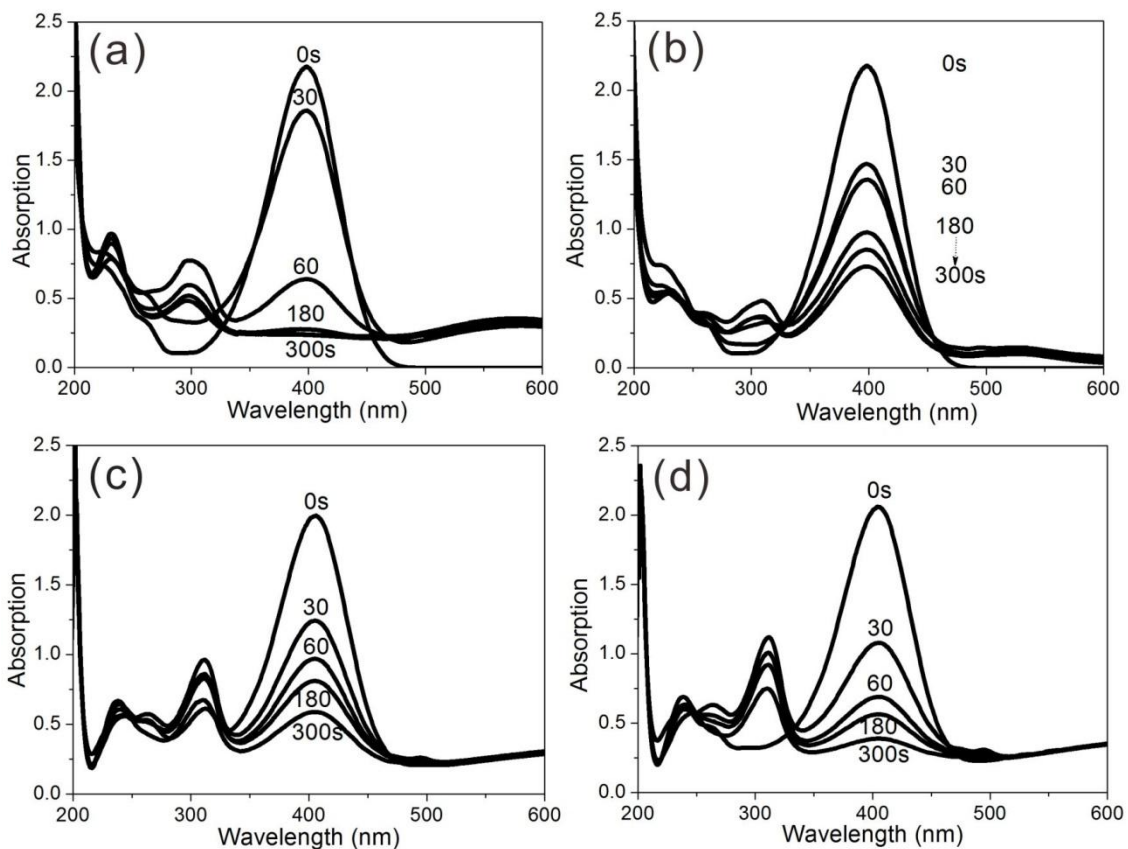
Figure S6. UV-Vis spectra showing the reduction reaction of 4-nitrophenol (4-NP) over (a) Au RLNPs; (b) HCl-treated Au RLNPs; (c) Au RLNPs@SiO$_2$; (d) HCl-treated Au RLNPs@SiO$_2$.
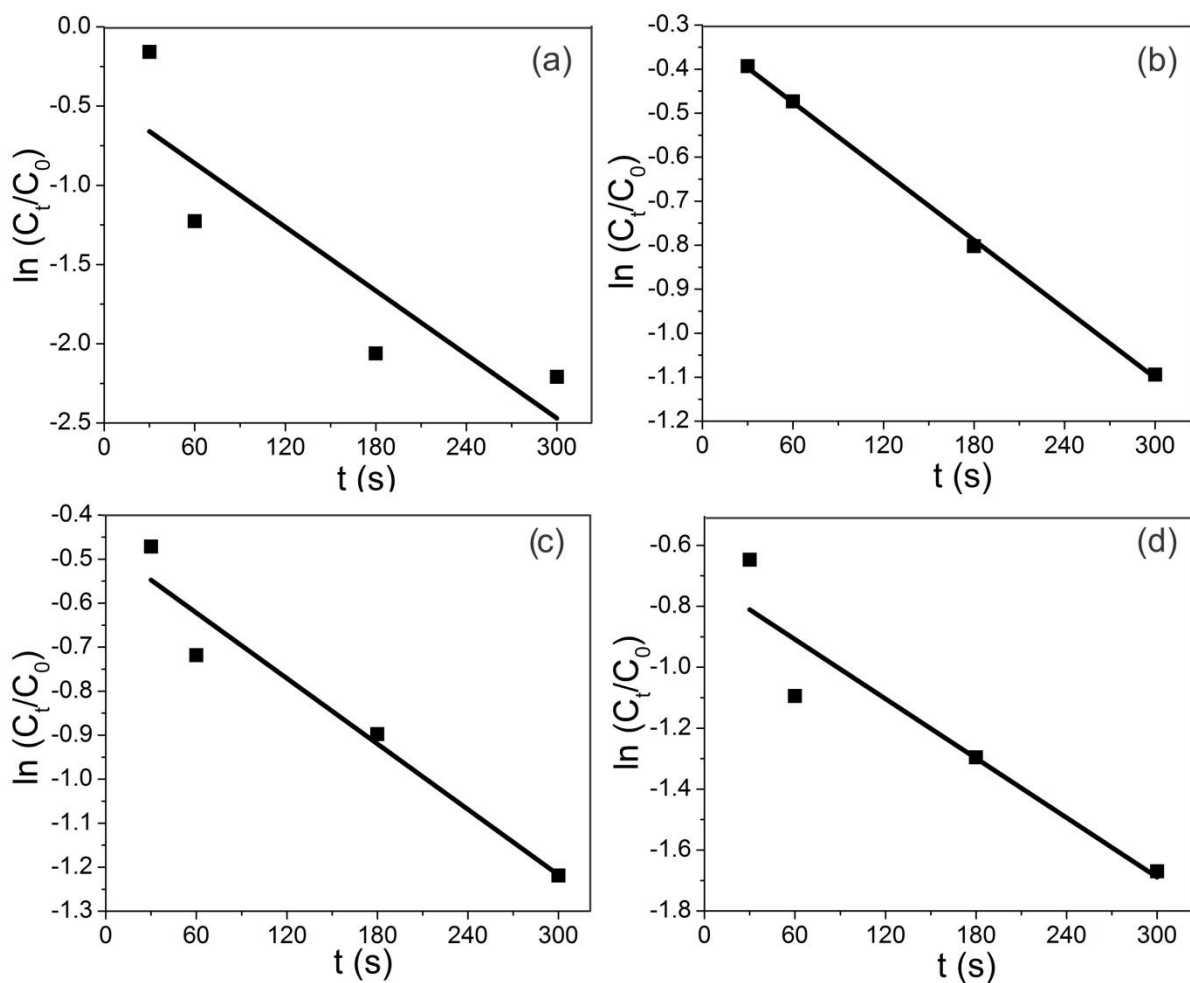
Figure S7. Plot of $\ln(C_t/C_0)$ versus time for (a) Au RLNPs; (b) HCl-treated Au RLNPs; (c) Au RLNPs@SiO$_2$; (d) HCl-treated Au RLNPs@SiO$_2$ NPs. The rate constants in different systems calculated based on the slope of the linear fit of $-\ln(C_t/C_0)$ versus time are (a) 6.7×10^{-3}, (b) 2.5×10^{-3} s^{-1}, (c) 2.6×10^{-3}, and (d) 3.3×10^{-3} s^{-1}
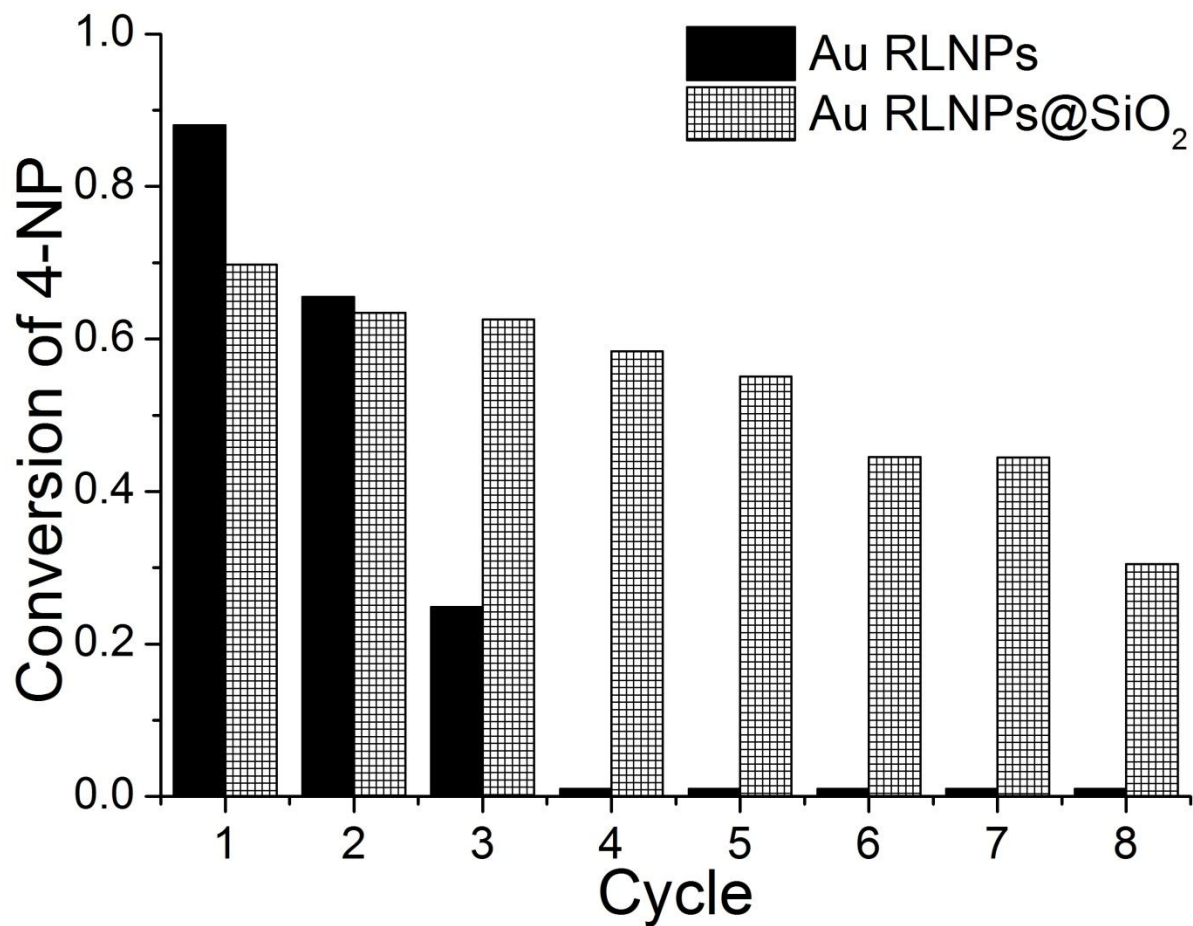
Figure S8. Histogram comparing the catalytic performance of Au RLNPs and Au RLNPs@SiO$_2$ based on the conversion of 4-NP. (Conversion of 4-NP = 1 − C_t/C_0)