Supporting Information for

Tailoring Longitudinal Surface Plasmon Resonance Wavelength of Gold Nanorods by Selective Etching

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AFFILIATIONS

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Sample	Length (nm)	Width (nm)	Aspect ratio
S1	71.45 (4.95)	18.03 (1.00)	3.97 (0.36)
S2	70.99 (4.92)	17.45 (0.87)	4.08 (0.33)
S3	70.41 (3.97)	16.91 (0.66)	4.17 (0.33)
S4	70.56 (3.43)	16.09 (1.00)	4.40 (0.30)
S5	70.83 (2.55)	15.59 (0.68)	4.54 (0.18)

Table S1. Average length, width, and aspect ratio of the S1-5 in figure 1.

Sample	Length (nm)	Width (nm)	Aspect ratio
S1	75.85 (7.99)	19.50 (2.45)	3.95 (0.66)
S2	70.72 (7.34)	19.83 (2.13)	3.61 (0.52)
S3	64.93 (6.83)	19.96 (2.20)	3.29 (0.47)
S4	57.07 (6.71)	19.12 (2.03)	3.01 (0.40)

Table S2. Average length, width, and aspect ratio of the S1-4 in figure 2.

Sample	Length (nm)	Width (nm)	Aspect ratio
S1	75.95 (5.17)	19.61 (2.32)	3.92 (0.50)
S2	72.68 (9.46)	18.69 (2.68)	3.95 (0.67)
S3	71.24 (10.66)	18.10 (2.53)	3.98 (0.65)
S4	67.15 (15.27)	17.28 (2.96)	3.92 (0.83)

Table S3. Average length, width, and aspect ratio of the S1-4 in figure 3.

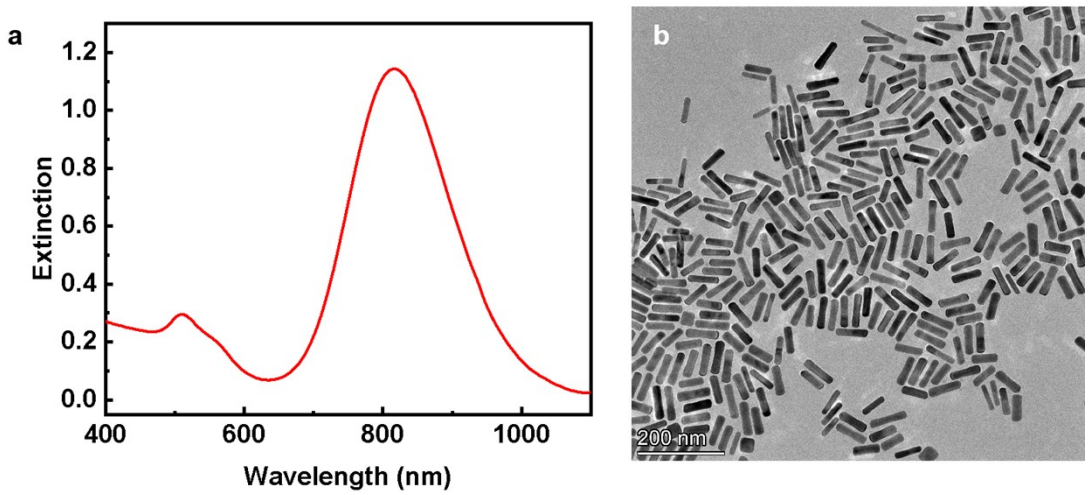

Figure S1. (a) The extinction spectra of the as-synthesized AuNRs by silver-ion-assisted seed-mediated method. **(b)** TEM image of as-synthesized AuNRs. The average diameter, length, aspect ratio, and LSPRW of AuNRs are 18.03 ± 1.00 nm, 71.45 ± 4.95 nm, 3.97 ± 0.36, and 817 nm, respectively.

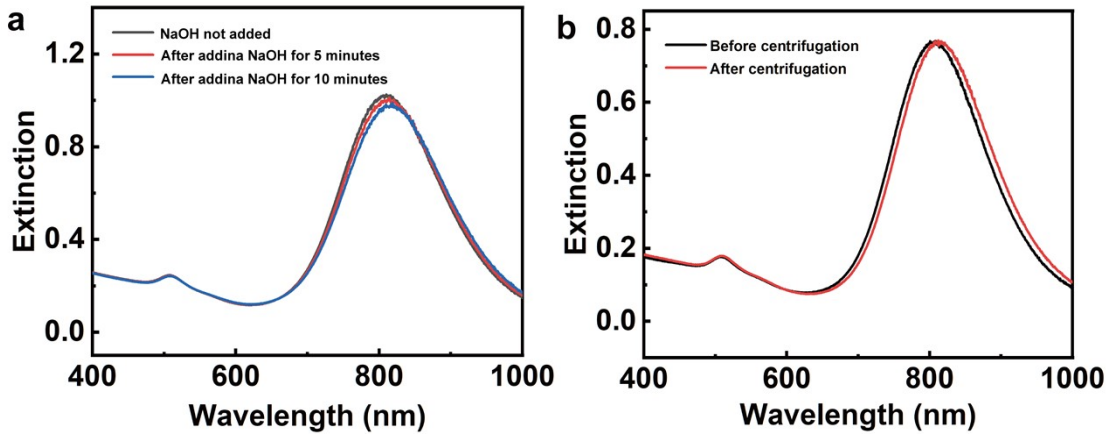

Figure S2. (a) To prevent further etching of gold nanorods during centrifugation, 100 µL of 0.01 M NaOH solution was added to 1 mL of the gold nanorod solution under oxidation to inhibit the etching behavior. The figure shows the extinction spectra of gold nanorods before the addition of NaOH, as well as at 5 min and 10 min after the addition. **(b)** The figure displays the extinction spectra of gold nanorods before and after centrifugation treatment.

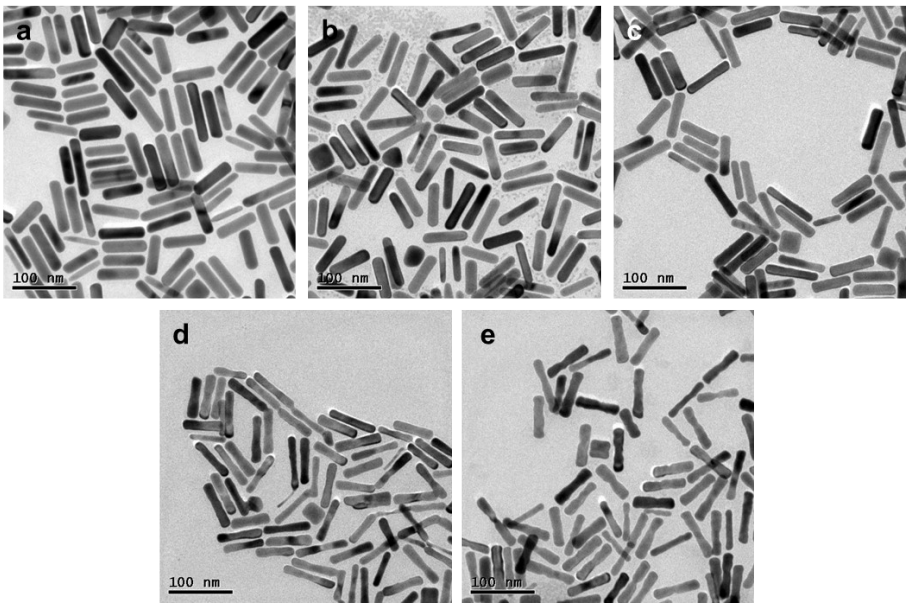

Figure S3. **(a-e)** TEM images of samples S1-5 in the figure 1a. Scale bars is 100 nm.

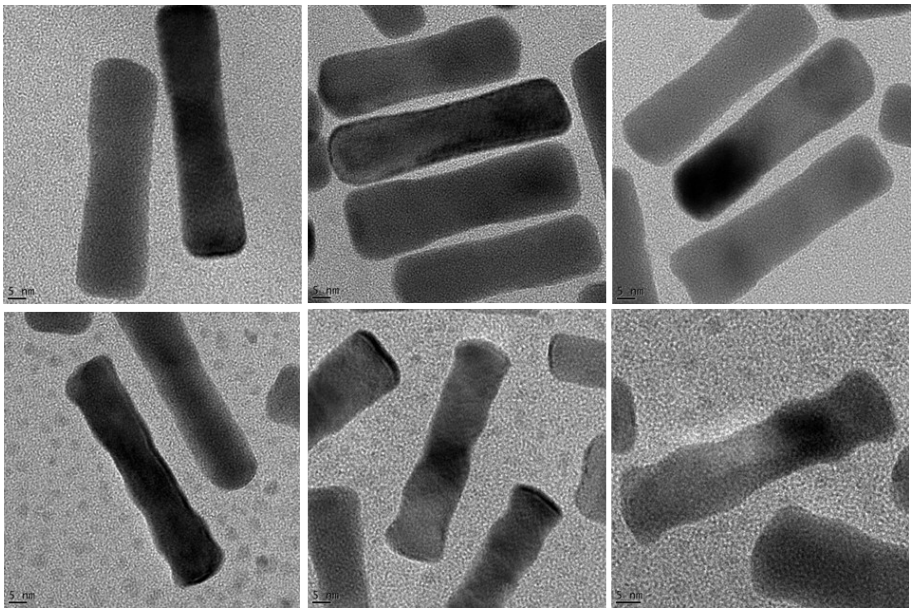

Figure S4. HRTEM images of samples S1 and S5 in the figure 1a.

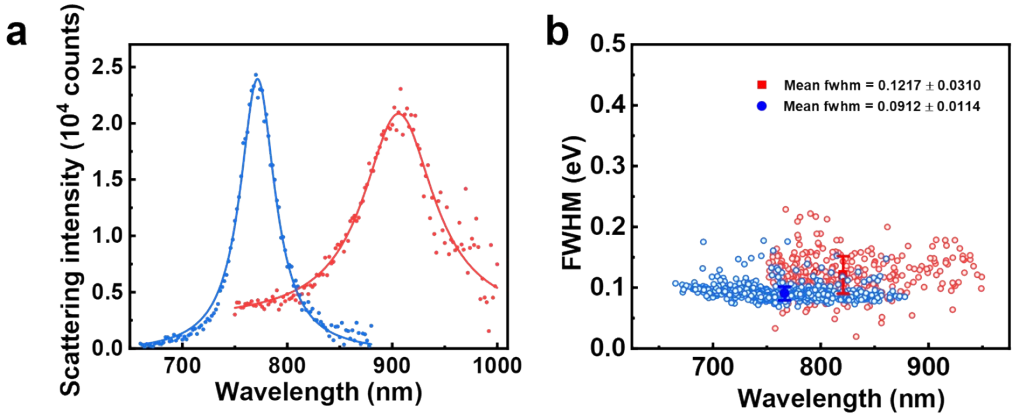

Figure S5. (a) Representative single particle dark-field scattering spectra of samples S1 and S5 in Figure 1a. **(b)** Line width distribution of samples S1 and S5 was statistically evaluated, and the mean FWHM values were measured to be 0.1217 ± 0.0310 eV for S1 and 0.0912 ± 0.0114 eV for S5.

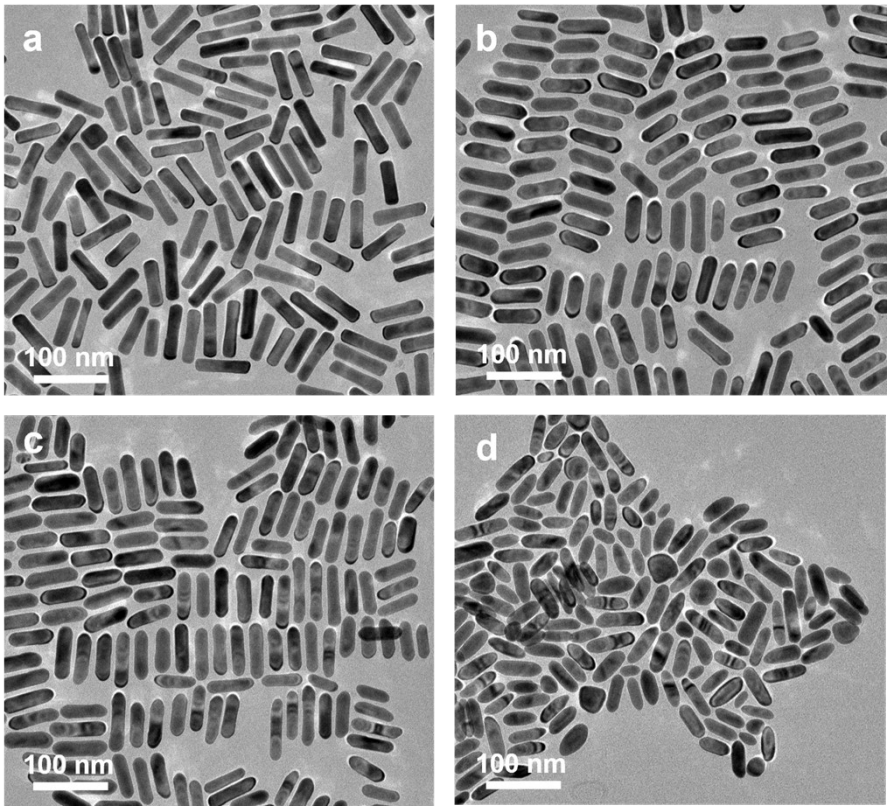

Figure S6. (a-d) TEM images of samples S1-4 in figure 2a.

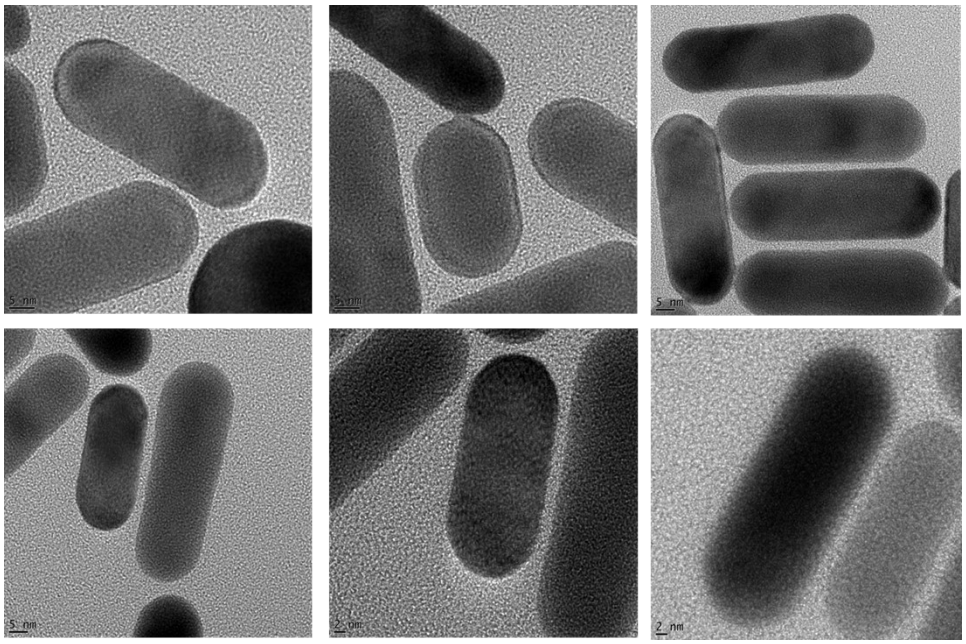

Figure S7. HRTEM images of samples S3 in the figure 2a.

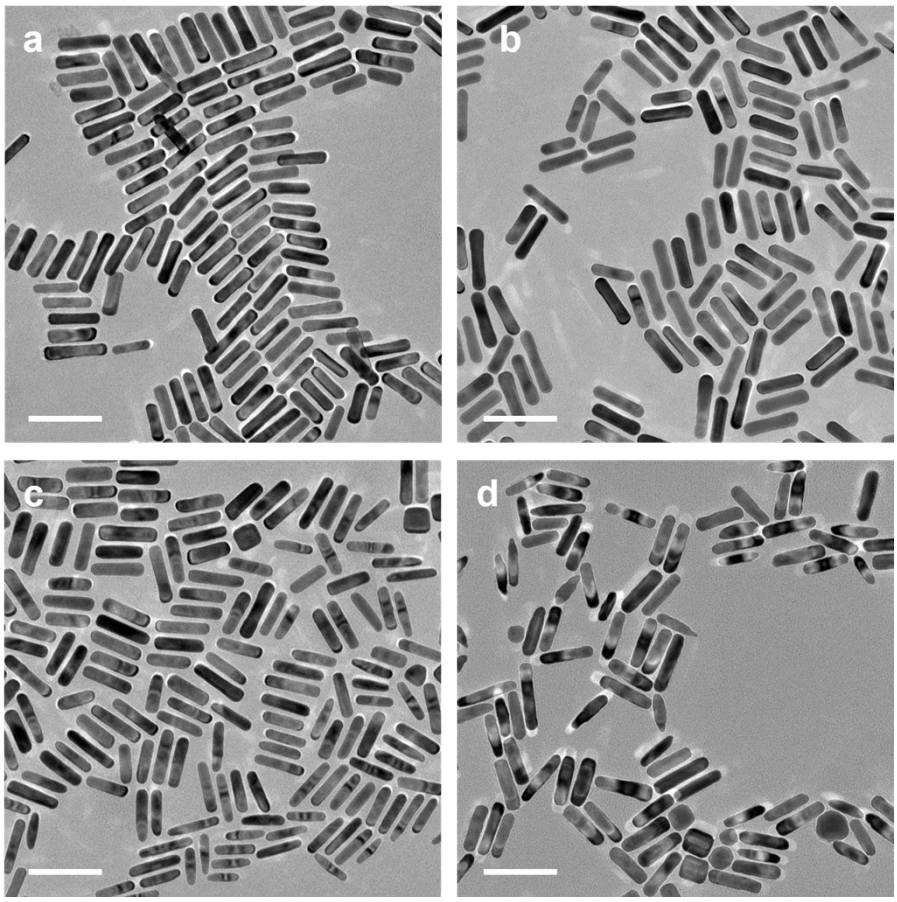

Figure S8. (a-d) TEM images of samples S1-4 in the figure 3a. Scale bars is 100 nm.

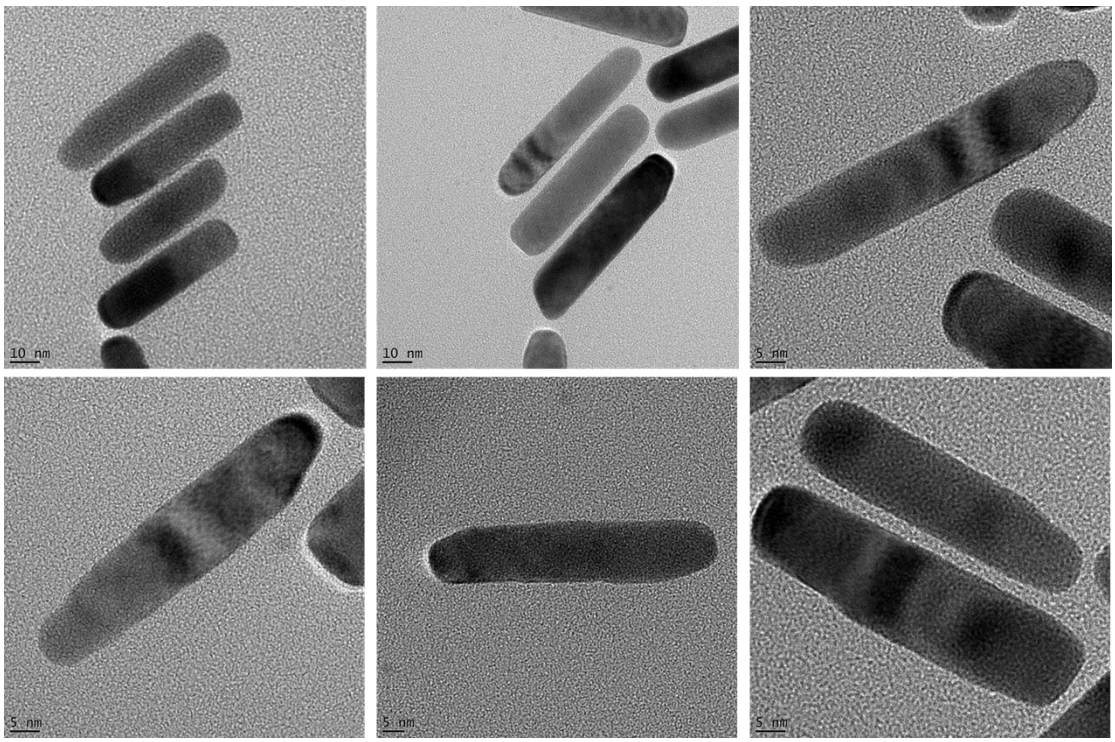

Figure S9. HRTEM images of samples S4 in the figure 3a.

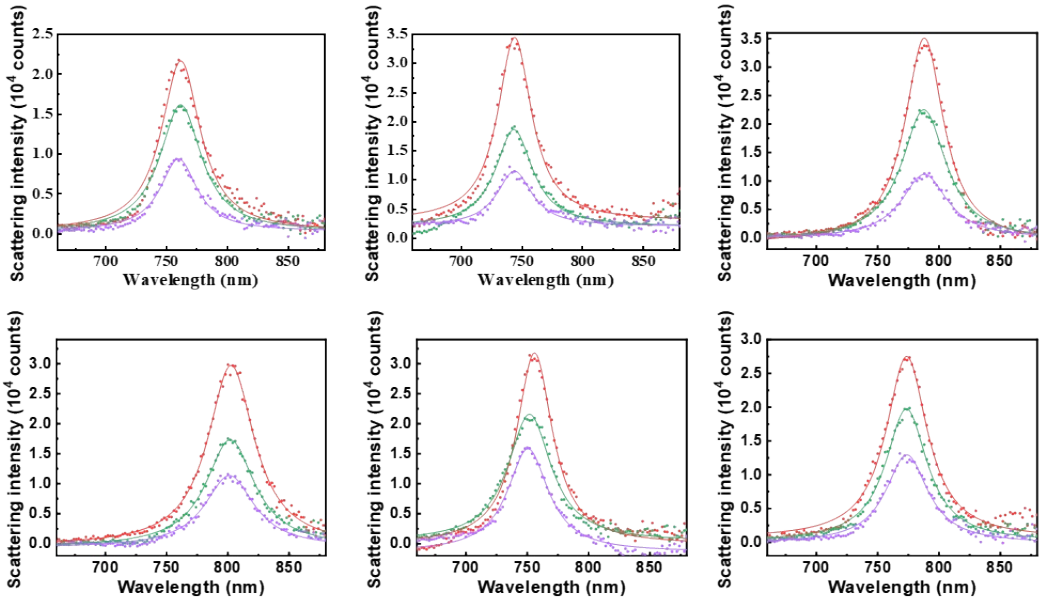

Figure S10. Evolution of the dark-field scattering spectrum from six single AuNRs during the oxidation. The spectra were recorded every 2.5 min.

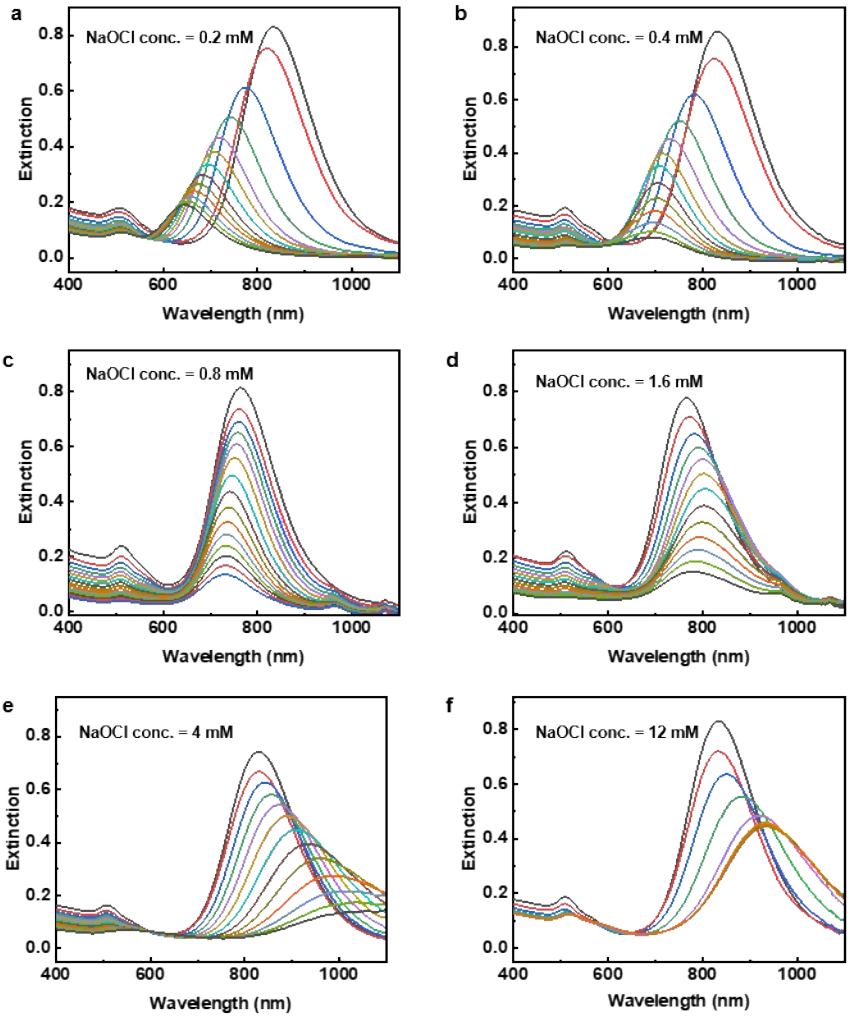

Figure S11. (a-f) Evolution of the extinction spectra of AuNRs during oxidation in presence of different concentrations of NaOCl.

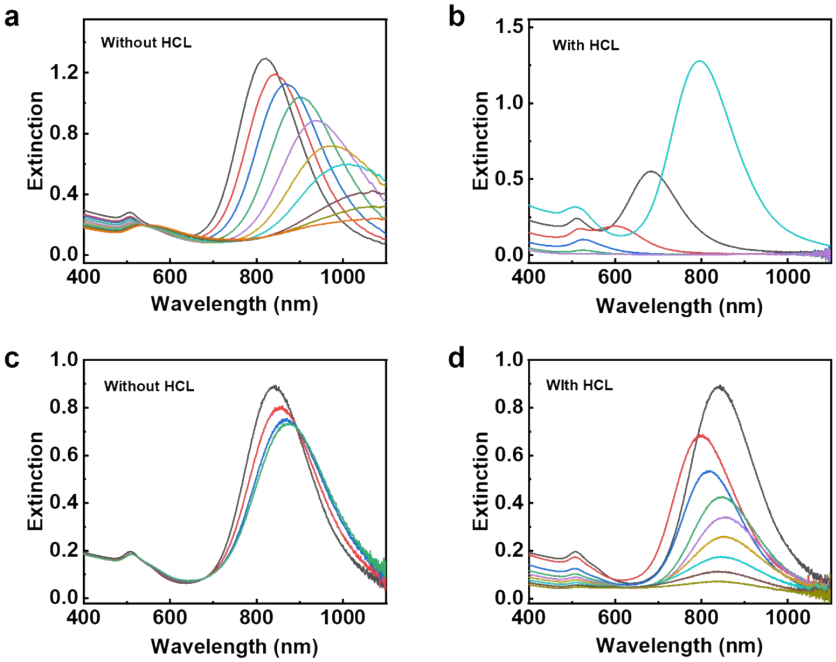

Figure S12. (a-b) Evolution of extinction spectra of AuNRs in the presence or absence of HCL during oxidation process. NaOCl concentration is 2 mM. **(c-d)** Evolution of extinction spectra of AuNRs in the presence or absence of HCL during oxidation process. NaOCl concentration is 12 mM.

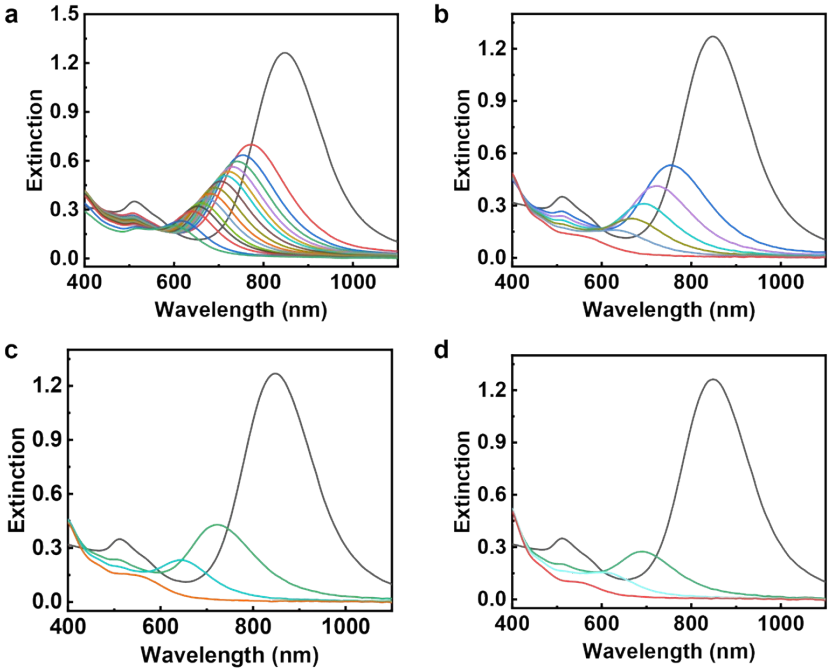

Figure S13. (a-d) Evolution of the extinction spectra of AuNRs in presence of 20 mM CTAB during oxidation. The concentration of NaOCl were 0.2, 0.4, 0.6, and 3 mM, respectively. The spectra were recorded every 3 s at room temperature.

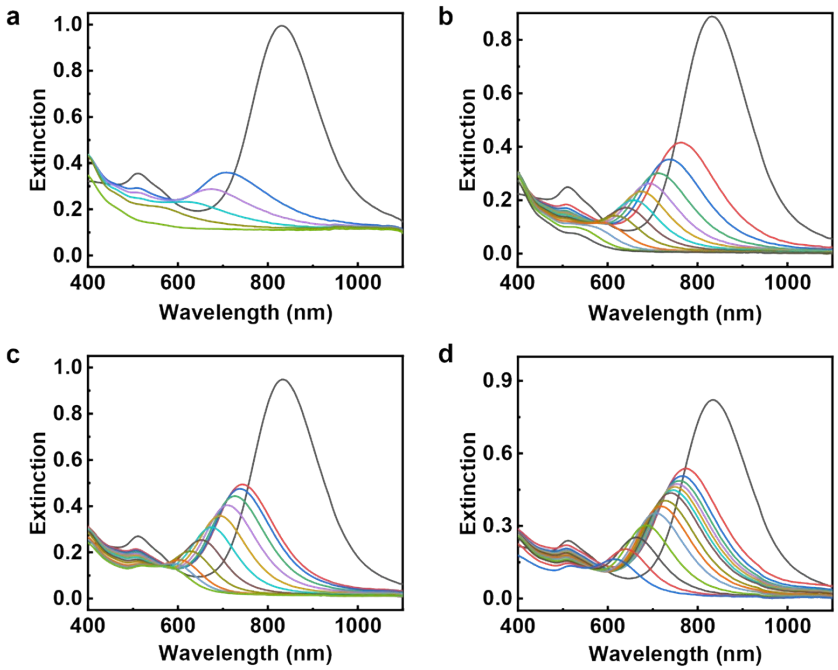

Figure S14. (a-d) Evolution of the extinction spectra of AuNRs in presence of 0.3 mM NaOCl during oxidation. The concentration of CTAB were 10, 20, 40, and 60 mM, respectively. The spectra were recorded every 3 s at room temperature.

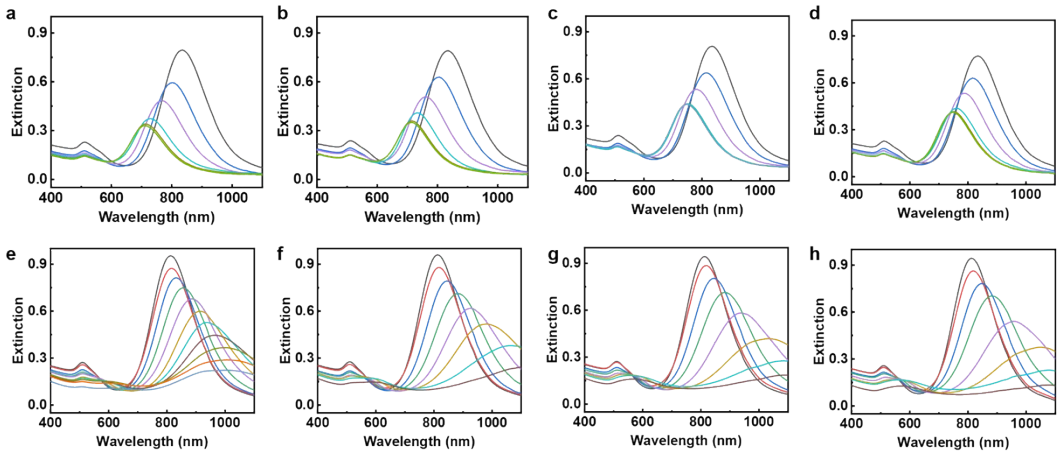

Figure S15. (a-d) Evolution of the extinction spectra of AuNRs in presence of 0.36 mM NaOCl and 20 mM CTAC during oxidation. The reaction temperatures are 30 °C, 35 °C, 40 °C, and 45 °C, respectively. **(e-h)** Evolution of the extinction spectra of AuNRs in presence of 3.2 mM NaOCl and 20 mM CTAC during oxidation. The reaction temperatures are 30 °C, 35 °C, 40 °C, and 45 °C, respectively.

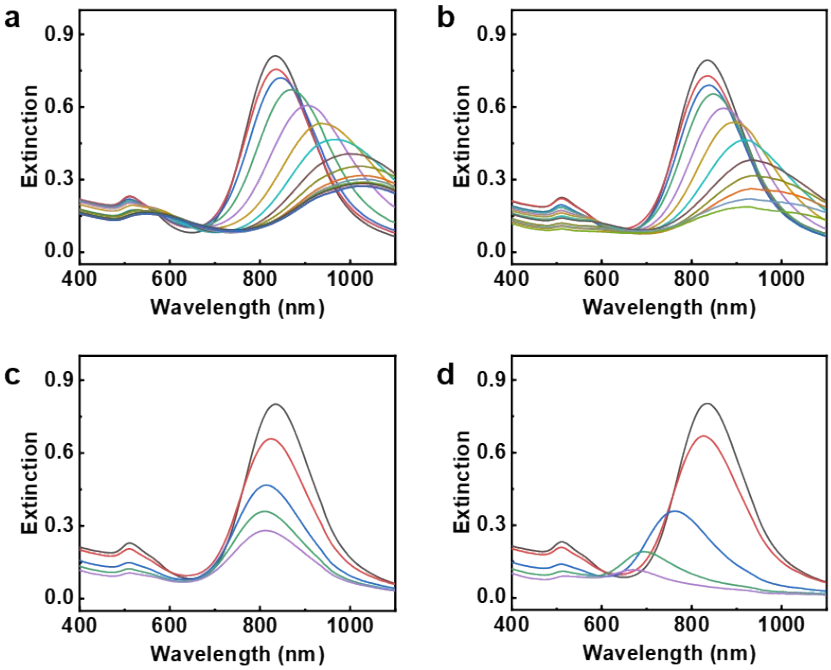

Figure S16. (a-d) Evolution of the extinction spectra of AuNRs in presence of 3.6 mM NaOCl during oxidation. The concentration of CTAC were 10, 20, 40, and 60 mM, respectively. The spectra were recorded every 2.5 min at room temperature.

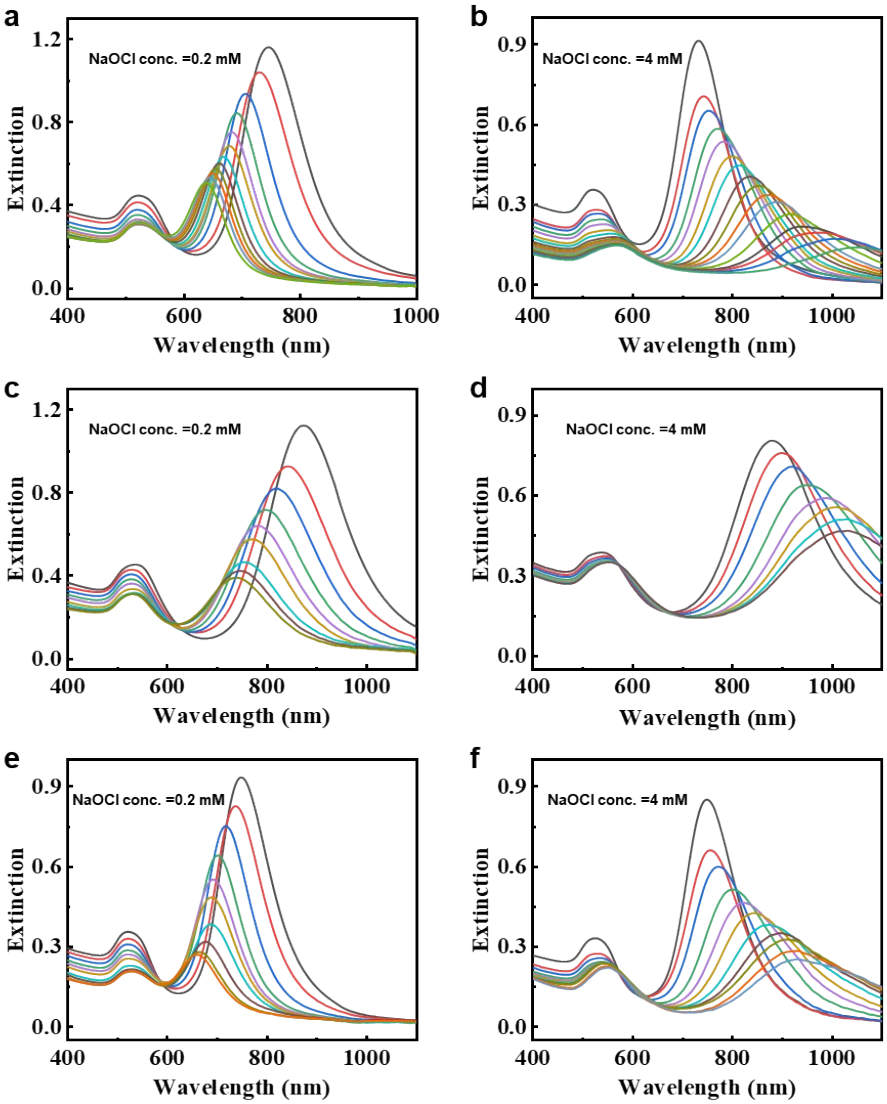

Figure S17. (a-b) Evolution of extinction spectra of AuNRs during oxidation. The LSPRW of AuNRs is 752 nm. NaOCl concentration is 0.2 mM and 4 mM. **(c-d)** Evolution of extinction spectra of AuNRs during oxidation. The LSPRW of AuNRs is 883 nm. NaOCl concentration is 0.2 mM and 4 mM. **(e-f)** Evolution of extinction spectra of AuNRs (5-bromo-2-hydroxybenzoic acid) during oxidation. The LSPRW of AuNRs is 753 nm. NaOCl concentration is 0.2 mM and 4 mM.

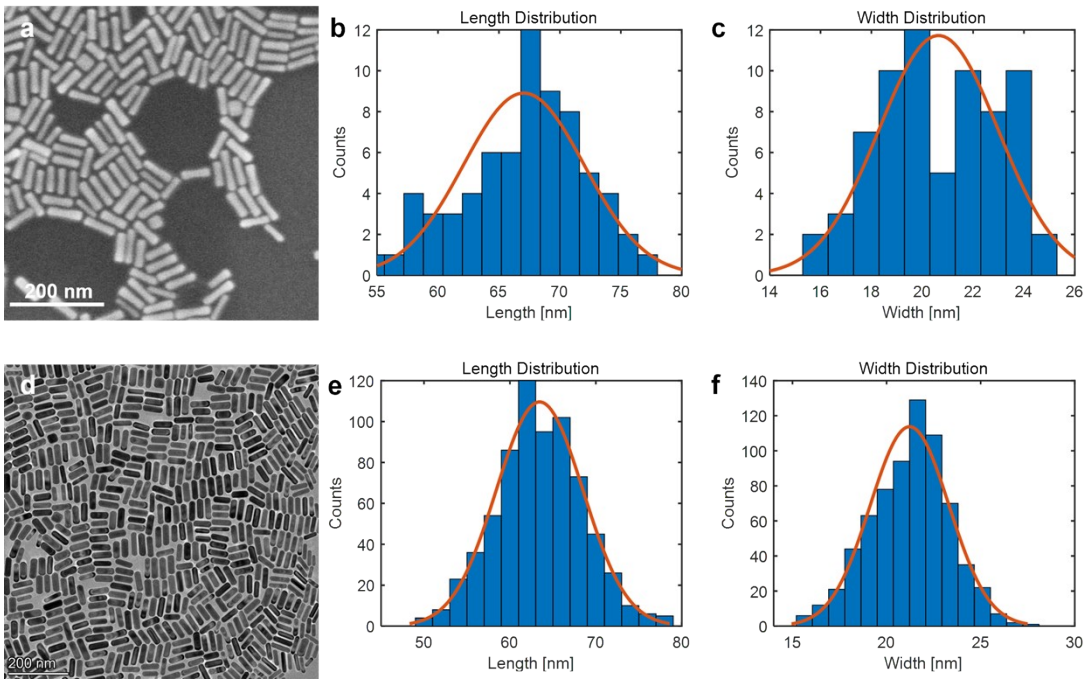

Figure S18. (a) SEM image of AuNRs obtained via oxidation. **(b-c)** Statistically analyzed length and width of the oxidized AuNRs, which are 65.58 ± 4.12 and 19.27 ± 1.51 nm, respectively. **(d)** TEM image of as-prepared AuNRs. **(e-f)** Statistically analyzed length and width of the as-prepared AuNRs, which are 63.45 ± 5.04 and 21.22 ± 2.09 nm, respectively.