

Supporting information for:

Using Binary Surfactant Mixtures to Simultaneously Improve Dimensional Tunability and Monodispersity in the Seeded-Growth of Gold Nanorods

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Methods

Materials. All chemicals were obtained from commercial suppliers and used without further purification. Hexadecyltrimethylammonium bromide (CTAB, > 98.0%), sodium oleate (NaOL, > 97.0%), potassium oleate (KOL, > 98.0%), sodium linoleate (> 95.0%), sodium stearate (> 95.0%) were purchased from TCI America. Hydrogen tetrachloroaurate trihydrate ($\text{HAuCl}_4 \cdot 3\text{H}_2\text{O}$) were purchased from Acros Organics. L-ascorbic Acid (BioUltra, $\geq 99.5\%$), silver nitrate (AgNO_3 , >99%), sodium borohydride (NaBH_4 , 99%), oleylamine (technical grade, 70%) and hydrochloric acid (HCl , 37 wt. % in water) were purchased from Sigma Aldrich. Ultrapure water obtained from a Milli-Q Integral 5 system was used in all experiments. All glassware was cleaned using freshly prepared aqua regia ($\text{HCl}:\text{HNO}_3$ in a 3:1 ratio by volume) followed by rinsing with copious amounts of water.

Synthesis of Gold NRs. The seed solution for gold NR growth was prepared as follows: 5 mL of 0.5 mM HAuCl_4 was mixed with 5 mL of 0.2 M CTAB solution in a 20 mL scintillation vial. 0.6 mL of fresh 0.01 M NaBH_4 was diluted to 1 mL with water and was then injected to the Au(III)-CTAB solution under vigorous stirring (1200 rpm). The solution color changed from yellow to brownish yellow and the stirring was stopped after 2 min. The seed solution was aged at room temperature for 30 min before use.

To prepare the growth solution, 7.0 g (0.037 M in the final growth solution) or 9.0 g (0.047 M in the final growth solution) of CTAB and a certain quantity of NaOL were dissolved in 250 mL of warm water ($\sim 50^\circ\text{C}$) in a 1L Erlenmeyer flask (Tables S2-S5). The solution was allowed to cool down to 30°C and 4 mM AgNO_3 solution, as detailed in Tables S2-S5, was added. The mixture was kept undisturbed at 30°C for 15 min after which 250 mL of 1 mM HAuCl_4 solution

was added. The solution became colorless after 90 min of stirring (700 rpm) and a certain volume of HCl (37 wt. % in water, 12.1 M) was then introduced to adjust the pH (Tables S2-S5). After another 15 min of slow stirring at 400 rpm, 1.25 mL of 0.064 M ascorbic acid (AA) was added and the solution was vigorously stirred for 30 s. Finally, a small amount of seed solution was injected into the growth solution (Tables S2-S5). The resultant mixture was stirred for 30 s and left undisturbed at 30°C for 12 h for NR growth. The final products were isolated by centrifugation at 7,000 rpm for 30 min followed by removal of the supernatant. No size and/or shape-selective fractionation was performed.

Structural and Optical Characterization. Transmission electron microscopy (TEM) images were acquired on a JEM-1400 microscope operating at 120kV. Scanning electron microscopy (SEM) was performed on a JEOL 7500F HRSEM operating at 5.0 kV. Optical extinction spectra were recorded using a Cary 5000 UV/Vis/NIR spectrophotometer. The pH of NR growth solutions were measured with an accument AP72 pH meter (Fisher Scientific). Dark-field imaging was carried out on an Olympus BX51 upright optical microscope. Samples were prepared by drop-casting a diluted solution of gold NRs (~20 μ L) onto a piece of clean glass cover slip, and were illuminated by white light from a 100 W tungsten-halogen lamp through an oil immersion dark-field condenser (NA 1.2–1.4). The scattered light was collected using a 50x objective (NA 0.75) and the images were captured with a color digital camera on a 308 PV microscope spectrophotometer system (Craic Technologies).



Figure S1. Photograph of a typical seed solution. To prepare high quality seed particles, it is crucial that the amount of NaBH_4 added for HAuCl_4 reduction is precise. Since NaBH_4 is very hygroscopic, it is highly recommended that NaBH_4 powders are stored in a N_2 -purged glovebox. Moreover, although we found that ice-cold NaBH_4 (aq) is not necessary, it is important to use fresh NaBH_4 (aq) (used within 2 min after its preparation).

Table S1. pH values of gold NR growth solutions with different amounts of added HCl.^a

volume of HCl (37 wt. % in water, 12.1 M)	pH ^b
N/A	5.86±0.12
1.0 mL	1.65±0.04
1.5 mL	1.51±0.02
2.1 mL	1.36±0.03
3.0 mL	1.27±0.04
3.6 mL	1.10±0.02
4.2 mL	1.06±0.01
4.8 mL	1.03±0.02
5.4 mL	0.95±0.01

^a The pH values are nearly identical between gold NR growth solutions using 1.234g (4 mmol) and 1.543g (~5 mmol) of NaOL given the same amount of added HCl.

^b Average values and standard deviations were determined by measuring the pH values of 10 batches of gold NR growth solutions having identical concentrations of reagents.

Table S2. Growth conditions for gold NRs with LSPR wavelengths longer than 700 nm and diameters less than 25 nm.

CTAB (g)	AgNO ₃ (mL)	Seed (mL)	HCl (mL)	NaOL (g)	Average length (nm)	Average diameter (nm)	Figure number
7.0	18.0	0.4	1.5	1.234	88.1±3.9	23.4±1.0	1a
7.0	18.0	0.8	2.1	1.234	89.3±4.1	16.7±0.8	1e, S3
7.0	18.0	0.4	2.1	1.234	95.9±5.2	21.2±1.5	1d
7.0	18.0	0.8	3.0	1.234	94.2±6.7	16.2±1.2	S2a
7.0	18.0	0.2	3.0	1.234	111.4±8.2	23.3±1.3	S2b
7.0	24.0	0.8	2.1	1.234	98.9±5.2	22.7±0.9	1c
7.0	24.0	0.4	2.1	1.234	97.2±4.9	25.1±1.2	1b
7.0	24.0	0.8	3.0	1.234	93.9±6.2	16.5±1.0	S14f
7.0	24.0	0.4	3.0	1.234	111.4±6.0	20.8±0.8	1f
7.0	24.0	0.8	3.6	1.234	101.5±5.5	15.5±0.7	1h
7.0	24.0	0.4	3.6	1.234	118.4±6.4	19.7±1.1	S2c
7.0	24.0	0.8	4.8	1.234	107.5±7.2	14.7±0.6	S2d
7.0	24.0	0.4	4.8	1.234	129.7±6.1	21.6±1.6	1g
7.0	24.0	0.8	5.4	1.234	127.8±7.0	16.8±0.9	1i
9.0	18.0	0.4	3.0	1.234	86.9±3.6	21.2±1.3	S6
9.0	18.0	0.2	3.0	1.543	109.5±5.7	27.3±1.9	S2e

9.0	24.0	0.4	2.1	1.543	92.2±4.8	22.1±1.1	S2f
9.0	12.0	0.8	2.1	1.234	69.9±3.7	17.5±0.9	S14i
9.0	18.0	0.4	1.5	1.234	86.7±5.1	20.0±1.4	S5
9.0	18.0	0.2	1.5	1.234	94.1±4.3	24.2±1.0	S5
9.0	18.0	0.2	2.1	1.234	98.2±6.2	23.8±1.1	S6
9.0	18.0	0.2	3.0	1.234	118.4±8.3	22.7±1.6	S6
9.0	24.0	0.8	1.5	1.234	86.0±4.2	16.4±0.9	S4
9.0	24.0	0.4	1.5	1.234	91.2±5.8	18.3±1.0	S4, S5
9.0	24.0	0.2	1.5	1.234	106.3±6.7	27.1±1.3	S4, S5
9.0	24.0	0.8	2.1	1.234	89.6±4.5	15.2±0.8	S4
9.0	24.0	0.4	2.1	1.234	104.3±5.0	18.0±0.6	S4
9.0	24.0	0.2	2.1	1.234	119.0±7.0	24.0±1.4	S4, S6
9.0	24.0	0.8	3.0	1.234	86.1±3.7	14.3±0.4	S4
9.0	24.0	0.2	3.0	1.234	126.2±6.9	23.7±1.1	S4, S6
9.0	24.0	0.2	4.2	1.234	137.1±8.3	24.2±1.4	S4
9.0	36.0	0.4	1.5	1.234	94.3±4.1	19.6±0.9	S5, S13b
9.0	36.0	0.2	2.1	1.234	110.0±6.2	22.7±1.0	S6
9.0	36.0	0.4	3.0	1.234	113.7±6.0	16.2±0.7	S6
9.0	36.0	0.2	3.0	1.234	122.0±7.8	19.8±0.7	S6

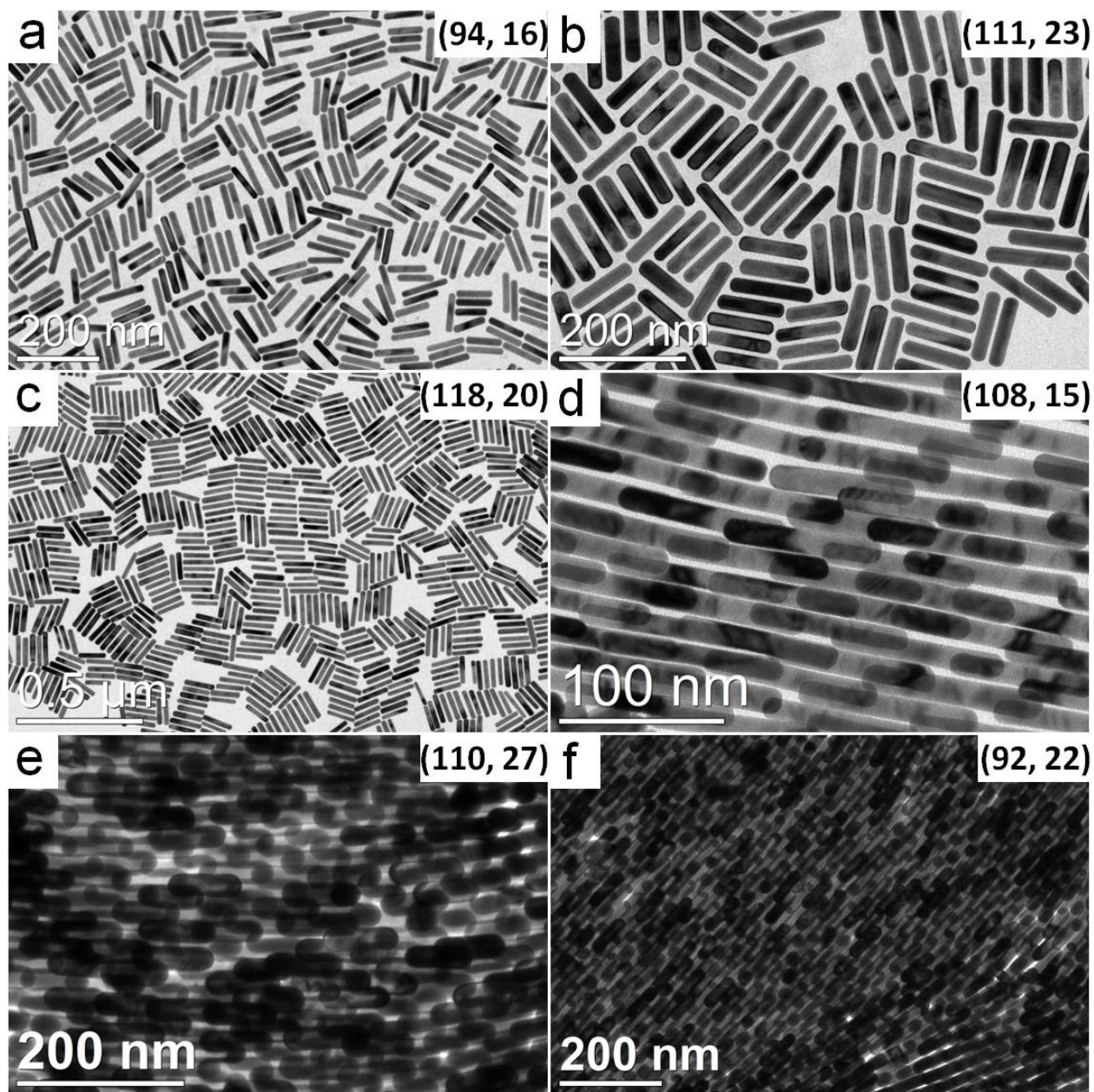


Figure S2. (a-f) TEM images of gold NRs having LSPR wavelengths longer than 700 nm and diameters less than 30 nm. Insets are the average length and diameter (in nm) of the NRs determined by measuring the dimensions of at least 50 NRs from their TEM images. NR growth conditions are detailed in Table S2.

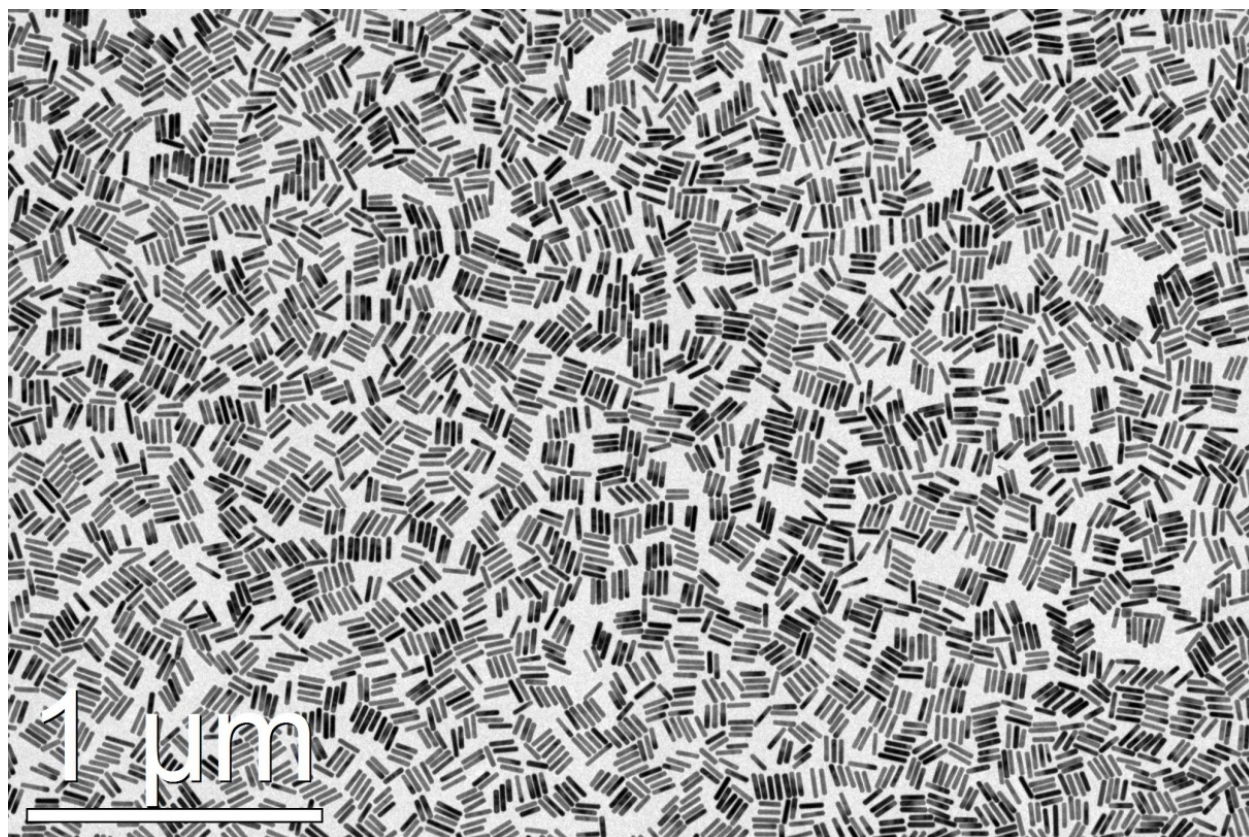


Figure S3. Large area TEM image of the same gold NRs shown in Figure 1e. The dimensions of the NRs are (89.3 ± 4.1) nm \times (16.7 ± 0.8) nm. The growth conditions are detailed in Table S2.

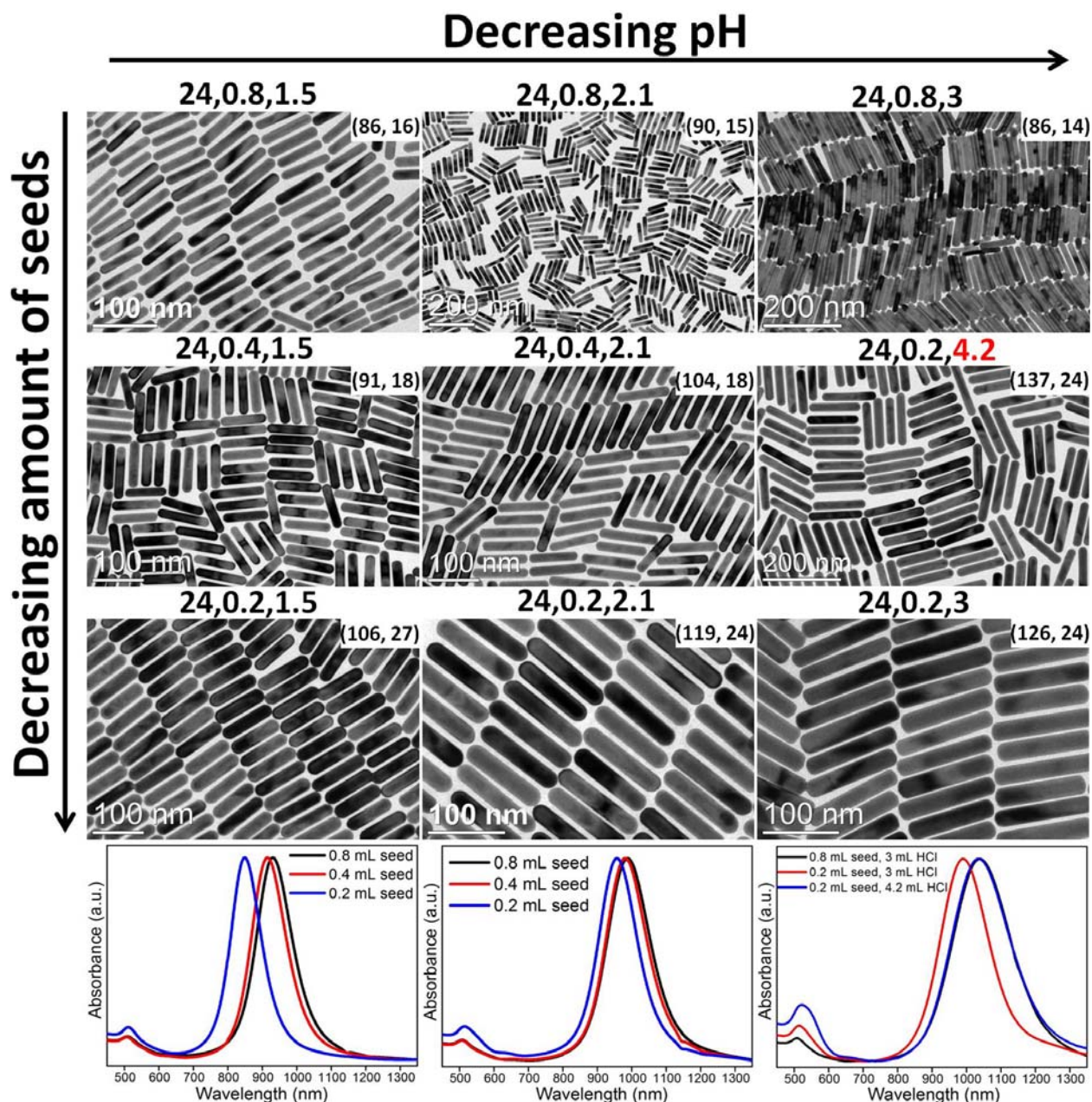


Figure S4. TEM images of gold NRs having LSPR wavelengths longer than 700 nm and diameters less than 30 nm. Insets are the average length and diameter (in nm) of the NRs determined by measuring the dimensions of at least 50 NRs from their TEM images. All NRs were synthesized using 0.047 M CTAB and 1.234 g of NaOL in the growth solution. The amounts (in mL) of 4mM AgNO₃ solution, seed solution and HCl added to the growth solution are provided above the TEM image of corresponding NR sample. Normalized extinction spectra of gold NRs are shown at the bottom of each column.

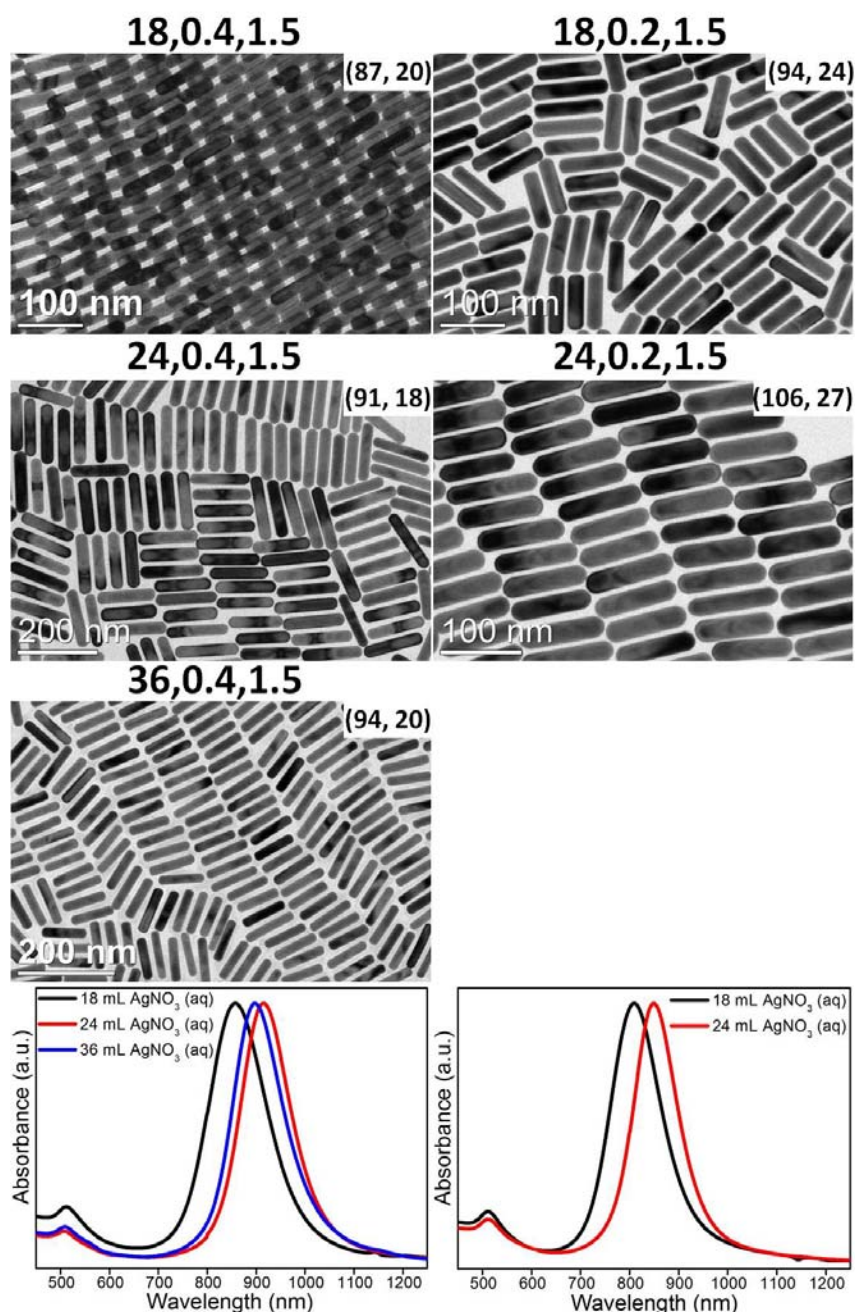


Figure S5. TEM images of gold NRs having LSPR wavelengths longer than 700 nm and diameters less than 30 nm. Insets are the average length and diameter (in nm) of the NRs determined by measuring the dimensions of at least 50 NRs from their TEM images. All NRs were synthesized using $\sim 0.047\text{M}$ CTAB and 1.234 g of NaOL in the growth solution. The amounts (in mL) of 4mM AgNO_3 solution, seed solution and HCl added to the growth solution are provided above the TEM image of corresponding NR sample. Normalized extinction spectra of gold NRs are shown at the bottom of each column.

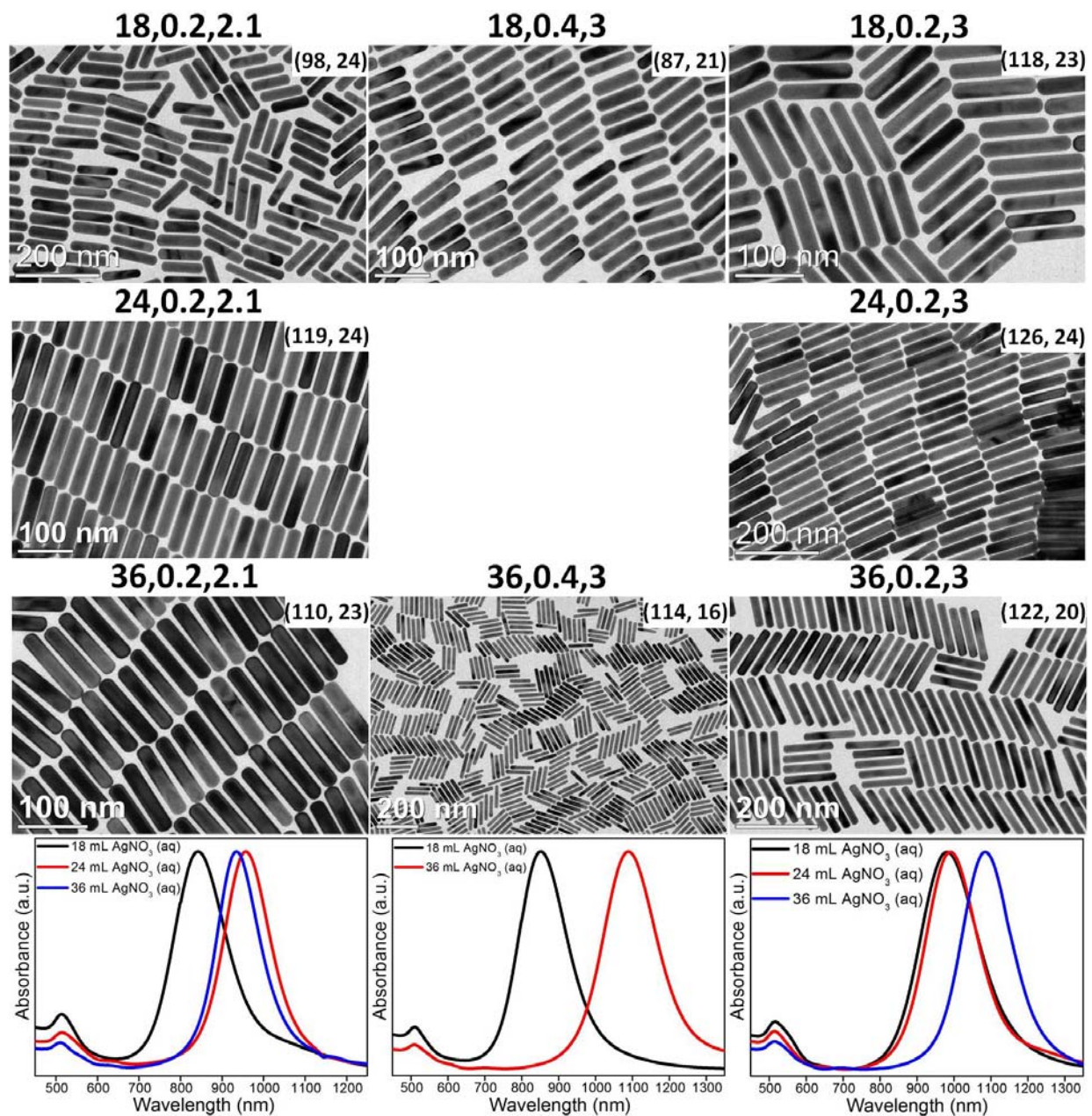


Figure S6. TEM images of gold NRs having LSPR wavelengths longer than 700 nm and diameters less than 30 nm. Insets are the average length and diameter (in nm) of the NRs determined by measuring the dimensions of at least 50 NRs from their TEM images. All NRs were synthesized using $\sim 0.047\text{M}$ CTAB and 1.234 g of NaOL in the growth solution. The amounts (in mL) of 4mM AgNO₃ solution, seed solution and HCl added to the growth solution are provided above the TEM image of corresponding NR sample. Normalized extinction spectra of gold NRs are shown at the bottom of each column.

Table S3. Growth conditions for gold NRs with LSPR wavelengths longer than 650 nm and diameters between 25 and 45 nm.

CTAB (g)	AgNO ₃ (mL)	Seed (mL)	HCl (mL)	NaOL (g)	Average length (nm)	Average diameter (nm)	Figure number
7.0	12.0	0.8	2.1	1.234	91.7±4.3	41.8±2.2	3a
7.0	24.0	0.4	1.5	1.234	115.1±6.4	38.7±1.6	3c
7.0	24.0	0.1	3.0	1.543	122.1±7.5	41.2±3.3	S7a
9.0	18.0	0.05	1.5	1.234	118.8±4.6	38.9±2.4	3d
9.0	18.0	0.4	2.1	1.543	90.0±3.0	30.1±1.1	3e
9.0	18.0	0.2	2.1	1.543	99.1±6.1	35.7±2.0	S7b
9.0	24.0	0.2	1.5	1.234	111.8±5.0	33.2±1.3	3h, S7c
9.0	24.0	0.1	1.5	1.234	125.0±5.5	40.1±1.9	3f
9.0	24.0	0.2	2.1	1.234	119.0±7.0	24.0±1.4	S4
9.0	24.0	0.1	2.1	1.234	124.8±6.6	34.7±1.8	3i
9.0	24.0	0.2	3.0	1.234	129.4±8.2	31.4±2.5	S7d
9.0	24.0	0.05	3.0	1.234	134.9±8.0	30.7±1.8	3k, S7e
9.0	24.0	0.05	3.6	1.234	142.8±6.5	30.1±1.9	S7f
9.0	24.0	0.05	4.2	1.234	147.0±6.3	29.6±1.2	3l

9.0	24.0	0.2	1.5	1.543	113.7±6.2	41.8±2.4	3b, S7g
9.0	24.0	0.2	2.1	1.543	105.0±5.7	32.2±1.7	3g
9.0	24.0	0.2	3.0	1.543	113.8±5.4	25.2±1.2	S7h
9.0	30.0	0.2	1.5	1.234	106.5±6.8	28.2±1.8	S7i
9.0	36.0	0.2	3.0	1.234	131.5±5.5	27.4±1.6	S7j
9.0	48.0	0.2	2.1	1.234	122.9±7.8	28.7±2.0	S7k
9.0	48.0	0.1	2.1	1.234	134.3±7.3	37.1±2.2	3j

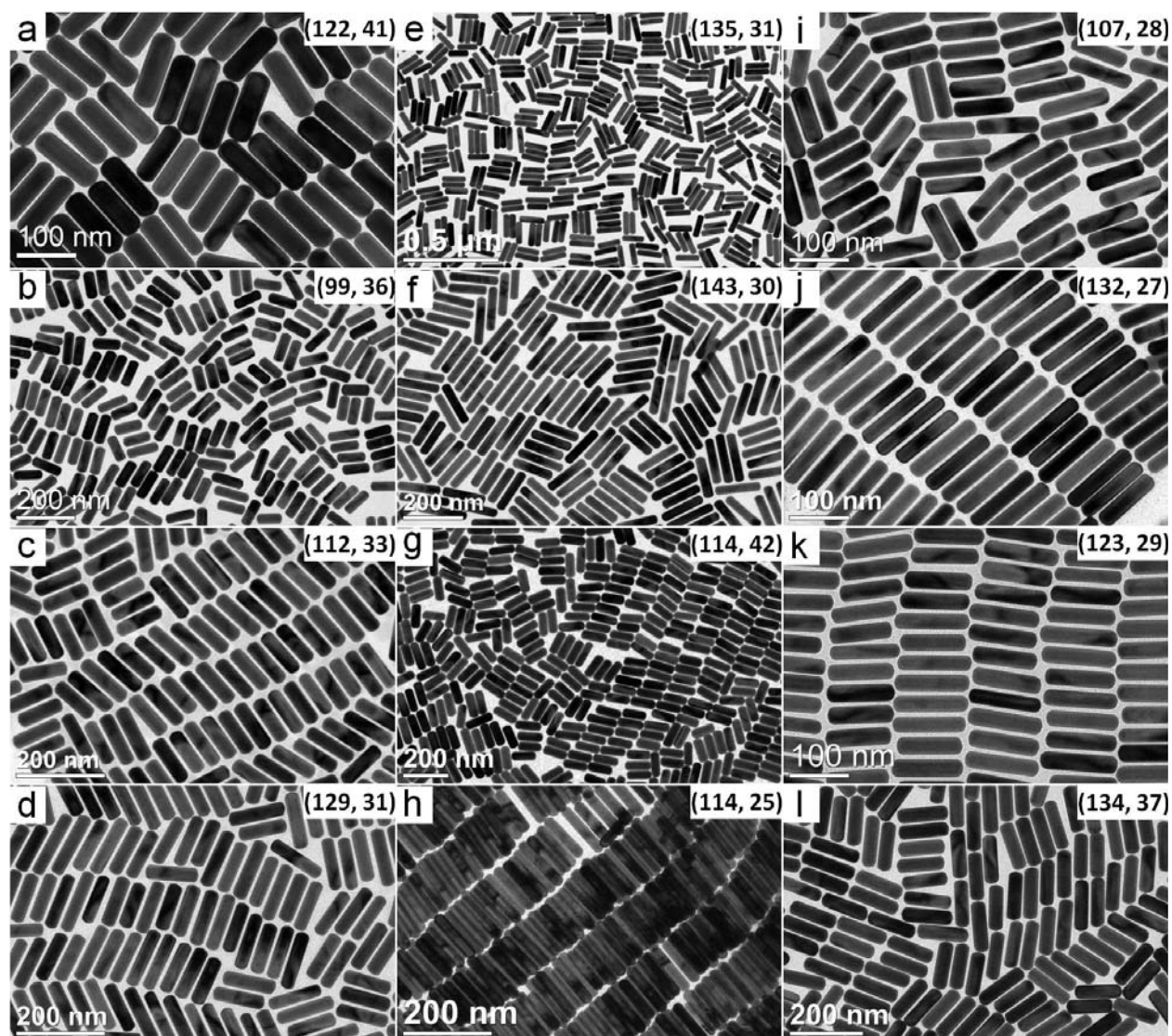


Figure S7. (a-l) TEM images of gold NRs having LSPR wavelengths longer than 650 nm and diameters between 30 and 45 nm. Insets are the average length and diameter (in nm) of the NRs determined by measuring the dimensions of at least 50 NRs from their TEM images. NR growth conditions are detailed in Table S3.

Table S4. Growth conditions for gold NRs with LSPR wavelengths longer than 700 nm and diameters greater than 45 nm.

CTAB (g)	AgNO ₃ (mL)	Seed (mL)	HCl (mL)	NaOL (g)	Average length (nm)	Average diameter (nm)	Figure number
7.0	12.0	0.8	2.1	1.543	109.2±9.1	54.4±3.0	S8a
7.0	24.0	0.2	1.5	1.234	124.7±7.8	52.2±2.1	5c, 5d
9.0	18.0	0.01	1.5	1.234	151.4±8.3	81.7±4.3	5a, 5b, S11c
9.0	24.0	0.01	3.0	1.234	171.9±12.3	48.9±3.0	S8c, S8d
9.0	24.0	0.01	3.6	1.234	173.3±8.0	51.8±2.6	5g, S8b
9.0	24.0	0.1	1.5	1.543	115.7±5.9	47.9±1.9	5e
9.0	24.0	0.01	3.0	1.543	163.0±10.7	74.9±4.0	5f

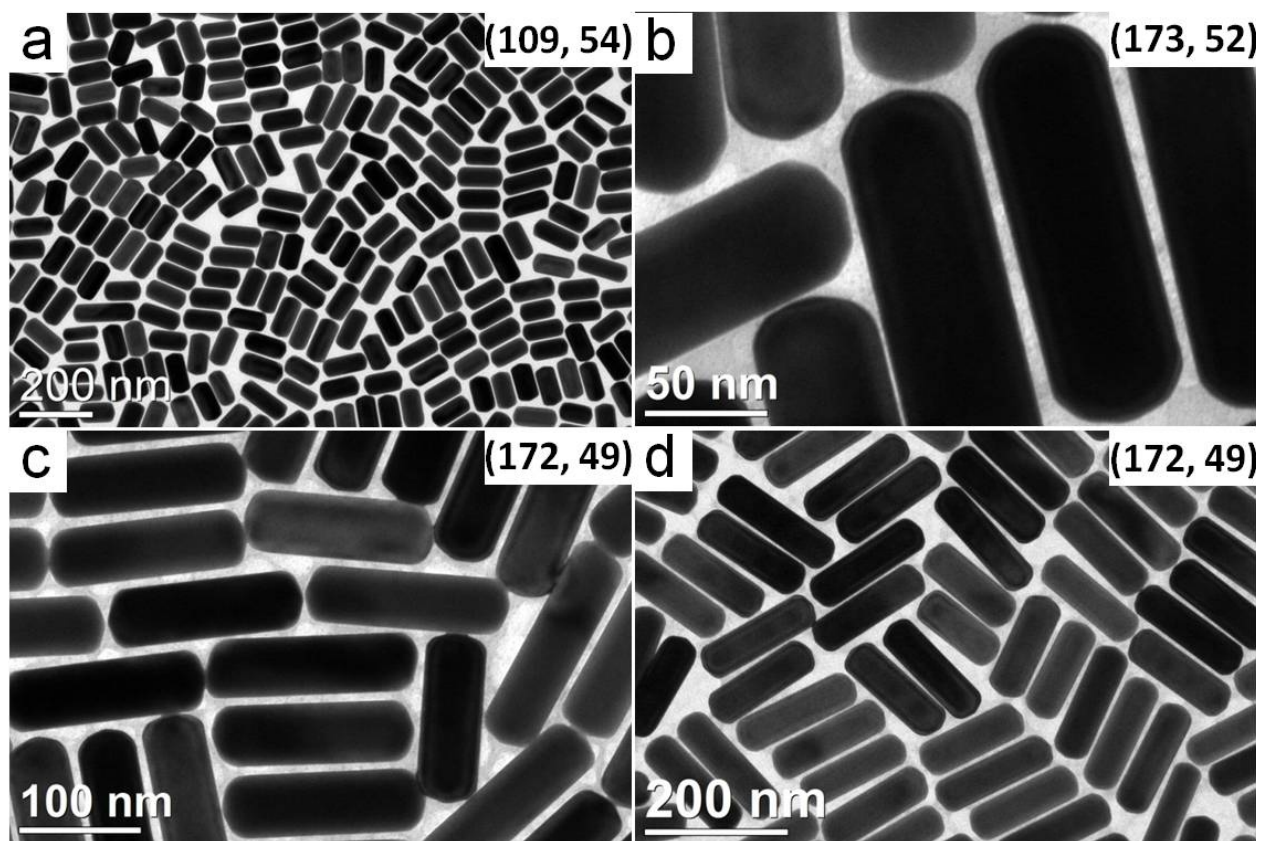


Figure S8. (a-d) TEM images of gold NRs having LSPR wavelengths longer than 700 nm and diameters greater than 45 nm. Insets are the average length and diameter (in nm) of the NRs determined by measuring the dimensions of at least 50 NRs from their TEM images. NR growth conditions are detailed in Table S4.

Table S5. Growth conditions for gold NRs with LSPR wavelengths shorter than 700 nm and diameters greater than 50 nm.

CTAB (g)	AgNO ₃ (mL)	Seed (mL)	HCl (mL)	NaOL (g)	Average length (nm)	Average diameter (nm)	Figure number
7.0	12.0	0.2	1.0	1.234	114.1±6.8	63.2±3.4	S10a, S10b
7.0	12.0	0.2	1.5	1.234	101.7±5.0	58.5±2.8	S10c, S10d
7.0	12.0	0.2	2.1	1.543	187.2±10.5	133.6±6.0	6f
7.0	12.0	0.2	3.0	1.543	115.4±6.2	64.6±3.0	S10e
7.0	18.0	0.4	1.5	1.234	140.0±5.0	84.7±3.7	6g-i, S9, S11a-b, S14c
7.0	18.0	0.2	1.5	1.234	113.0±4.9	59.6±2.6	6b, S11g
9.0	12.0	0.8	1.0	1.543	110.0±8.9	69.8±3.8	S10f
9.0	12.0	0.05	1.5	1.543	114.2±5.1	69.8±3.1	6d, 8a, 8b, S11d-f
9.0	12.0	0.01	1.5	1.543	173.7±9.1	115.6±4.0	6e, 8d, 8e
9.0	12.0	0.01	2.1	1.543	136.0±8.8	80.0±5.5	S10g, S10h
9.0	12.0	0.01	3.0	1.543	131.3±5.8	66.0±3.4	6c
9.0	18.0	0.4	1.5	1.543	88.2±4.0	40.0±1.6	S10i, S10j
9.0	18.0	0.2	1.5	1.543	105.3±4.5	49.9±2.0	6a, S11h, S11i

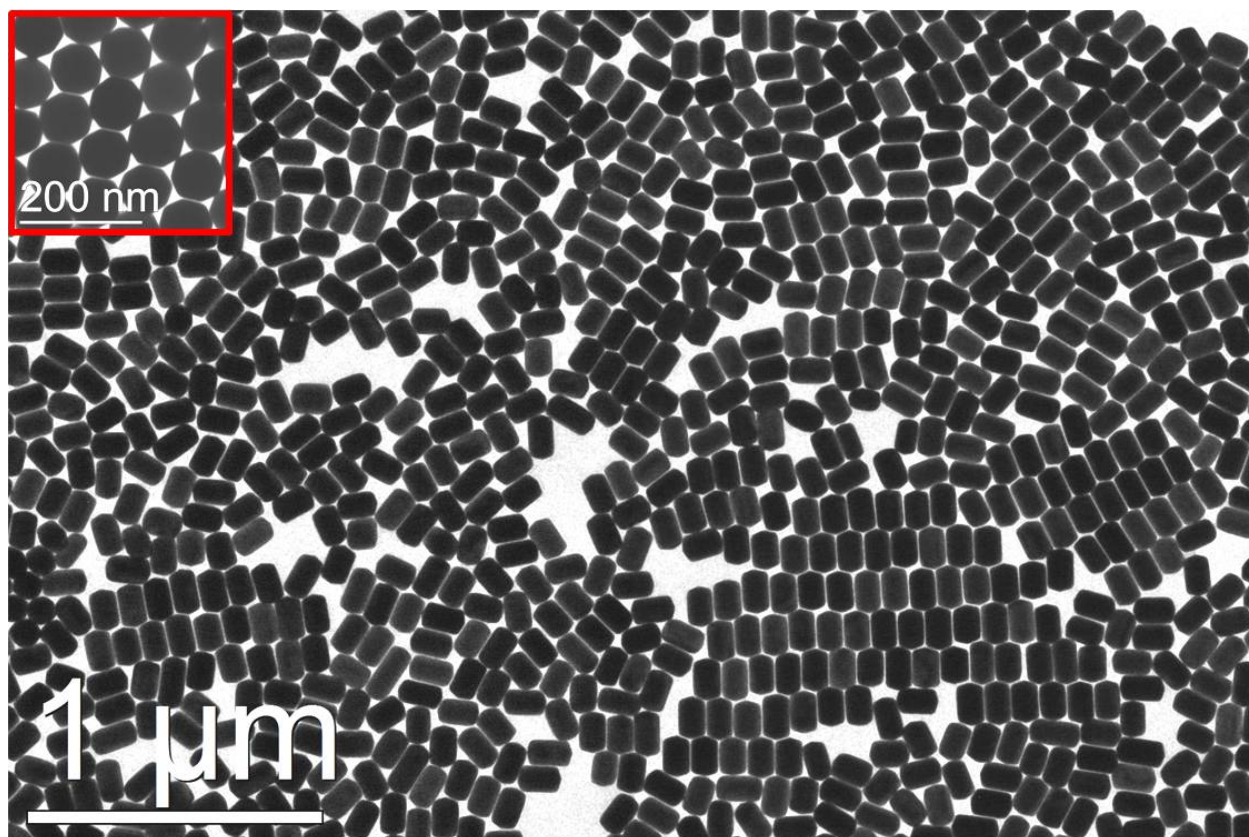


Figure S9. Large area TEM image of the same gold NRs shown in Figures 6g-i. The dimensions of the NRs are $(140.0 \pm 5.0) \text{ nm} \times (84.7 \pm 3.7) \text{ nm}$. The growth conditions are detailed in Table S5.

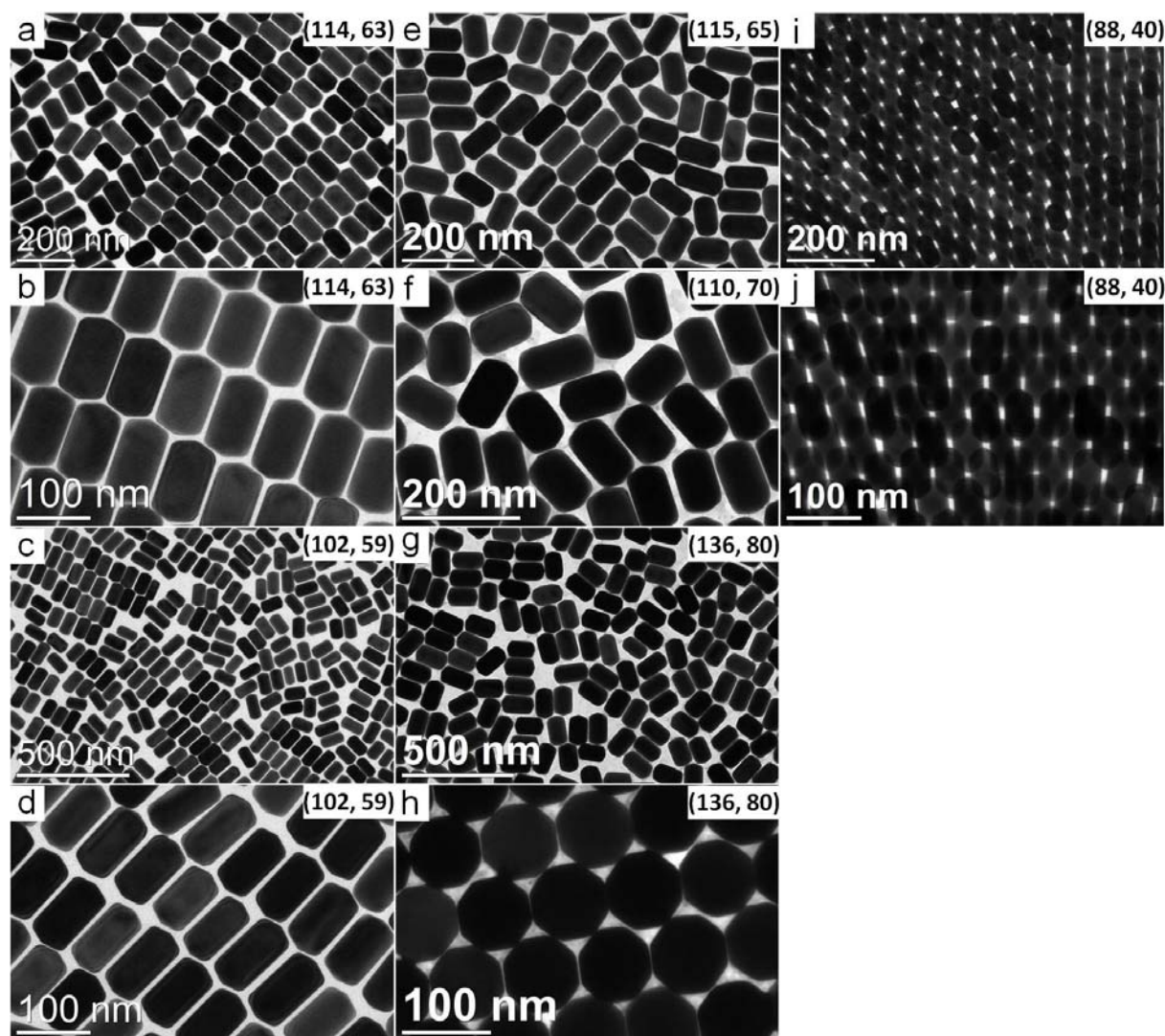


Figure S10. (a-j) TEM images of gold NRs having LSPR wavelengths shorter than 700 nm and diameters greater than 40 nm. Insets are the average length and diameter (in nm) of the NRs determined by measuring the dimensions of at least 50 NRs from their TEM images. NR growth conditions are detailed in Table S5.

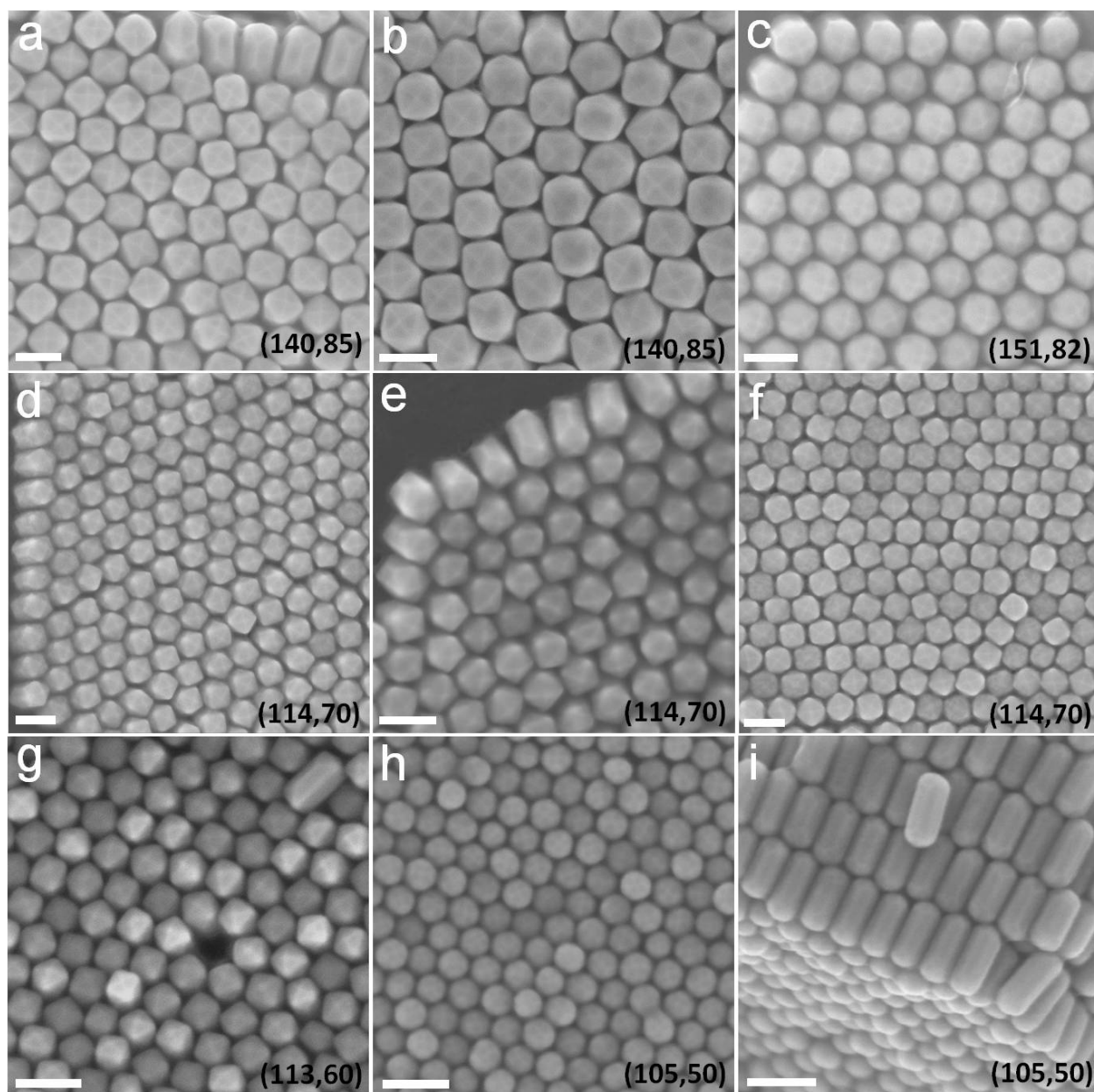


Figure S11. Additional SEM images of ETTH-shaped gold NRs having LSPR wavelengths shorter than 700 nm and diameters greater than 50 nm. Insets are the average length and diameter (in nm) of the NRs determined by measuring the dimensions of at least 50 NRs from their TEM images. All scale bars represent 100 nm. Correlations between the same sample's TEM and SEM image are: (a, b) Figures 6g-i and Figure S9. (c) Figures 5a, 5b. (d-f) Figures 6d, 8a, 8b. (g) Figure 6b. (h, i) Figure 6a.

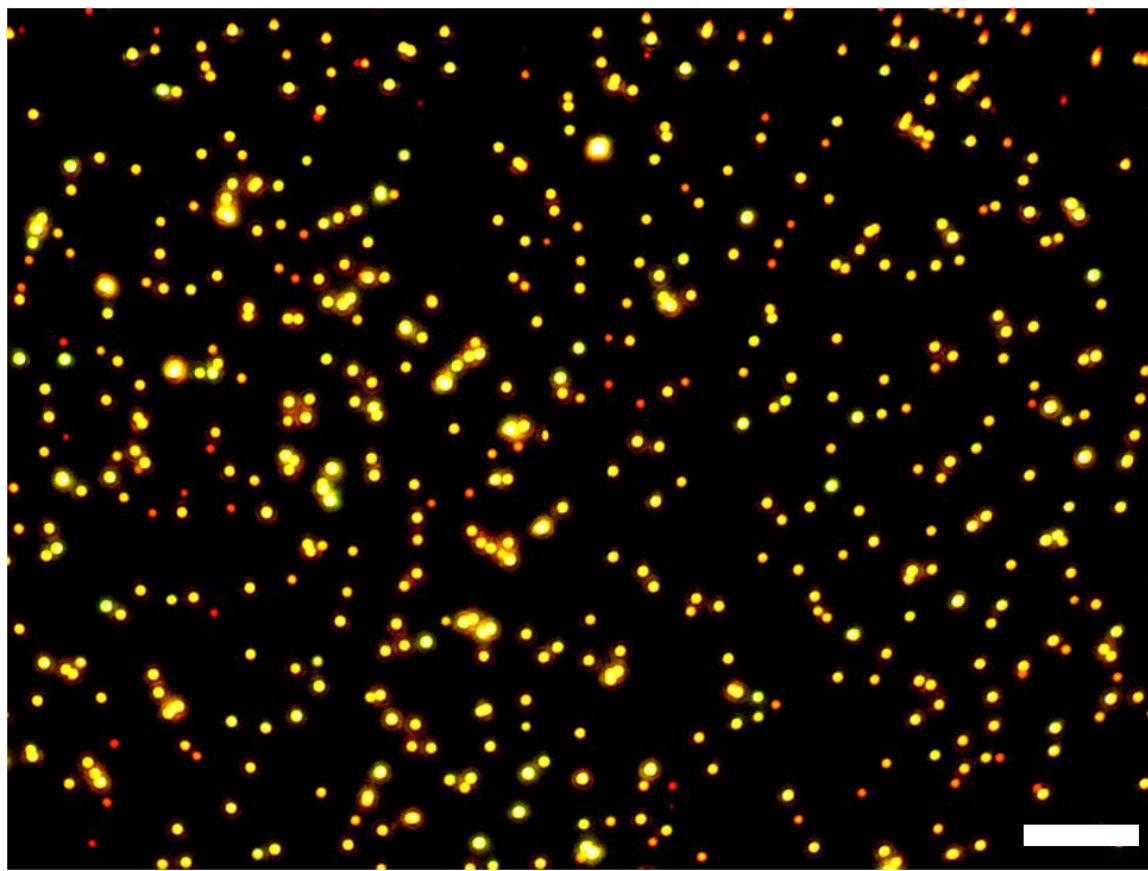


Figure S12. Far-field dark-field scattering image of gold NRs deposited on a glass cover slip. The dimensions of the NRs are (140.0 ± 5.0) nm x (84.7 ± 3.7) nm (the same sample shown in Figures 6g-i and Figure S9). Scale bar: 10 μ m.

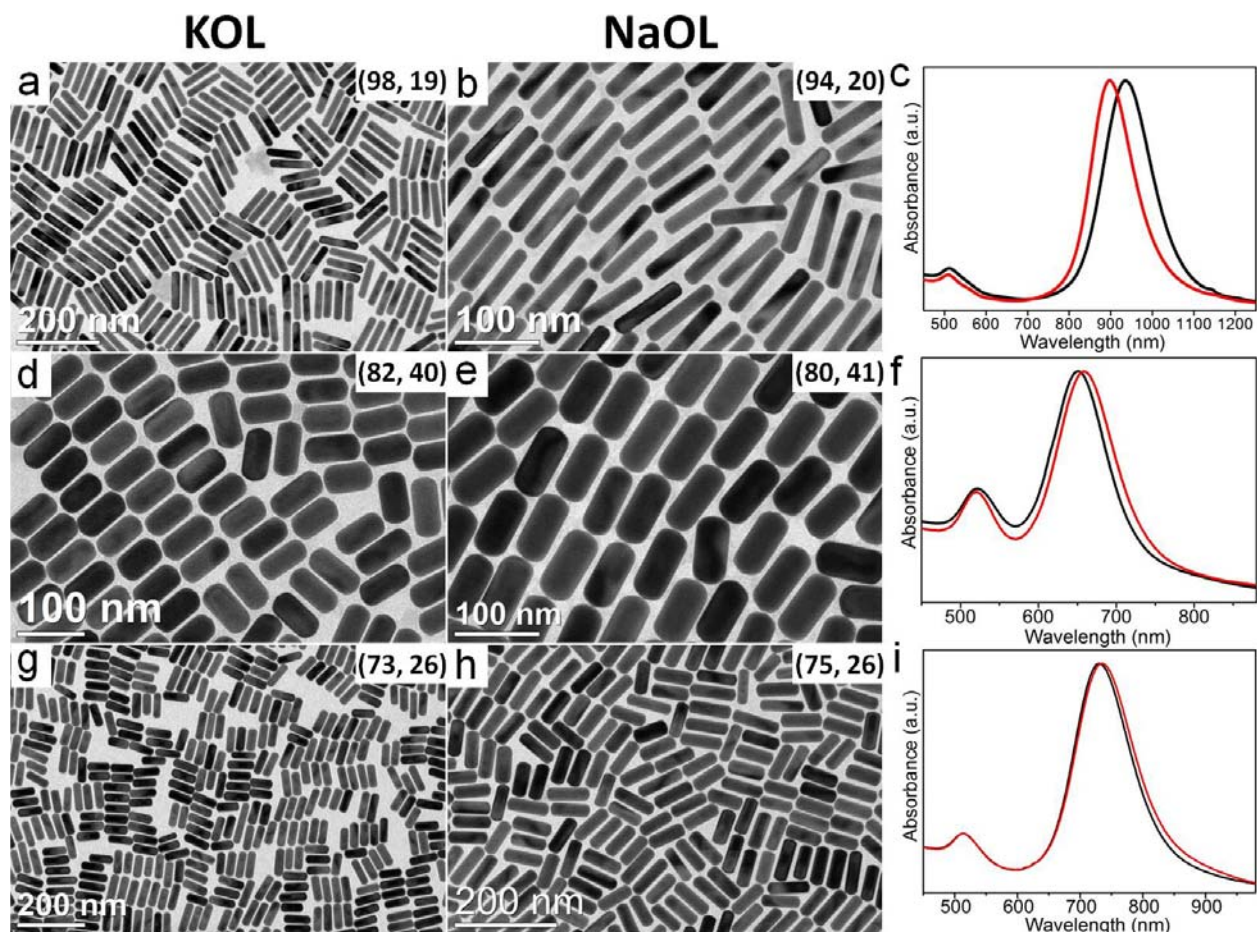


Figure S13. (a, b) TEM images of gold NRs synthesized using identical growth conditions as detailed in Table S2 except with (a) 1.303 g of potassium oleate (KOL) and (b) 1.234 g of NaOL. (c) Normalized extinction spectra of gold NRs shown in a (black curve) and b (red curve). (d, e) TEM images of gold NRs synthesized with (d) 1.629g of KOL and (e) 1.543g of NaOL. Other synthetic parameters are: 9.0 g of CTAB, 12 mL of 4 mM AgNO_3 solution, 0.4 mL of seed solution and 1.5 mL of HCl. (f) Normalized extinction spectra of gold NRs shown in d (black curve) and e (red curve). (g, h) TEM images of gold NRs synthesized with (g) 1.629 g of KOL and (h) 1.543 g of NaOL. Other synthetic parameters are: 9.0 g of CTAB, 12 mL of 4 mM AgNO_3 solution, 0.4 mL of seed solution and 2.1 mL of HCl. (i) Normalized extinction spectra of gold NRs shown in d (black curve) and e (red curve). Insets are the average length and diameter (in nm) of the NRs determined by measuring the dimensions of at least 50 NRs from their TEM images.

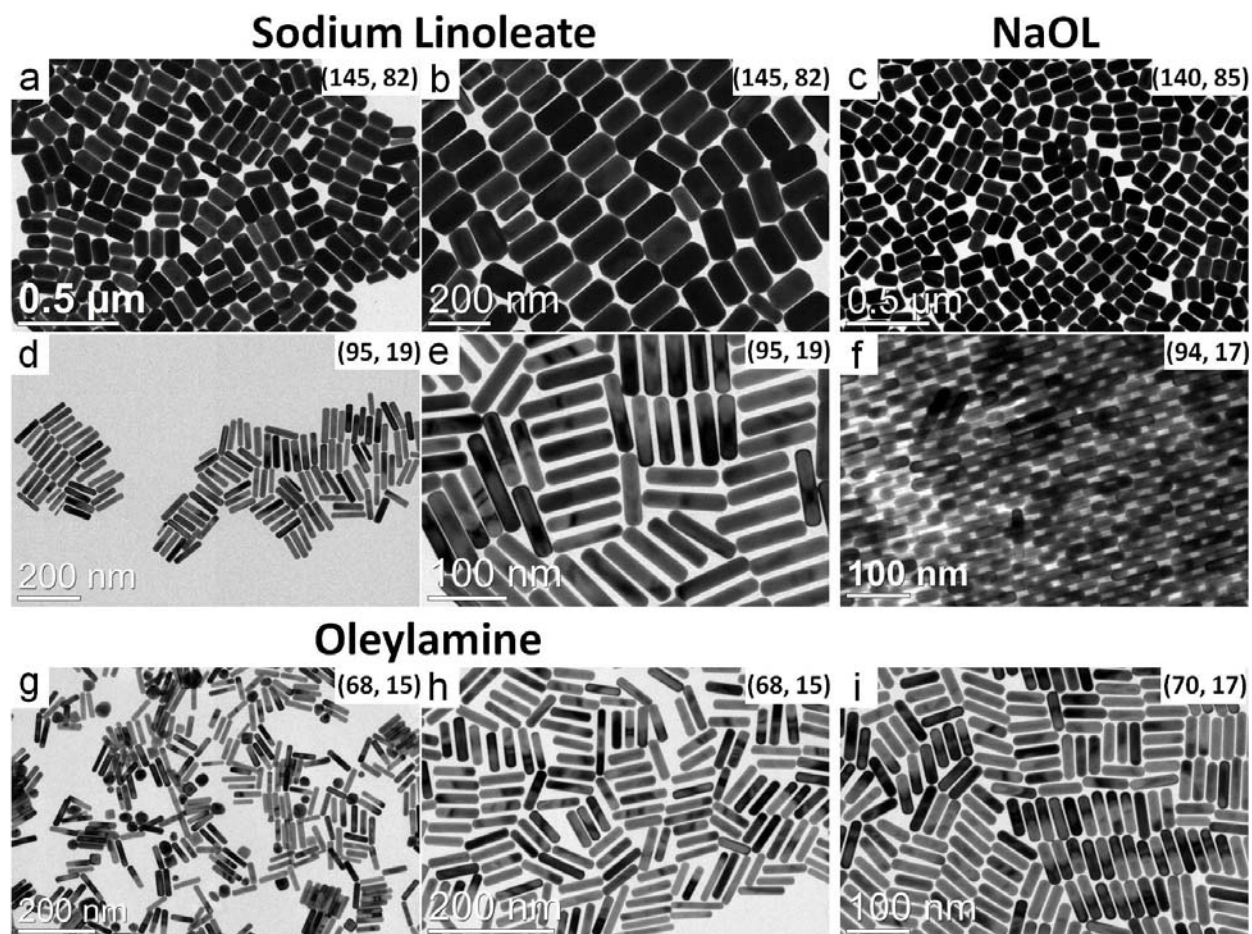


Figure S14. (a-c) TEM images of gold NRs synthesized using identical growth conditions as detailed in Table S5 except with (a, b) 1.234 g of sodium linoleate and (c) 1.234 g of NaOL. (d-f) TEM images of gold NRs synthesized using identical growth conditions as detailed in Table S2 except with (d, e) 1.234 g of sodium linoleate and (f) 1.234 g of NaOL. (g-i) TEM images of gold NRs synthesized using identical growth conditions as detailed in Table S2 except with (g, h) 4 mmol of oleylamine and (i) 1.234 g of NaOL.

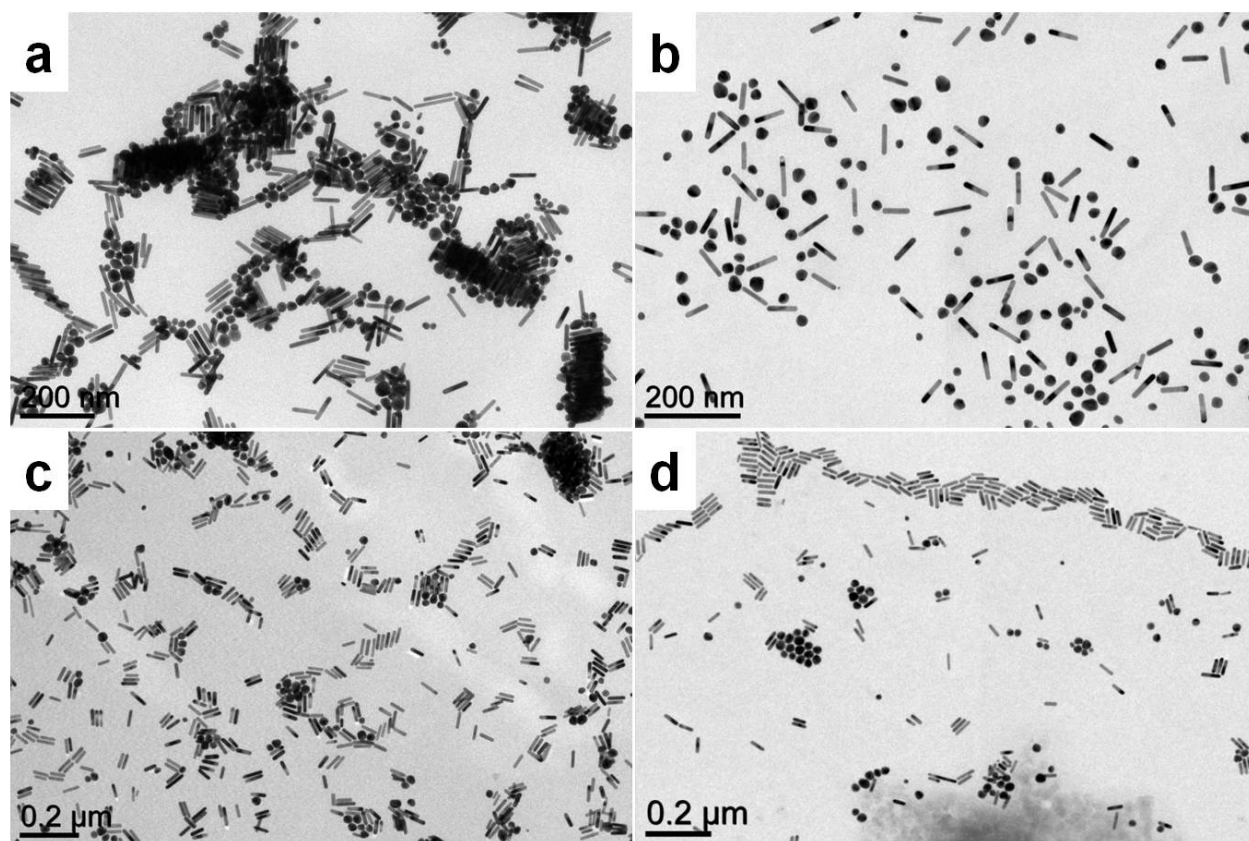


Figure S15. TEM images of gold NRs synthesized by replacing NaOL with same amount of sodium stearate. 4.5 mL of 0.064 M AA was used for all reactions to ensure complete reduction of Au^{3+} before injection of seed particles. Other synthetic parameters are: (a) 7.0 g of CTAB, 12 mL of 4 mM AgNO_3 solution, 0.8 mL of seed solution, 2.1 mL of HCl and 1.553 g of sodium stearate. (b) 9.0 g of CTAB, 18 mL of 4 mM AgNO_3 solution, 0.4 mL of seed solution, 1.5 mL of HCl and 1.242 g of sodium stearate. (c) 9.0 g of CTAB, 12 mL of 4 mM AgNO_3 solution, 0.2 mL of seed solution, 1.5 mL of HCl and 1.553g of sodium stearate. (d) 9.0 g of CTAB, 12 mL of 4 mM AgNO_3 solution, 0.4 mL of seed solution, 1.5 mL of HCl and 1.553g of sodium stearate.

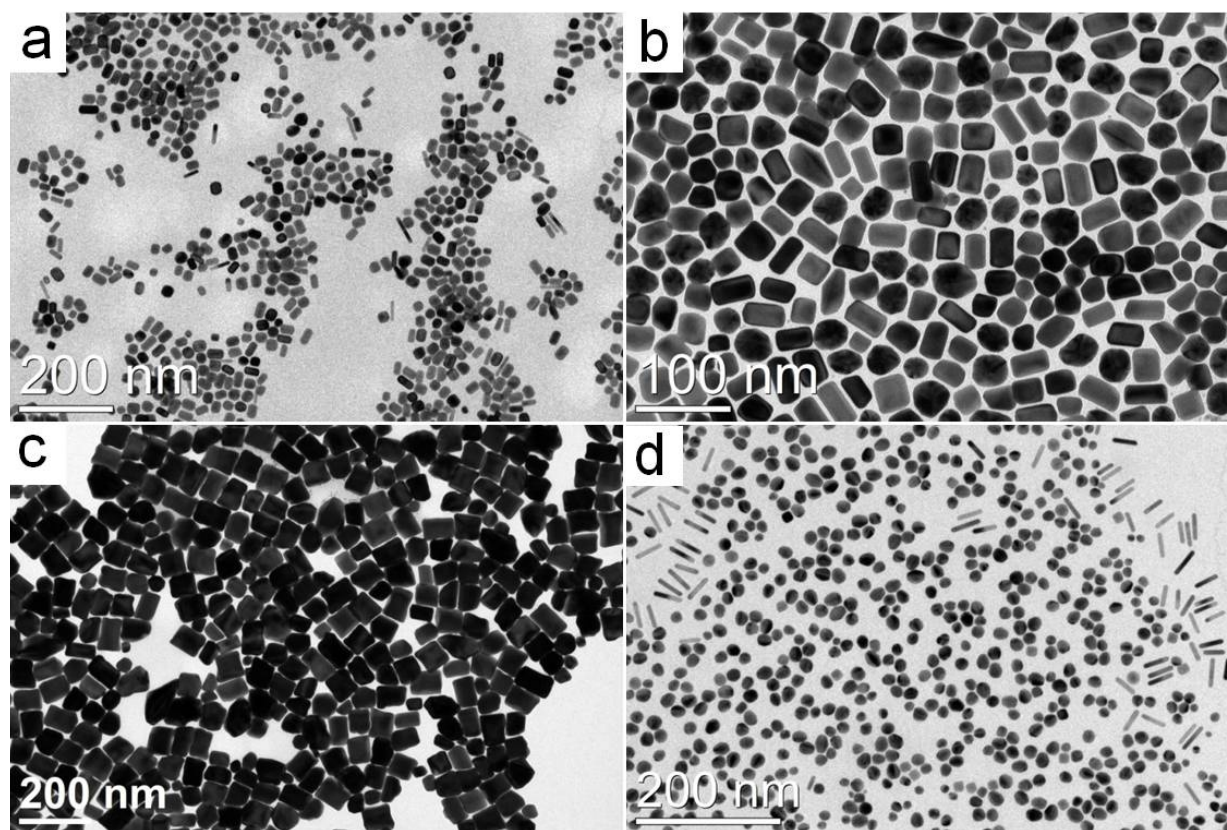


Figure S16. (a-c) TEM images of gold nanocrystals synthesized using 9.0 g of CTAB, 1.543 g of NaOL and 1.25 mL of 0.064 M AA in the growth solution but without the addition of HCl. pH of these growth solutions are measured to be around 5.8 (Table S1). Other synthetic parameters are: (a) 12 mL of 4 mM AgNO_3 solution, 0.8 mL of seed solution. (b) 24 mL of 4 mM AgNO_3 solution, 0.2 mL of seed solution. (c) 12 mL of 4 mM AgNO_3 solution, 0.01 mL of seed solution. (d) TEM image of gold NRs synthesized with 9g of CTAB (0.047 M), 24 mL of 4 mM AgNO_3 solution, 0.4 mL of seed solution, 2.1 mL of HCl and 4.5 mL of 0.064 M AA in the growth solution. pH of the growth solution was measured to be 1.30. It is apparent that with comparable acidity of growth solution, reducing the amount of seed particles under 0.047M CTAB does not lead to the same level of control as CTAB (0.047M)—NaOL system. Gold NRs synthesized using the same growth conditions as (d) except with additional 1.234 g of NaOL can be found in Figure S4.

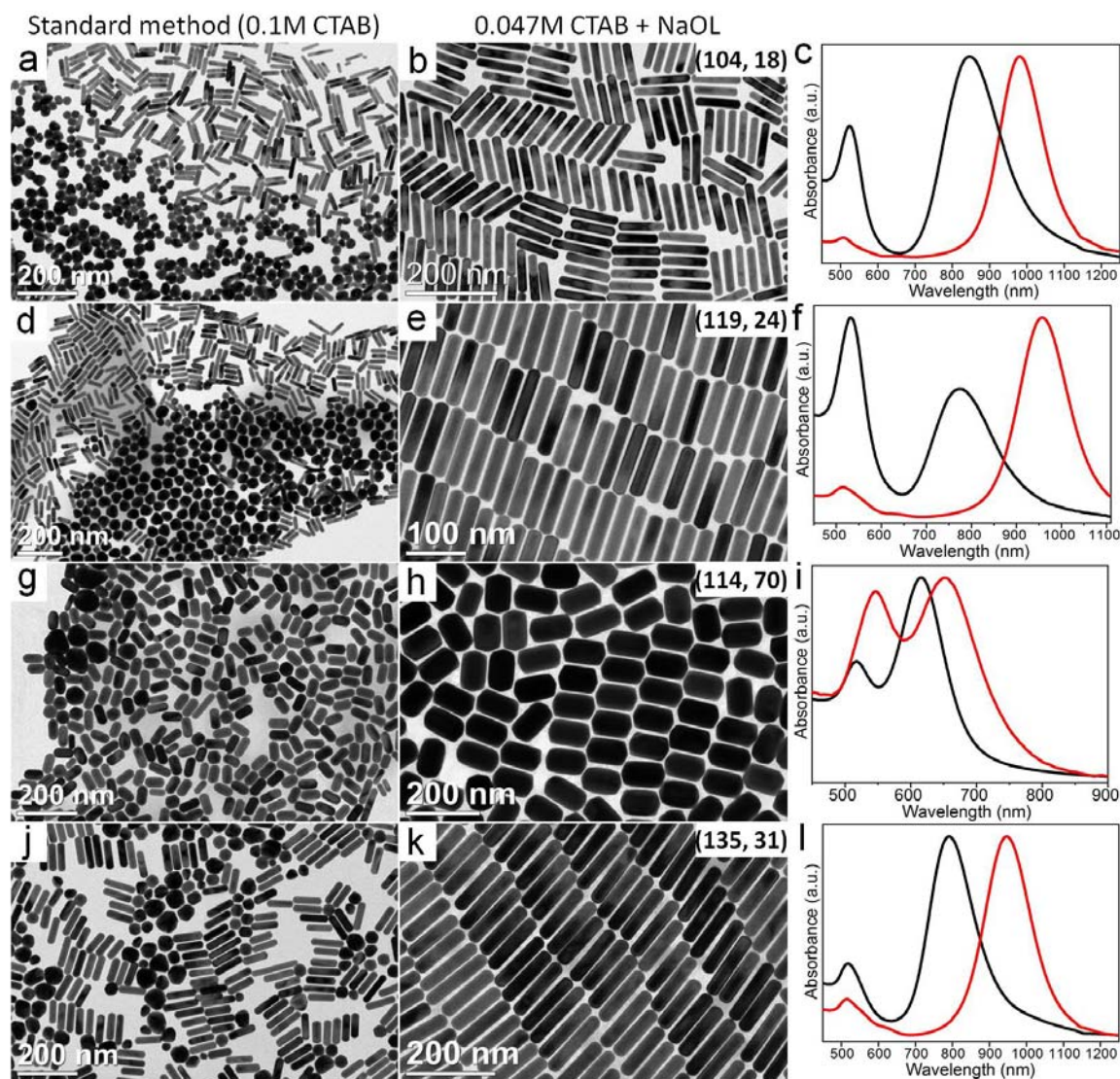


Figure S17. Comparative studies of size uniformity and dimensional tunability of gold NRs synthesized using 0.1 M CTAB (left column) vs. 0.047 M CTAB-NaOL system (middle column). 4.5 mL of 0.064 M AA were used for samples shown in the left column while 1.25 mL of 0.064 M AA were used for samples shown in the middle column. Other synthetic parameters are: (a, b) 24 mL of 4 mM AgNO_3 solution, 0.4 mL of seed solution, 2.3 (a) and 2.1 (b) mL of HCl. (d, e) 24 mL of 4 mM AgNO_3 solution, 0.2 mL of seed solution, 2.3 (d) and 2.1 (e) mL of HCl. (g, h) 12 mL of 4 mM AgNO_3 solution, 0.05 mL of seed solution, 1.7 (g) and 1.5 (h) mL of HCl. (j, k) 24 mL of 4 mM AgNO_3 solution, 0.05 mL of seed solution, 3.3 (j) and 3.0 (k) mL of HCl. 1.234 g of NaOL were used for (b, e, k) and 1.543 g of NaOL for (h). (c, f, i, l) Normalized extinction spectra of gold NRs shown in the corresponding rows synthesized using 0.1 M CTAB (black curves) and 0.047 M CTAB-NaOL system (red curves).

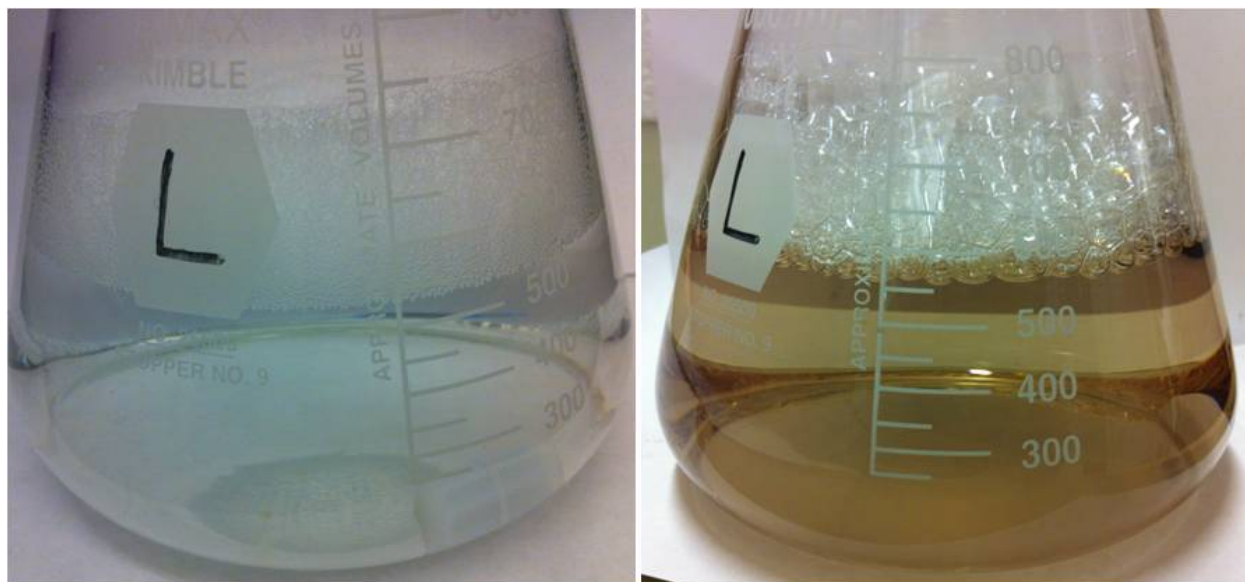


Figure S18. (Left) Photograph of the colorless reaction mixture 90 min after the addition of HAuCl_4 . NaOL molecules reduces Au^{3+} to Au^+ and AA has not been added to the growth solution at this point. (Right) Photograph of the reaction mixture 120 min after the injection of seed particles. 2.1 mL of HCl was employed for this reaction. The absence of a reddish hue in the growth solution is indicative of a very low concentration of spherical shape impurities.

Table S6. Comparison of dimensions of gold NRs synthesized under identical growth conditions except with different amounts of NaOL.

CTAB (g)	AgNO ₃ (mL)	Seed (mL)	HCl (mL)	NaOL (g)	Average length (nm)	Average diameter (nm)	Figure number
9.0	18.0	0.2	3.0	1.543	109.5±5.7	27.3±1.9	S2e
9.0	18.0	0.2	3.0	1.234	118.4±8.3	22.7±1.6	S6
9.0	24.0	0.4	2.1	1.543	92.2±4.8	22.1±1.1	S2f
9.0	24.0	0.4	2.1	1.234	104.3±5.0	18.0±0.6	S4
9.0	18.0	0.2	2.1	1.543	99.1±6.1	35.7±2.0	S7b
9.0	18.0	0.2	2.1	1.234	98.2±6.2	23.8±1.1	S6
9.0	24.0	0.2	1.5	1.543	113.7±6.2	41.8±2.4	3b, S7g
9.0	24.0	0.2	1.5	1.234	111.8±5.0	33.2±1.3	3h, S7c
9.0	24.0	0.2	2.1	1.543	105.0±5.7	32.2±1.7	3g
9.0	24.0	0.2	2.1	1.234	119.0±7.0	24.0±1.4	S4, S6
9.0	24.0	0.2	3.0	1.543	113.8±5.4	25.2±1.2	S7h
9.0	24.0	0.2	3.0	1.234	126.2±6.9	23.7±1.1	S4, S6
7.0	12.0	0.8	2.1	1.543	109.2±9.1	54.4±3.0	S8a
7.0	12.0	0.8	2.1	1.234	91.7±4.3	41.8±2.2	3a
9.0	24.0	0.1	1.5	1.543	115.7±5.9	47.9±1.9	5e
9.0	24.0	0.1	1.5	1.234	125.0±5.5	40.1±1.9	3f
9.0	24.0	0.01	3.0	1.543	163.0±10.7	74.9±4.0	5f
9.0	24.0	0.01	3.0	1.234	171.9±12.3	48.9±3.0	S8c, S8d
9.0	18.0	0.4	1.5	1.543	88.2±4.0	40.0±1.6	S10i, S10j
9.0	18.0	0.4	1.5	1.234	86.7±5.1	20.0±1.4	S5
9.0	18.0	0.2	1.5	1.543	105.3±4.5	49.9±2.0	6a, S11h, S11i
9.0	18.0	0.2	1.5	1.234	94.1±4.3	24.2±1.0	S5