Electronic Supplementary Information for:

Spectrum and size-controllable synthesis of high quality gold nanorod using 1,7-dihydroxynaphthalene as a reducing agent

Yuyang Guo,[#,a] Qiuyue Liu,[#,a] Anhua Wei,[a] Suju Jiang,[a] Feifei Chen,[a] Jun Huang,[a] Yimiao He,[a] Guobao Huang,[b] and Zihua Wu*[,a]

[a] Guangxi Key Laboratory of Natural Polymer Chemistry and Physics, College of Chemistry and Materials, Nanning Normal University, Nanning 530001, China

[b] Guangxi Key Laboratory of Agricultural Resources Chemistry and Biotechnology, College of Chemistry and Food Science, Yulin Normal Universal University, Yulin 537000, China

Corresponding author Email: zihuawu@126.com

Tab. S1 A summary of impacts of silver ion on LSPR wavelength, statistical results (length and diameter), and aspect ratio of AuNR. (Other conditions are: 0.1 M CTAB, 0.9 mL reducing agent, and 0.5 mL gold seed)

$AgNO_3$ (mL)	LSPR (nm)	Length (nm)	Diameter (nm)	Aspect ratio	Figure number
0.1	590.5	62.8±4.0	28.9±1.5	2.2	2a
0.125	631	–	–	–	–
0.15	676	–	–	–	–
0.175	703	–	–	–	–
0.2	725	63.8±2.8	20.5±0.7	3.1	2b
0.225	748.5	–	–	–	–
0.25	771	–	–	–	–
0.275	798.5	–	–	–	–
0.3	828.5	71.4±3.8	17.3±0.9	4.3	–
0.325	859.5	–	–	–	–
0.35	893	–	–	–	–
0.375	929	–	–	–	–
0.4	951	81.6±4.2	15.6±0.8	5.2	2c
0.425	982.5	–	–	–	–
0.45	1003	–	–	–	–
0.6	1017	86.7±3.3	14.3±0.5	6.1	2d
0.7	991.5				
0.9	945.5	–	–	–	2e
1.1	895				
1.3	895	66.7±3.7	13.9±0.8	4.8	2f

Tab. S2 A summary of impacts of CTAB on LSPR wavelength, statistical results (length and diameter), and aspect ratio of AuNR. (Other conditions are: 0.6 mL silver ion, 0.9 mL reducing agent, and 0.5 mL gold seed)

CTAB (M)	LSPR (nm)	Length (nm)	Diameter (nm)	Aspect ratio	Figure number
0.01	661	22.4±1.6	9.0±0.6	2.5	4a
0.02	745	–	–	–	–
0.04	828.5	36.0±1.9	9.3±0.5	3.9	4b
0.06	885	–	–	–	–
0.07	926.5	–	–	–	–
0.08	965	58.1±3.4	11.3±0.8	5.1	4c
0.09	1013.5	–	–	–	–
0.10	1033.5	–	–	–	–
0.11	1025.5	–	–	–	–
0.12	990	85.4±5.0	15.4±0.9	5.5	4d
0.14	930.5	83.8±6.2	18.4±1.0	4.6	4e
0.16	899	–	–	–	–
0.18	886	–	–	–	–
0.20	869	79.1±4.2	21.2±1.2	3.7	4f

Tab. S3 A summary of impacts of reducing agent on LSPR wavelength, statistical results (length and diameter), and aspect ratio of AuNR. (Other conditions are: 0.1 M CTAB, 0.6 mL silver ion, and 0.5 mL gold seed)

Reducing agent (mL)	LSPR (nm)	Length (nm)	Diameter (nm)	Aspect ratio	Figure number
0.2	962.5	96.9±5.2	18.7±1.8	5.2	6a
0.3	1006	–	–	–	–
0.4	1032.5	–	–	–	–
0.6	1051	92.7±5.0	14.6±1.3	6.3	6b
0.7	1050	–	–	–	–
0.9	1042	–	–	–	–
1.1	1028	–	–	–	–
1.3	1019	–	–	–	–
1.5	1005	–	–	–	–
1.8	983.5	–	–	–	–
2.2	959.5	75.4±3.4	13.9±0.7	5.4	6c
2.6	944	–	–	–	–
3.2	911	–	–	–	–
3.8	890	56.4±2.5	11.3±0.6	5.0	6d
4.5	865.5	–	–	–	–
5.5	840	–	–	–	–
7.0	804	36.2±1.9	9.1±0.7	4.0	6e

Tab. S4 A summary of impacts of gold seed on LSPR wavelength, statistical results (length and diameter), and aspect ratio of AuNR. (Other conditions are: 0.1 M CTAB, 0.6 mL silver ion, and 0.9 mL reducing agent)

Gold seed (mL)	LSPR (nm)	Length (nm)	Diameter (nm)	Aspect ratio	Figure number
0.005	817	115.7±4.6	31.5±1.9	3.7	8a
0.01	820	–	–	–	–
0.025	834	–	–	–	–
0.05	852.5	–	–	–	–
0.1	876.5	–	–	–	–
0.25	954.5	89.3±4.8	16.0±1.0	5.6	8b
0.5	1010.5	–	–	–	–
1.0	1060	71.3±3.4	10.6±0.7	6.7	8c
1.5	1054	–	–	–	–
2.0	1024	60.0±3.5	10.0±0.7	6.0	8d
2.5	1003	–	–	–	–
3.0	978	–	–	–	–
4.0	941	–	–	–	–
5.0	904	44.4 ± 3.2	8.7 ± 0.4	5.1	8e
6.0	876	–	–	–	–
7.0	854	–	–	–	–
8.0	835.5	–	–	–	–
9.0	816.5	–	–	–	–
10.0	800.5	29.0±2.5	7.3±0.6	4.0	8f

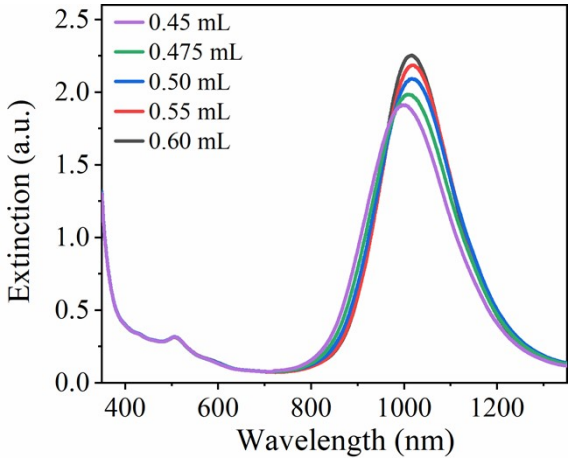

Fig. S1 Extinction spectra of AuNR prepared by increasing silver ion from 0.45 mL to 0.6 mL.

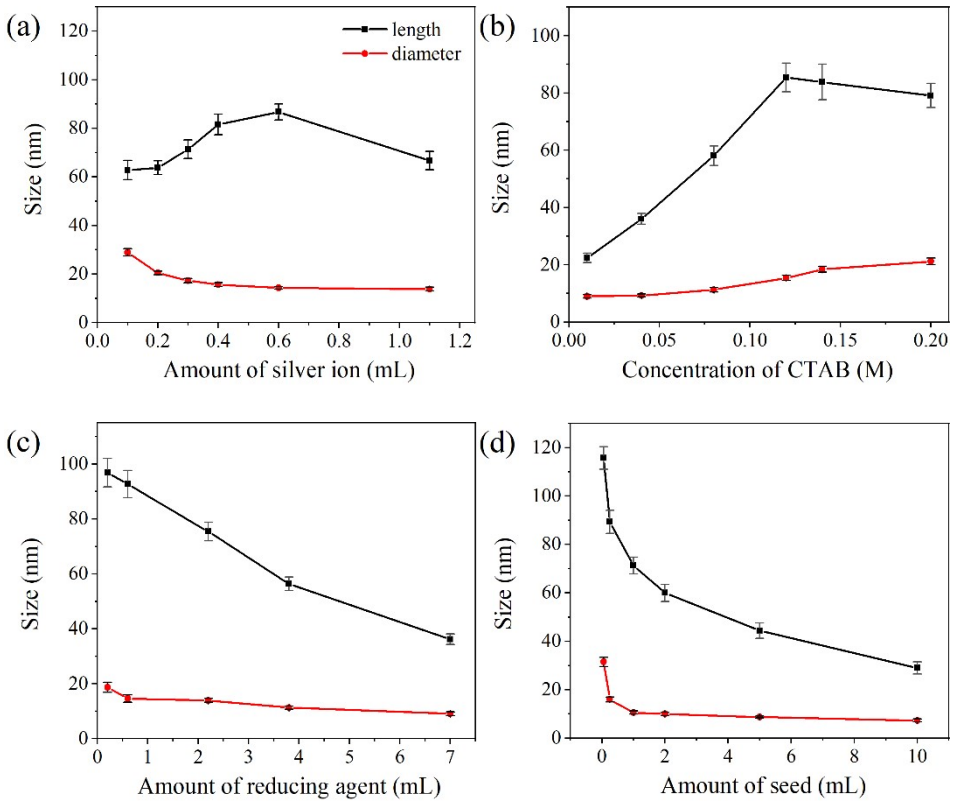

Fig. S2 Variations of size of AuNR as a function of different amount or concentration of (a) silver ion, (b) CTAB, (c) reducing agent and (d) gold seed.

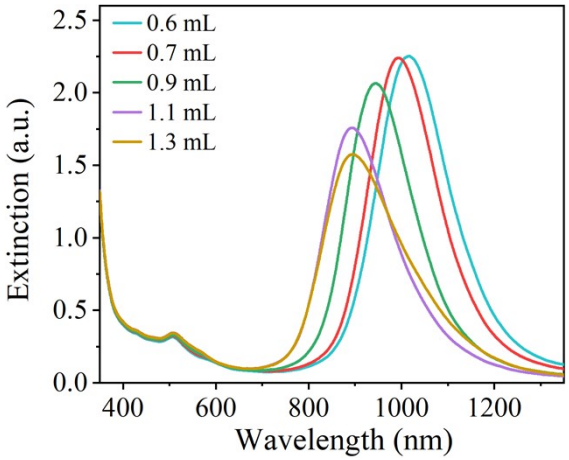

Fig. S3 Extinction spectra of AuNR prepared by increasing the silver ion to above 0.6 mL.

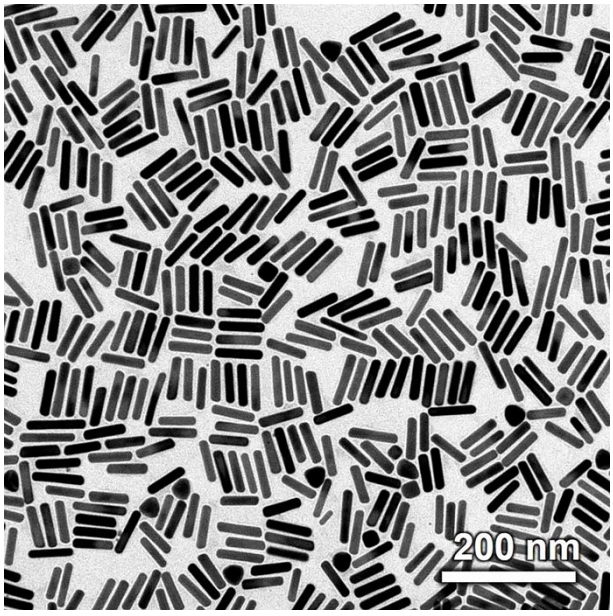

Fig. S4 TEM image of AuNR prepared from 1.3 mL of silver ion.

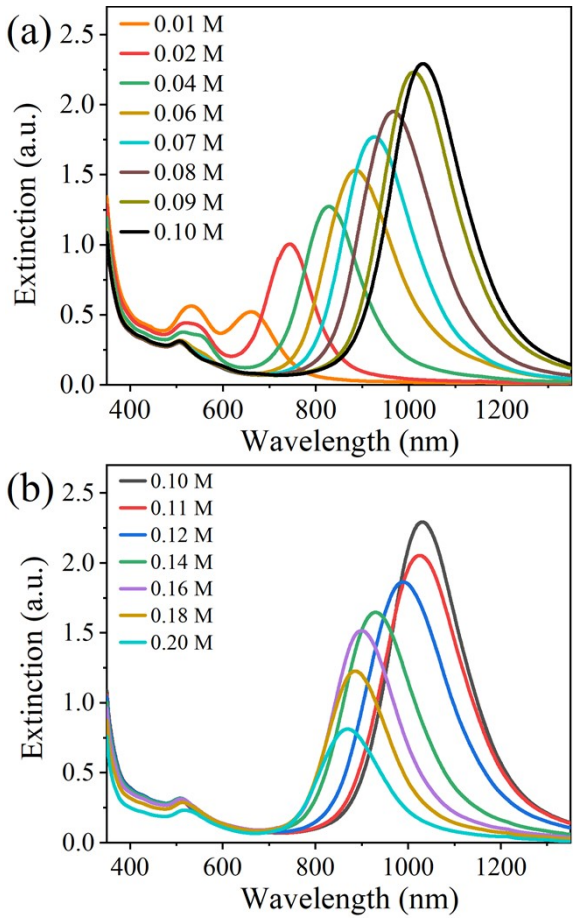

Fig. S5 Extinction spectra of AuNR prepared by increasing the CTAB from (a) 0.01~ 0.10 M and (b) 0.10 ~ 0.20 M.

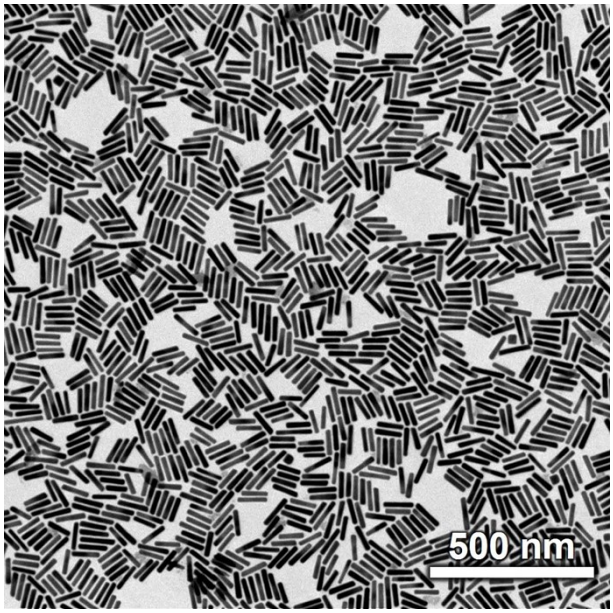

Fig. S6 TEM image of AuNR prepared from 0.9 mL of reduction agent.