Supplementary Information

Impact of BSA and Au^{3+} concentration on the formation and fluorescence properties of Au nanoclusters

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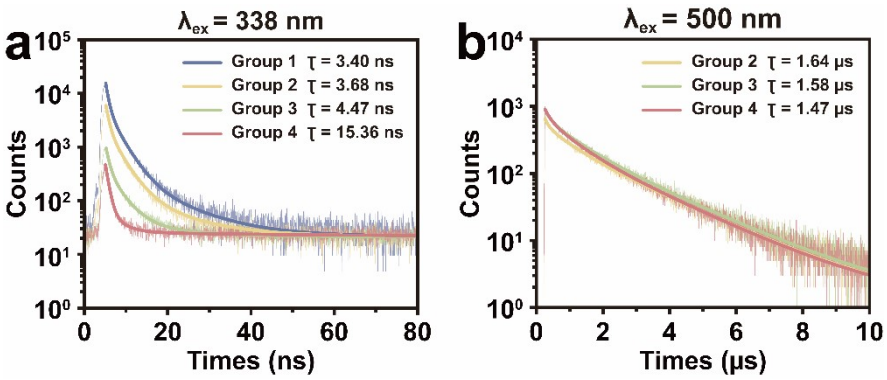

Figure. S1 Fluorescence decay profiles of Groups 1-4 (λ_{ex} = 338 nm and 500 nm).

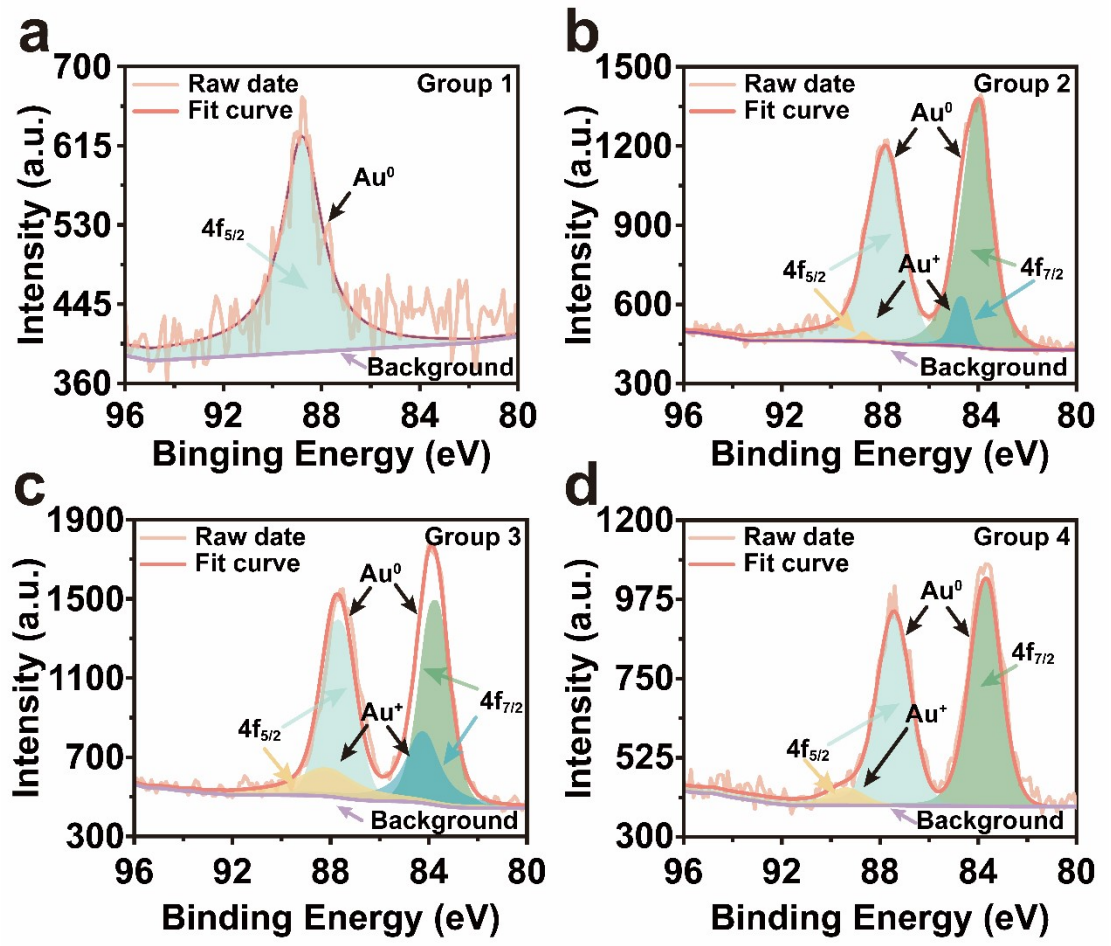

Figure. S2 Au 4f XPS spectrum of Group1, 2, 3 and 4.

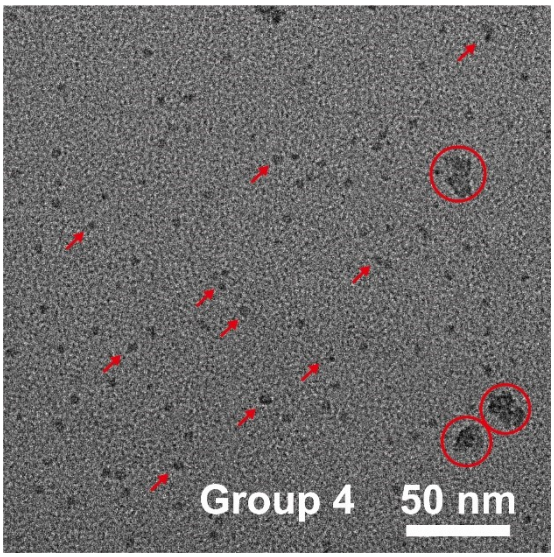

Figure. S3 HRTEM image of BSA-Au NCs. BSA-Au NCs were pointed out by red arrow. BSA oligomer-stabilized Au NCs were circled with red circle.

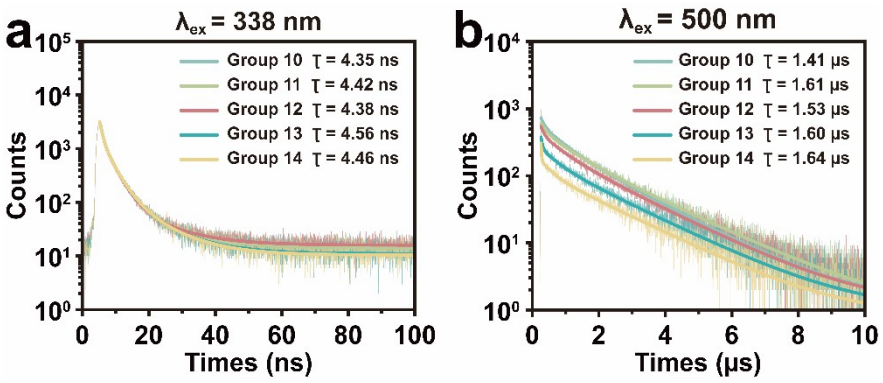

Figure. S4 Fluorescence decay profiles of Groups 10-14 (λ_{ex} = 338 nm and 500 nm).

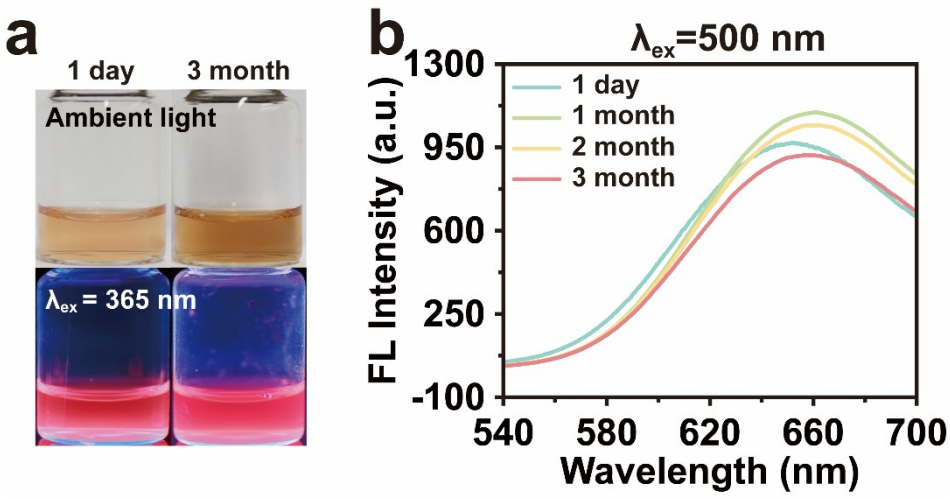

Figure. S5 a) Digital images of Group 13 under ambient light (above) and 365 nm ultraviolet lamp (below) at different storage times. b) Time evolution of the photoemission spectrum (λ_{ex} = 500 nm) at 4 °C. Slit widths of excitation: 5 nm, slit widths of emission: 5 nm, and voltage: 600 V.

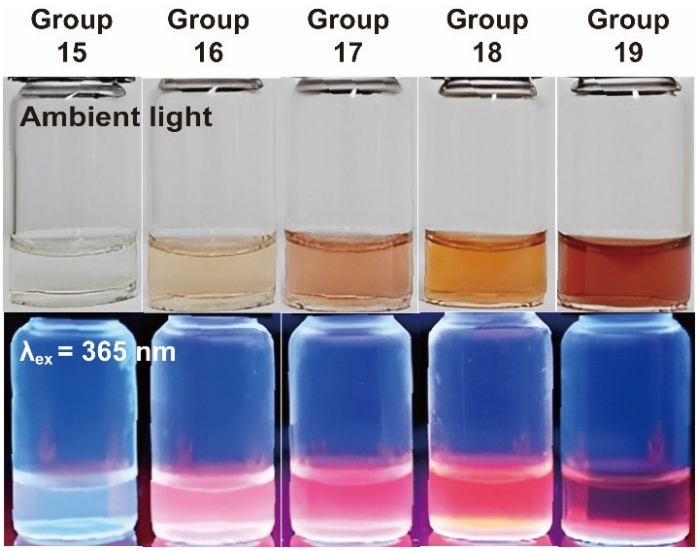

Figure. S6 Digital images of BSA-Au NCs synthesized with various concentrations of $HAuCl_4$ under ambient light (above) and 365 nm ultraviolet lamp (below).

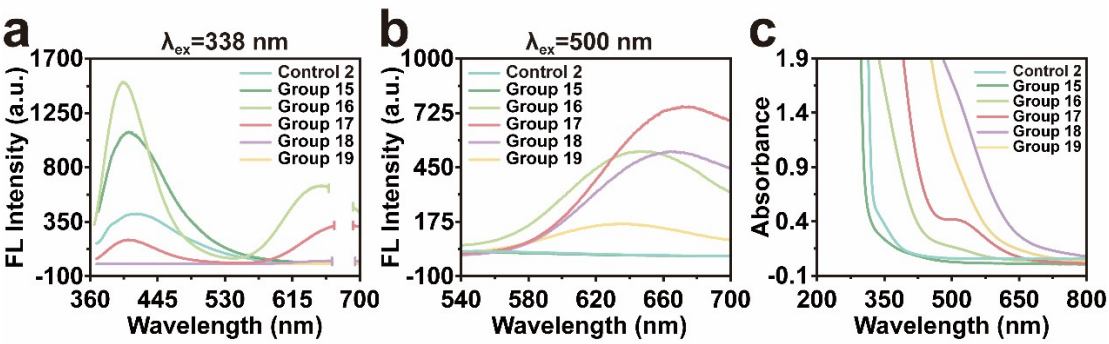

Figure. S7 a-b) Photoemission spectra of each group (λ_{ex} = 338 nm and 500 nm). c) UV-vis absorption spectrum of each group. Slit widths of excitation: 5 nm, slit widths of emission: 5 nm, and voltage: 600 V.

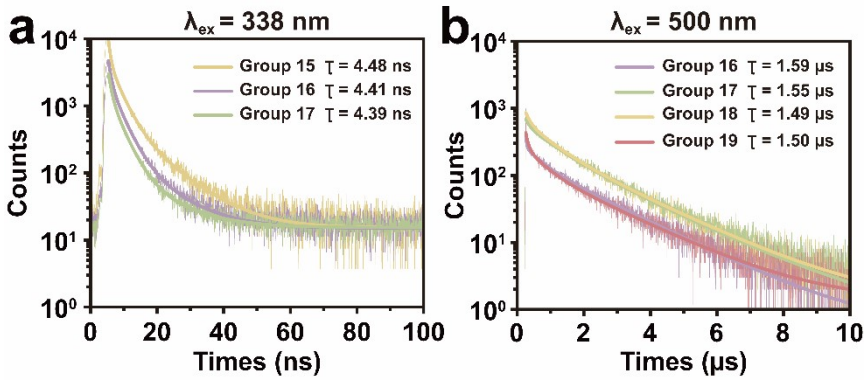

Figure. S8 Fluorescence decay profiles of Groups 15-18 (λ_{ex} = 338 nm and 500 nm).

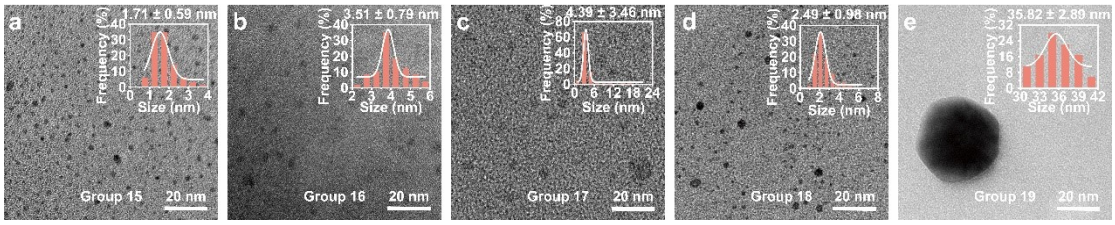

Figure. S9 The HRTEM images and particle size (Inset) of BSA-Au NCs synthesized with various concentrations of $HAuCl_4$.

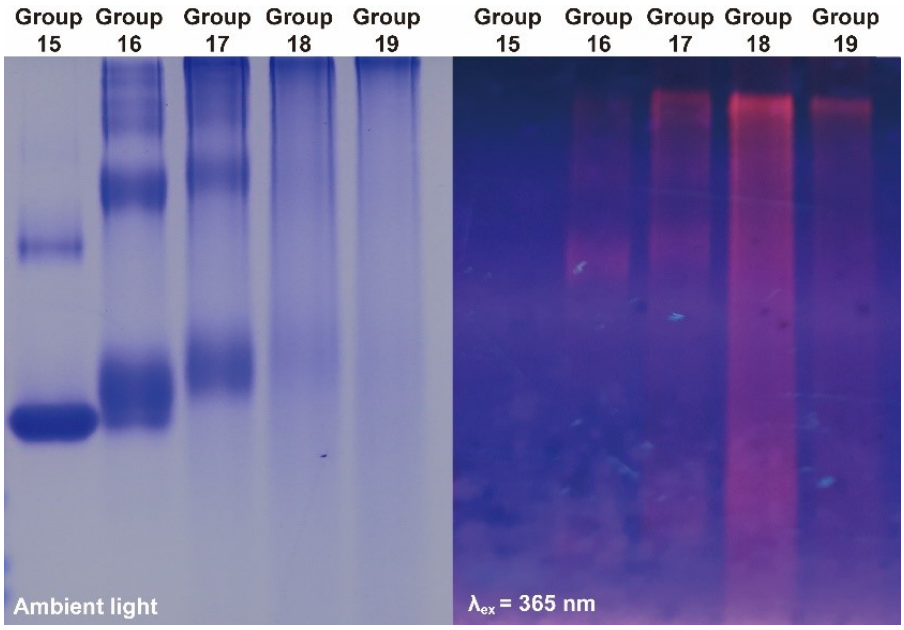

Figure. S10 Coomassie brilliant blue staining gel image of BSA-Au NCs synthesized from various concentrations of $HAuCl_4$ (left) and Native-PAGE under 365nm ultraviolet lamp (right).

Table S1. The quantum yields (QYs) of each group under 500 nm excitation.

Group	QYs (%)
1	0.44
2	7.58
3	5.48
10	6.80
11	11.82
12	24.96
13	74.30
14	2.24

Table S2. BSA-Au NCs formed at various $HAuCl_4$ concentrations.

Group	BSA (mg/mL)	$HAuCl_4$ (mg/mL)	pH	Concentration ratio
15	50	0.34	12	147.06:1
16	50	1.70	12	29.41:1
17	50	3.40	12	14.71:1
18	50	8.50	12	5.88:1
19	50	17.00	12	2.94:1