Supporting Information:

Controllable Synthesis of Stable Urchin-like Gold Nanoparticles Using Hydroquinone to Tune the Reactivity of Gold Chloride

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Figure S1 UV-vis absorption spectra (a), and TEM image (b) of gold seeds, that were prepared by the citrate reduction of HAuCl₄ in boiling water.
Figure S2 UV-vis absorption spectra of the aqueous solution of HAuCl₄ in the absence of citrate and after the addition of sodium citrate for 0, 1, 2, 3, 4, and 5h. The concentration of HAuCl₄ was 0.25mM, and it was 0.03w/v% for citrate. During storage at room temperature, the absorption peak around 210nm became inconspicuous, whereas two new absorption peaks respectively at 250 and over 500nm appeared. Meanwhile, the apparent color of the solution turned from colorless to dark blue.
Figure S3 Influence of citrate amount on the UV-vis absorption spectra of the as-prepared gold NPs. The amount of additional citrate was altered from 11, 22, 66, to 88μL, whereas the amount of seeds, HAuCl₄, and hydroquinone was fixed at 50, 25, and 1000μL, respectively. The growth duration for all samples was 30min.
**Figure S4** Influence of seed amount on the optical observation (a), and UV-vis absorption spectra (b) of the as-prepared gold NPs. The amount of gold seeds was altered from 15, 50, 100, 200, 300, to 400uL from left to right, whereas the amount of HAuCl₄, sodium citrate, and hydroquinone was fixed at 25, 22, and 100uL, respectively. The growth duration was 30min. Note that the only difference between Figure S4 and Figure 3 was the amount of hydroquinone, 100 and 1000uL, respectively.
Figure S5 Influence of seed amount on the morphologies of the as-prepared gold NPs. 

The amount of gold seeds was altered from 15 (a), 50 (b), 100 (c), 200 (d), 300 (e), to 400μL (f), whereas the amount of HAuCl₄, sodium citrate, and hydroquinone was fixed at 25, 22, and 100μL, respectively. The growth duration was 30min. Note that the only difference between Figure S5 and Figure 4 was the amount of hydroquinone, 100 and 1000μL, respectively.
**Figure S6** UV-vis absorption spectra of freshly prepared urchin-like NPs (solid), and the NPs with fourteen days storage at room temperature in the growth solution (dash).