Optimization of High Yield Biological Synthesis of Single-Crystalline Gold Nanoplates

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SI-1. Pictures of fresh *Sargassum* sp.

SI-2. TEM images of gold nanoparticles synthesized by directly mixing washed seaweed powder with aqueous AuCl_4^- solution.

SI-3. UV-visible spectra for gold nanoparticles synthesized at different initial pH. Experimental conditions: 5 ml 1-day aged seaweed extract + 5 ml deionized water + 1 ml 0.01 M HAuCl_4 solution, room temperature for 3 h under different initial pH. (Inset shows a HAuCl_4 absorption band at 300 nm)

SI-4. TEM images and their corresponding SAED patterns (inset) of nanoparticles obtained in alkaline solutions. A) pH = 10. B) pH = 13. Experimental conditions: 5 ml 1-day aged seaweed extract + 5 ml deionized water + 1 ml 0.01 M HAuCl_4 solution, room temperature for 3 h.

SI-5. TEM image of a mixture of gold nanoplates and nanoparticles. Experimental conditions: 5 ml seaweed extract (seaweed extract was aged together with the seaweed powder for 3 days. The clear supernatant was then removed and stored at room temperature for another 4 days) + 5 ml deionized water + 1 ml 0.01 M HAuCl₄ solution, neutral pH, room temperature for 3 h.

SI-6. UV-visible spectra of gold nanoplates with different sizes. Experimental conditions: a) 10 ml 5-day aged seaweed extract + 1 ml 0.01 M HAuCl_4 solution, neutral pH and room temperature for 3 h. b) 5 ml 5-day aged seaweed extract + 5 ml deionized water + 1 ml 0.01 M HAuCl_4 solution, neutral pH, room temperature for 3 h. c) 5 ml 5-day aged seaweed extract + 5 ml deionized water + 2 ml 0.01 M HAuCl_4 solution, neutral pH, room temperature for 3 h. (Inset shows HAuCl_4 absorption at 300 nm)

SI-7. TEM images of gold nanoplates showing peculiar morphologies

SI-8. TEM images of gold nanoplates synthesized in the dark. Experimental conditions: 5 ml 3-day aged seaweed extract + 5 ml deionized water + 1 ml 0.01 M HAuCl_4 solution, neutral pH, room temperature for 3 h. After addition of the gold solution, the reactor was immediately wrapped with aluminum foil and kept inside a dark box.