One-pot interfacial synthesis of Au nanoparticles and Au-polyaniline nanocomposites for catalytic applications

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Experimental

Interfacial polymerization. In a 20 ml vial, 1 ml of aniline (98%, Aldrich) was dissolved in 5 ml of CCl₄ (Aldrich) as the oil phase. 5 ml of H₂O were then added to the vial to form a water/oil interface. Then, the vial was placed in an ice-water bath. 15 minutes later, 5 ml of 10 mM HAuCl₄ (Aldrich) were added to the water phase to initiate the polymerization of aniline. After a controlled time, the water phase was transferred, and the aqueous solution (containing Au nanoparticles) and black powders (Au-PANI nanocomposites) were separated by centrifugation. The Au-PANI nanocomposites were washed with H₂O for several times and dispersed in 1 ml of H₂O for catalytic study. Note: As the amount of aniline used in the reaction is excessive as compared to the oxidant, HAuCl₄, the conversion rate of aniline is not calculated in our experiment.

Catalytic study. The reduction of rhodamine B (RhB) by NaBH₄ was chosen as the model system for studying the catalytic properties of Au-PANI nanocomposites. In the reaction, 1 ml of freshly prepared NaBH₄ (0.5 M) was added to 20 ml of RhB aqueous solution (5×10⁻⁵ M). Then 0.5 ml of Au-PANI nanocomposite was added to the system. Variation of the RhB concentration was monitored by recording the absorptions at 554 nm in UV-Vis spectra.

Additional Figures:

![UV-Vis absorption spectrum of Au-PANI nanocomposite at a reaction time of 1 h.](image)
**Fig. S2** TEM images of AuNPs taken from the supernatant of the water phase, at a reaction time of 1 h.

**Fig. S3** UV-Vis absorption spectrum of AuNPs at a reaction time of 12 h.

**Fig. S4** Thermogravimetric curves of Au-PANI nanocomposites.
**Fig. S5** UV-Vis absorption spectrum of the reduction of RhB by NaBH₄ in the presence of Au-PANI nanocomposite obtained at a reaction time of 12 h.