

**Supplementary Information For:
Synthesis of polyaniline-gold nanocomposites using “grafting from”
approach**

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Synthesis of peroxide capped gold nanoparticles

Gold nanoparticles and nanorods were synthesized using a seeded approach, as reported by Murphy *et al.*⁸ In a typical synthesis, a gold-nanoparticle *seed solution* was obtained by adding 0.6 ml of 0.1 M NaBH₄ to a solution containing $2.5 \cdot 10^{-4}$ M HAuCl₄, and $2.5 \cdot 10^{-4}$ M sodium citrate. The solution turned reddish brown upon addition of NaBH₄. This solution was left undisturbed (no stirring) for 5 h.

Three 10-ml solutions were prepared and labeled A, B and C. Each contained $2 \cdot 10^{-3}$ M HAuCl₄, 0.01 M ascorbic acid and 0.1 M 10-bromodecylperoxide. To solution A, 1 ml of the *seed solution* was added. After shaking this solution for 5 s, 1 ml of solution A was added to solution B. After shaking solution B for 30 s, all of solution B was added to solution C, which was left undisturbed for 24 h to allow the growth of nanorods. TEM images of gold nanoparticles (solution A) and a mixture of gold nanoparticles and nanorods (solution C) are shown in Figure S1 (a) and (b) respectively. The UV-Vis spectra of gold nanoparticles (solution A) and mixture of gold nanoparticles and nanorods (solution C) are shown by (a) and (c), respectively, in Figure S2.

Emulsion polymerization of polyaniline

To a 5-ml solution containing gold nanoparticles (solution A) or a mixture of gold nanoparticles and gold nanorods (solution C), 5 ml of 0.1 M aniline in chloroform was added to each while the solution was stirred. To each solution, 1 ml of 35% HCl was added, drop-wise. The solutions were stirred at room temperature for 24 h. The polyaniline dispersion obtained was thoroughly washed with an excess of water and methanol to remove surfactant and other possible by-products. UV-Vis spectra, taken as a function of polymerization time, are reported in Figure S3 and show an increase of absorption in the 300-500 nm range due to formation of polyaniline. The absorption peak (around 950 nm), due to Au nanorods, remains unchanged, indicating that Au nanorods are not destroyed by polymerization.

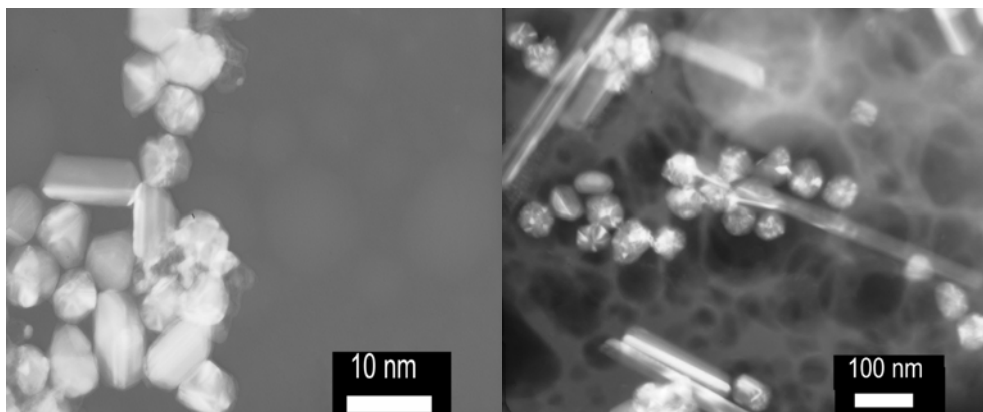


Fig S1. TEM images of (a) gold nanoparticles (solution A) and (b) a mixture of gold nanoparticles and nanorods obtained using the seeding approach (solution C).

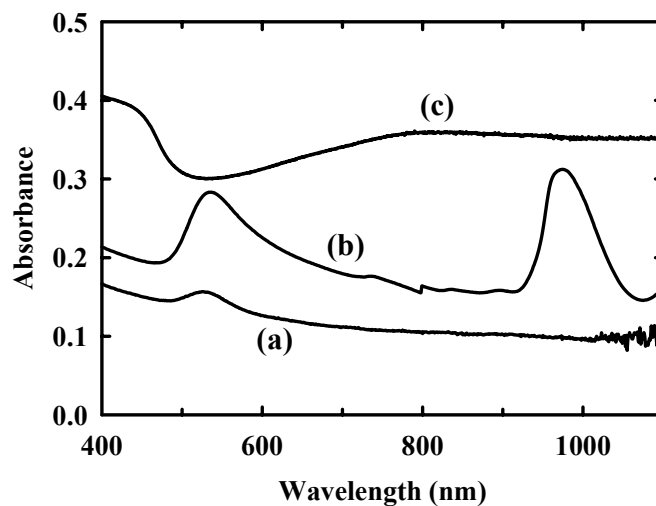


Fig S2. UV-Vis spectra of (a) peroxide-capped Au nanoparticles (solution A); (b) mixture of gold nanoparticles and nanorods (solution C); (c) polyaniline-Au nanoparticles (solution A) composite (arbitrary absorbance units).

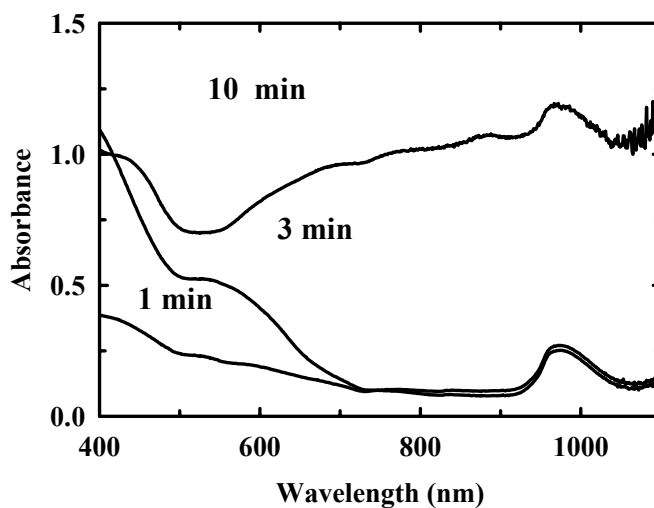


Fig S3. UV-Vis spectra of polyaniline-Au nanorods composites as a function of polymerization time (arbitrary absorbance units).