The Approach for Seed-Mediated Synthesis of High Aspect Ratio Gold Nanorods: The effect of pH and Nitric Acid

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We investigated the effect of pH in the presence of nitric acid growing the gold nanorods through a modified seed-mediated synthesis. Varying the pH of the growth solution, different amounts of nitric acid were added to study the influence on the yield and aspect ratio of gold nanorods. As a result of controlled pH and the amount of nitric acid in the growth solution, high aspect ratio gold nanorods were synthesized. The aspect ratio of gold nanorods was approximately up to 15, and the percent yield of nanorods was significantly enhanced. As previously reported, nitric acid highly reduced the formation of spherical nanoparticles and nanoplates. In addition, pH of the growth solution also influenced the yield of nanorods. Variation of both pH and the amount of nitric acid showed high dependency on the specific growth of gold nanorods. Two plasmon bands of gold nanorods were shown in UV-vis-NIR absorption spectra, in which the longitudinal band appeared beyond 2000nm.