

Growth Kinetics of Gold Nanorods Synthesized by a Seed-Mediated Method Under pH Acidic Conditions

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Resumen

A systematic study of the effect of ascorbic acid concentration on the growth kinetics of gold nanorods under pH acidic conditions was done. We employed the seed-mediated approach at pH 1.25 using different ascorbic acid/Au+3 molar ratios. We monitored the gold nanorods growth using UV-Vis spectroscopy and the apparent growth rates were determined fitting the experimental data with a theoretical non-linear Boltzmann function. We found that, under the conditions proven, an increase of the ascorbic acid/Au+3 molar ratio induces a red-shift in the longitudinal surface plasmon resonance, as well as the formation of undesirable by-products. The apparent growth rates show a linear dependence with the increment of ascorbic acid concentration. We determined a range of growth rates from 0.034 to 0.078 min⁻¹, from the lowest to the highest molar ratio used, respectively; which corresponds to deposition rates from 0.128 to 0.235 atoms per second. A low pH in the growth solution promotes a slower growth nanorods rate, which prevents the drastic blue-shift observed in the synthesis at higher pH and provides an aspect ratio tuning.

Palabras clave

Palabras clave de autor: [Gold Nanorods](#); [Kinetic Growth](#); [Anisotropic](#); [SPR](#)

KeyWords Plus: [ASPECT-RATIO](#); [HIGH-YIELD](#); [OPTICAL-PROPERTIES](#); [AQUEOUS-SOLUTION](#); [ASCORBIC-ACID](#); [SHAPE](#); [SIZE](#); [NANOPARTICLES](#); [NANOCRYSTALS](#); [DEPENDENCE](#)

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