

**Gold Nanocubes:
novel photo-synthetic method and morphological characterization**

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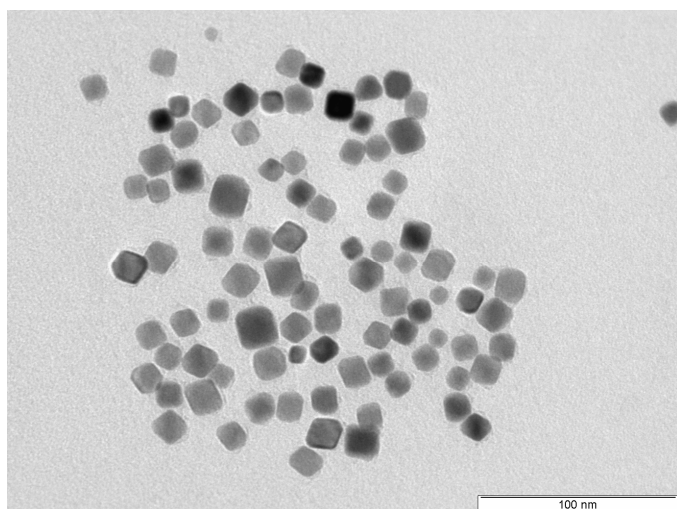
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The development of new synthetic methods to prepare nanoparticles with different morphological characteristics is critical for the successful application of nanotechnology. Nanostructures with a cubic shape are quite interesting as they have larger surface-to-volume ratios and may prove to have significantly different reactivity and selectivity in catalysis.

To our best knowledge no one has reported the preparation of gold nanocubes by a bottom-up approach with mean edge length below 20 nm. Herein we describe a green simple rapid method to obtain nanocubes that have a mean edge length below 20 nm. This method is based on that previously reported by Shelnutt *et al.* for preparing platinum nanostructures[1]. Gold nanocubes were obtained by a light driven/crystal growth process using triethanolamine (TEA) as an electron donor, hexadecyltrimethylammonium bromide (CTAB) as the capping agent, and a photosensitizer - Sn (IV) meso-Tetra(N-methyl-4-pyridyl) porphine tetra tosylate chloride (SntMepyP).

The formation of nanoparticles was monitored by ultraviolet-visible spectroscopy and the morphological characterization was carried out by transmission electron microscopy (TEM). UV/vis spectra showed one plasmon band at ~530 nm within 60 minutes after starting irradiation, accompanied by a color change from slightly yellow (gold) to red. TEM analysis indicates that the cubes have a mean edge length 16.91 ± 2.54 nm. Electron dispersive spectroscopy and X-ray photoelectron spectroscopy were performed in order to obtain a more accurate chemical analysis of the nanoparticles prepared.

Figures:



References:

[1] Song, Y.; Yang, Y.; Medforth, C. J.; Pereira, E.; Singh, A. K.; Xu, H.; Jiang, Y.; Brinker, C. J.; van Swol, F.; Shelnutt, J. A., *J. Am. Chem. Soc.* 2004, 126, 625-635.

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