A PHOTOCHEMICAL APPROACH FOR PREPARING GOLD NANOTRIANGLES: SYNTHESIS AND MORPHOLOGICAL CHARACTERIZATION

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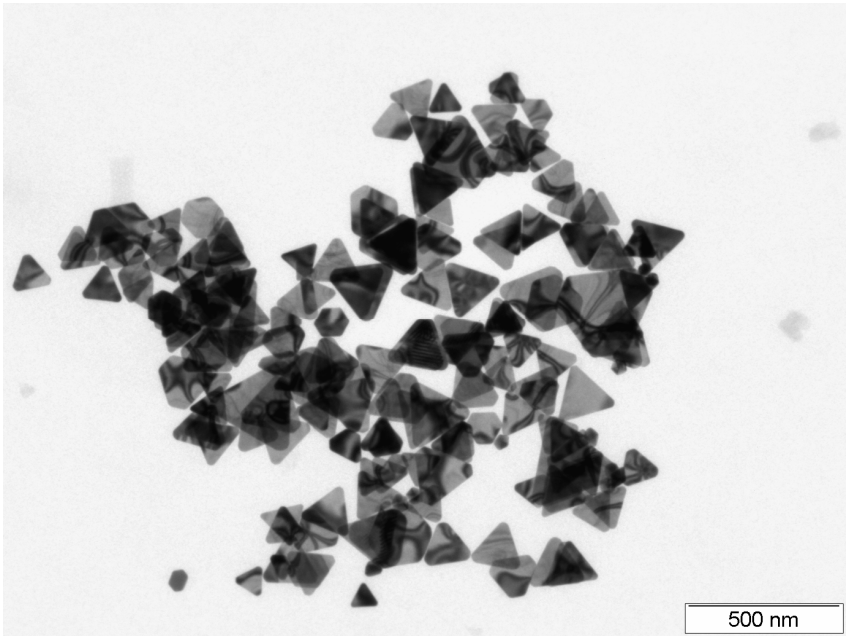
One of major challenges in nanoscience is to obtain nanoparticles with controlled size and shape. Anisotropic nanoparticles like prisms are a very interesting class of nanoparticles due to their unique optical properties that can open new possibilities in biomedical diagnostics and biosensors.

Herein, we report a photochemical method with remarkable pH dependence for the synthesis of gold nanotriangles based on visible light irradiation/crystal growth. Gold nanotriangles were obtained by the photocatalytic reduction of hydrogen tetrachloroaurate (III) by triethanolamine using Sn (IV) meso-tetra(N-Methyl-4pyridyl)porphine tetratosylate chloride as the photocatalyst, and CTAB as the capping agent, in aqueous medium (pH = 6.5-8.0). The particle growth process was monitored by UV/Vis spectroscopy and the morphological characterization was carried out by transmission electron microscopy (TEM) and tapping mode atomic force microscopy (AFM).

pH and the concentration of CTAB and SntMepyP have a strong influence on the morphology of the nanoparticles. These factors were optimized for the preparation of nanotriangles with length ≈130 nm and 15-19 nm height. The combination of TEM, AFM and electron diffraction analysis allowed a thorough investigation of the nanotriangles morphology, resulting in further insight on the dependence of morphology on growth conditions, as well as the mechanisms of crystal growth.

Figures:



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