269 Silver and gold nanoparticles in aqueous media: synthesis and characterization

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Metal nanoparticles have been the focus of intense researches due to their novel properties and diverse applications. Noble metal nanoparticles, especially gold and silver aggregates have been studied due to their fascinating properties, high stability, corrosion resistance and mainly to their potential applications in different areas like catalysis, biology, optics, electronics and so on [1].

These kinds of structures are normally stabilized with polymers or surfactants in order to prevent the aggregation of these highly reactive particles. The use of cationic surfactants like cetyltrimethylammonium bromide (CTAB) has been investigated due to the ability of these molecules of stabilizing the nanostructures in aqueous and organic media, increasing the versatility of the final products [1, 2].

The applications of the metallic nanoparticles are highly dependent of the size and the shape of these materials. In order to know the characteristics of the products and their potential uses it is necessary to study the formation process and determine the final properties of the nanostructures.

In this investigation we studied the synthesis, formation and the size-time effect on silver and gold nanoparticles. These nanostructures were stabilized with CTAB in aqueous media using sodium borohydride as a reducing agent. The reaction took place at low temperatures in order to reduce the reaction rate. The products were characterized using X-ray powder diffraction (XRD), UV-Visible (UV-Vis), transmission electron microscopy (TEM), and dynamic light scattering measurements (DLS) to estimate the size of the nanostructures. The results show a time-dependent formation of the silver and gold nanoparticles.

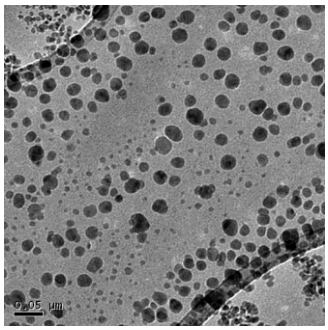

Fig. 1 TEM image of Silver nanoparticles in aqueous media after 24 h of synthesis

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