

Nanochemistry and biotechnology

Synthesis of metallic nanoparticles by seed growth mediated method

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In recent years, many methods of nanoparticle synthesis (NPs) have been developed to control size and shape of NPs. One of them is the method of growing metallic nanoparticles on seeds, which allows separation of the nucleation and growth stages of nanocrystals and thus provides better control of size. An extremely important feature of the presented method is the ability to provide a chemically stable reaction medium irrespective of the final size of the nanoparticles, which is particularly important in applications.

The purpose of this work was to develop a procedure for the preparation of aqueous colloids of monodisperse, spherical gold (AuNPs), silver on gold (Au@AgNPs) and silver nanoparticles (AgNPs) by crystallization nucleation. The methodology includes the synthesis of approximately 10 nm NPs that serve in subsequent stages as crystallization nuclei to obtain larger nanoparticles. Control of such factors as concentration, molar ratio, order and rate of addition of reagents allowed for monodisperse AuNPs and Au @ AgNPs of size 20-50 nm. The shape and particle size distribution was determined using the following test methods: dynamic light scattering, UV-Vis spectroscopy and scanning electron microscopy.

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