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Synthesis of gold coated iron oxide nanoparticles.

Without shell magnetite nanoparticles are unstable and toxic under physiological conditions, and also difficult for functionalization. In order to eliminate these shortcomings, we have coated the surface of low-frequency magnetite with gold, which ensures their stability, minimizes the toxicity of particles, and also forms strong covalent bonds with sulfur-containing ligands, which ensures the simplicity of surface modification. There is a large number of works devoted to the coating of magnetic low frequency gold shell. The main tasks of the study were the development and optimization of methods for obtaining and purifying magnetite-gold nanoparticles of the core-shell type, carrying out a complex physicochemical study of magnetite-gold nanoparticles, and then demonstrating possible applications in biomedicine.

Summary

The study presents the results of the chemical synthesis gold coated iron oxide nanoparticles obtained by hydrolysis from iron (II) and (III) chlorides in a molar ratio of 1:2. To study the structural and morphological properties, magnetite was examined under a scanning electron microscope (SEM) and studied by X-ray diffraction. According to SEM images, the resulting particles are spherical particles whose average size is 27-30 nm, the thickness of the gold coating is no more than 5-7 nm. According to the X-ray diffraction data, the obtained samples are biphasic, the core of the nanoparticles is Fe3O4 nanoparticles with a cubic lattice, the unit cell parameters a = 4.03702 Å differing from the reference value, the average crystallite size is 15-17 nm. The shell covering the magnetic core of nanoparticles is an AuO layer with a cubic structure, the unit cell parameter is 8.35365 Å.

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