SYNTHESIS OF $Ag@Fe_3O_4$ NANOCOMPOSITE BY SINGLE-PHASE SURFACE MODIFICATION METHOD

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In recent years, many research efforts aimed at obtaining nanoparticles with desired shape, size and complex physical and chemical properties. Described a lot of synthetic approaches, each with a par of benefits is not without some drawbacks.

Putting a silver coat on the surface of magnetic nanoparticles allows such systems, along with the preservation of magnetic properties, acquire new properties, in particular due to antiseptic properties of silver. In addition to protection against aggregation, oxidation, acidic and alkaline corrosion, silver shell may act as a linker to connect pharmaceutical agents or biomolecules to magnetic media. This will allow to decrease the concentration of drug and systemic toxicity due to longer hold it in the affected area.

The aim of our research – development of a method applying a silver coating on the surface of the nanoparticles magnetite and identify factors, that influence the effectiveness of magnetic media.

The original method of single-phase synthesis of nanoparticles with a spherical core and silver shell islet type was proposed. First received systematic data on the impact and value of the components of the synthesis conditions on the structure of nanocomposite $Ag@Fe_3O_4$. The general algorithm to obtain core-shell nanostructures consisting of basic steps: 1) synthesis of magnetic cores specified size and shape and adsorption of Ag nanoparticles on it's surface; 2) synthesis of magnetic cores compatible Fe_3O_4 and Ag adsorption on the surface; 3) "rearing" islet Ag shell to obtain a continuous coating of a given thickness.

Phase composition and phase characteristics of the samples determined using a mix of modern physical and chemical methods (thermogravimetric and X-ray diffraction analysis, scanning electron microscopy, AAS). To determine the quantitative composition of the phases and their dispersion carried lattice parameter refinement by Rietveld method. We prove that the obtained nanocomposites containing silver particles on the surface as a monolayer point. Magnetic properties of the samples determined by the dependence of magnetization impregnation on the value of the external magnetic field.

To the resulting nanocomposite selected medicine form – magnetically suppositories urological supplies, conducted a comprehensive research of the selected drug.