

Nanocomposites and nanomaterials

Hybrid Fe₃O₄/Chitosan nanocomposites for some biocompatible lanthanide complexes loading

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A promising path of development of modern therapy of cancer consists in realization of a concept of chemical design of magnetosensitive nanocomposites with the multi-level hierarchical architecture and functions of biomedical nanorobots: recognition of microbiological objects in biological environments; targeted drug delivery to the cells and target organs; complex chemo- and immunotherapy with the use of neutron irradiation and hyperthermia methods, multimodal diagnostics.

Nanosized magnetite (Fe₃O₄, 10-20 nm) was coated by chitosan (low-molecular weight, Sigma) followed by partial crosslinking of chitosan by epichlorohydrin.

Adsorption of some biocompatible lanthanide complexes (Gd-DTPA, Gd-EDTA) on the surface of hybrid magnetite/biopolymer nanomaterial (Fe₃O₄/Chitosan) was studied.

Physico-chemical properties of synthesized materials were studied by using the low-temperature nitrogen adsorption-desorption (ASAP) analysis, Fourier transform-infrared spectroscopy (FTIR), transmission and scanning electron microscopy (TEM, SEM). Inductively coupled plasma–mass spectrometry was used in order to study sorption properties of synthesized composite.

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