

ABSTRACT

The work contains 60 p., 15 fig., 11 tab., 47 sources.

The thesis presents a literature review of the current state of the theory and practice of obtaining hydroxyapatite and evaluation of its adsorption capacity.

The aim of the work is to compare the composition and structural state of hydroxyapatites of different origin, with the level of properties that confirm the expediency of their use for medical purposes, including as capsules for directional drug transfer.

To achieve this goal, the following tasks were solved in the work:

The process of producing biogenic and synthetic stoichiometric and non-stoichiometric hydroxyapatite was investigated.

Saturation of hydroxyapatite powders with methylene blue was carried out, which confirmed the data on the adsorption potential of the material, obtained during the initial experiments on the determination of adsorption activity.

The microstructure, chemical composition, adsorption capacity and some physical and mechanical characteristics were investigated.

Object of research: powders of hydroxyapatite - BHA "Osteoapatite ceramic" (Ukraine) and SHA "Biomin" (Ukraine) with particle size <50 microns.

Subject of research: morphology, chemical composition and adsorption capacity of hydroxyapatite.

Methods of research and equipment:

– determination of the specific surface was carried out by thermal desorption of nitrogen in accordance with GOST 23401-90;

– phase composition - X-ray phase analysis (XRD) using X-ray diffractometer Ultima IV (Rigaku, Japan), wavelength λ CuK α = 0.154187 nm; Infrared (IR) spectroscopy in the frequency range 4000-400 cm⁻¹, using a Fourier spectrophotometer FSM 1202 ("Infraspectr", Russia); energy-dispersive X-ray fluorescence elemental analysis using the Expert 3L chemical analyzer ("INAM", Ukraine);

– morphology of powders - scanning electron microscopy (microscope TEM JEM-2100F, Japan).

Scientific novelty of the results:

– it is shown that the morphology of particles and the specific surface area of hydroxyapatite powders depends on the method of its production;

– differences in the adsorption mechanism for BHA (due to the nanostructured porosity of the powder particles) and SGA (due to the high specific surface area of the powder 90.0-209.5 m²/g);

– it was found that, despite of the different adsorption mechanism, hydroxyapatite powders have the same adsorption activity, is 106-108 mg/g.

Keywords: HYDROXYAPATITE, BIOGENIC, SYNTHETIC, STOICHIOMETRIC, NON-STOICHIOMETRIC, METHYLENE BLUE, ADSORPTION ACTIVITY