

Nanocomposites and nanomaterials

Sr-containing glass-ceramic composites based on biogenic hydroxyapatite

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Hydroxyapatite and other bioactive calcium phosphate materials, including bioactive glass, can be used in tissue engineering to replace bone tissue. A modern problem in the field of diseases of bone pathology is the treatment of osteoporosis, which is the reducing the density of the patient's bone tissue as a result of hormonal or other causes. That's why it is quite relevant to develop new bioactive materials that can stimulate the formation of new cells of bone tissue and improve its structure. From this point of view, the introduction of strontium ions into the composition of calcium phosphate materials can improve their bioactive properties [1-3].

Thus the work is focused on the preparation of bioactive materials based on biogenic hydroxyapatite/glass composite with adding SrO for tissue engineering.

To obtain Sr-containing glass-ceramic composites samples were used powders of bioactive glass-ceramic composites based on nanostructured biogenic hydroxyapatite (BHA) and sodium borosilicate glass with the relation 50/50 % wt. Powders of the composites were mixed with powder of strontium oxide (1 wt. %), samples were formed and sintered at the temperature 780 °C.

The phase composition and structure of the obtained samples were studied by X-ray diffraction, IR spectroscopy and SEM. It was established that Sr-containing glass-ceramic composite hydroxyapatite contains non-stoichiometric hydroxyapatite. The effect of the addition of strontium oxide resulted in the changes in the crystal lattice of biogenic hydroxyapatite and in the composite material dissolution rate *in vitro* in physiological saline.

1. *Queridoa W., Rossi A. L., Farina M.* The effects of strontium on bone mineral: A review on current knowledge and microanalytical approaches // *Micron.* - 2016. – **80.** - P. 122–134.
2. *Wang C., Li Q., Yang J., Fu T., Ma X.* Preparation and properties of strontium doped nano hydroxyapatite // *Journal of Orthopaedic Translation.* - **7,** 2016, P. 81.
3. *Frasnelli M., Cristofaro F., Sglavo V.M., Dirè S., Callone E., Ceccato R., Bruni G., Cornaglia A.I., Visai L.*