Charge retention testing reveals that some interdependent charge decay processes after write pulse take place which cannot be resolved by conventional measurement procedure.

[1] Turchanikov V.I., Nazarov A.N., Lysenko V.S. et. al. // "Study of the unipolar bias recharging phenomenon in the nonvolatile memory cells containing silicon nanodots" Materials Science and Engineering: B, Vol.124-125, 5 December 2005, pp.517-520, ISSN 0921-5107.

RESEARCH OF SOLUBILITY OF BIOCOMPATIBLE CALCIUMSILICOPHOSPHATE GLASS MATERIALS IN PHYSIOLOGICAL MEDIA

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During synthesis of biocompatible glass materials one of the main conditions is the presence of adjustable chemical durability in the environment of an organism that provides necessary life expectancy of implant, and also presence of the set level of solubility which provides diffusion of ions of calcium and phosphorus in the medium of a live organism. However, high rate of leaching can negatively affect condition of an organism and patient's health in general. Speed of dissolution (leaching, hydrolysis, condensation) and quantity of separate components passed into solution is defined, firstly, by a chemical composition and structure of glass materials. Solubility of a biomaterial in the physiological environment is defined by weight losses of the sample, concentration of ions in a solution and solution pH change after exposure of sample in it. The purpose of the given work was the research of solubility of glass materials on the basis of glasses in the system Na2O – CaO – R2O3 – RO2 – P2O5 – SiO2, where RO2 – TiO2, ZrO2; R2O3 – B2O3, Al2O3 in various physiological environments. In the given system 12 compositions of modelling glasses with SiO2 content from 45 to 55 mol. %. P2O5 from 5 to 10 mol. %; CaO from 15 to 25 mol. %, have been synthesised. Content of TiO2, ZrO2, B2O3, Al2O3 was from 0 to 5 mol. % for every glass.

For the purpose of solubility research investigated samples have been sustained in a physiological solution, Ringer's solution and 10 % albumin solution throughout 30 days. Rates of sodium and calcium leaching were determined on flame photometer PFM-UCH.I. An emission of phosphorus ions, defined with the use of a comparison method with a standard solution on photocolorimeter KFK-2. A crystal phase in investigated glasses was defined with the help of X-ray diffraction analysis on «DRON-3M» unit.

On the basis of results of the conducted researches it has been established, that investigated samples are characterised by the loss of weight after exposure in solutions Pm from 0,05 to 2 %

and are related to I - III hydrolytic classes. Weight loss of phosphorus ions in solutions is in limits of 0,002 – 0,08 %, sodium ions – 0,0175 – 0,69, calcium ions – 0,0156 – 0,07 % that makes 2,8 – 4,9 % for phosphorus, 27,9 – 38 % for sodium and 30 – 35 % for calcium from the general loss of weight, modified to 100 %.

The most perspective for obtainment of resistive glass materials of medical use is investigated sample BC-11, which is characterized by Pm 0,11 %, and by volume hydroxyapatite crystallisation.

NON-EQUILIBRIUM PHASE TRANSITIONS IN ULTRATHIN LUBRICANT FILM

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The boundary friction mode is considered realizing when two atomically-flat surfaces are separated by lubricant of some atomic diameters thick. Earlier in numerous experimental works, for example [1,2], it is shown that such systems are characterized by anomalous behavior compared with lubricants working in hydrodynamic mode. One of these peculiarities is the intermittent friction mode (stick-slip) when lubricant solidifies and melts during motion periodically. Usually, such mode of intermittent motion is inherent in a dry friction. Since this regime is mainly responsible for damage of rubbing parts the currency of its detailed study has considerably increased in recent years.

Earlier in Ref. [3] a deterministic theory of an ultrathin lubricant film melting between two atomically-smooth solid surfaces is built. For the description of lubricant state the parameter of excess volume arising due to chaotization of solid medium structure in the course of melting is introduced. Thermodynamic and shear melting are described. Dependences of stationary friction force on lubricant temperature and shear velocity of rubbing surfaces are analyzed during their uniform motion with constant velocity. Within a simple tribological model the stick-slip friction is described. The effects of velocity, temperature, and external normal pressure on stick-slip friction are analyzed.

The proposed work is the prolongation of [3] and devoted to investigation of non-equilibrium process occurring during lubricant melting. For their consideration the separate values of lubricant temperature and friction surfaces are introduced, that allows to take into account both