

REFERENCES

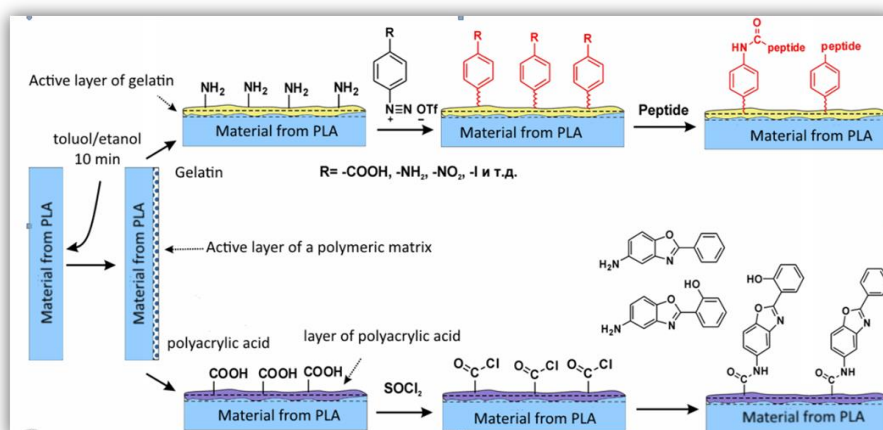
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MEASUREMENT OF NEW HYBRID BIODEGRADABLE MATERIALS' MODIFIED LAYER THICKNESS

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The biodegradable materials using polylactic acid (PLA) are widespread in medical practice. Polylactic acid, and also its composites are used in tooth implantation, for regeneration of bones, sheaves, cartilages, skin, nerves and vessels [1]. Complications such as inflammatory processes while using similar materials in implantology don't exceed 10% [2]. Different methods such as modifying polymer surface are used to reduce the reflectivity of materials by a humantissue [3]. The figure below illustrates one of the methods used nowadays.

Fig. 1.



The offered method represents the treatment of biomaterial surface by PLA mix toluol/etanol=3/7 for 10 minutes and further keeping it in the prepared solution. A

covalent inoculation of bifunctional cross-linkers under triflate reactions on the materials modified by gelatin has been carried out. The properties of the received hybrid biomaterials have been investigated by means of UF-, Raman- and IR-spectroscopy, RFA and TGA/DTA/DSK.

So we've got two classes of materials: materials in which target biomolecules are non-covalent and are applied on a surface directly by PLA, and materials in which target biomolecules are applied covalently to a polymer surface via intermediate layer.

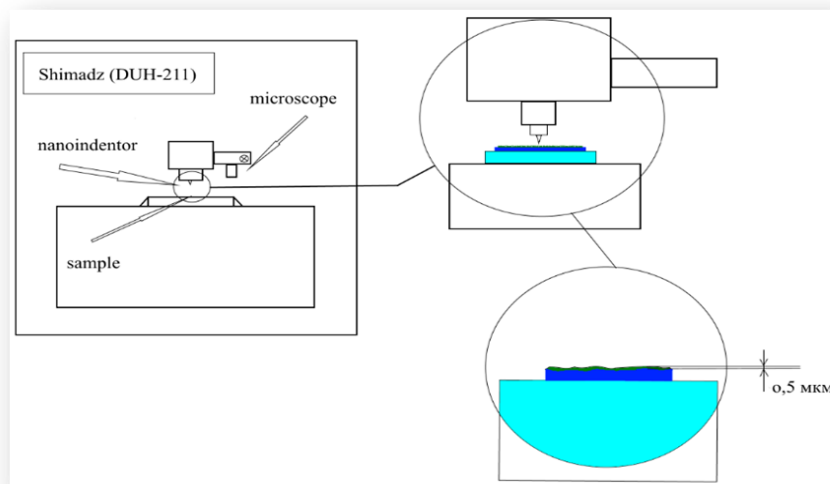
While receiving new hybrid materials we pay much attention to the thickness of the received modified layer. Some measuring methods of the received layer thickness have been proposed.

1. Measurement of thickness by means of the goniometer (measurement of light deviation while passing through the substance).

2. Measurement of thickness by means of a spectrometer (receiving a range of reflection, its analysis).

However, these ways weren't applicable to the studied material because of the errors in the measurement. The next task includes the measurement of modified layer thickness with the help of a measurement method called nanoindentation using Shimadzu (DUH-211).

Fig. 2.

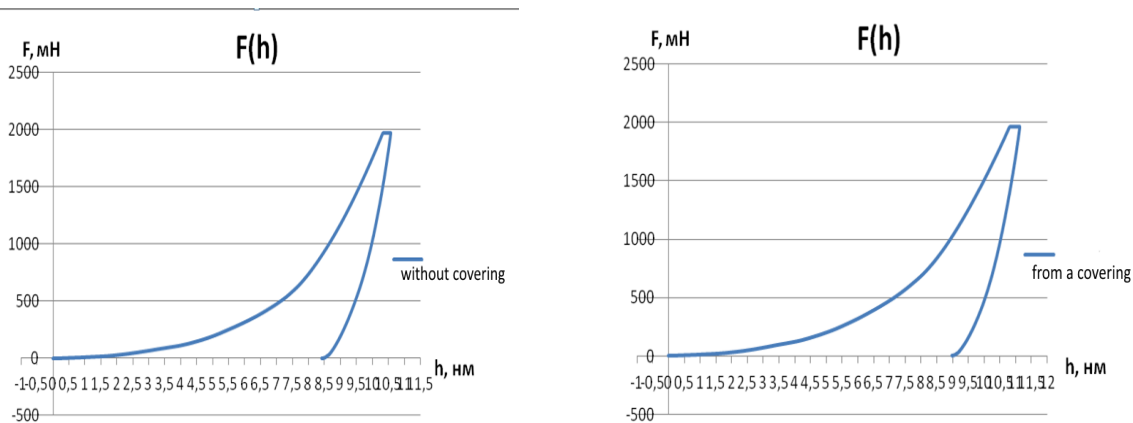


The method consists of drawing PLA on glass and in cave-in of a indetor in the studied material. While caving-in an indetor consistently punches a layer of PLA and classifies the schedule of material hardness change. It is determined by the schedule intervals:

1. Small change of hardness which corresponds to a covering.
2. Strong change of durability corresponding to glass on which the covering is applied.

Fig. 3.

Fig. 4.



Cave-in was calculated as a difference of thickness of polylactic acid without active layer and with it. Film thickness without $d_1=3,0997$ active agent, with $d_2=3,6205$ active agent (micron). $d=d_2-d_1$ $d=3,6205-3,0997 = 0,5208$ (microns) thickness of an active layer. Our research has proved that this is the best method for measuring the thickness of new hybrid biodegradable material modified layer.

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ULTRA HD (4K) MONITORS

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Introduction

4K technology seems to be on the cusp of taking over the HD digital media world, from TV screens to computer monitors to cameras and projectors, 4K screen resolution and all of its accompanying features are starting to circulate widely [1].

4K resolution