early XIX century. After the discovery of rubber vulcanization, soft material which could capture ceramic teeth on the plate was invented. First individual dental porcelain crowns were made at the end of XIX century. At the end of the World War II metal bridges were widely used.

Calcium phosphates are used for bone replacement. Titanium implants are used for tooth replacement and hip joint implants coated with calcium to increase the mechanical stability of the implant due to bone ingrowth.

Polymers have been used clinically since 1960. From the chemical point of view polymers are long chain molecules consisting of repetitive small particles (monomers). The number of monomer units in the polymer is denoted as the degree of polymerization. Short chains are called oligomers. If monomer units are equal, the polymer is referred to as a homopolymer. If they are different, it is called a copolymer. The polymers have many useful properties and characteristics: elasticity, ductility, hardness, creep, weariness, wear.

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POLYMERIC MATERIALS MODIFICATION

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Nowadays medicine is progressing rapidly, and one of many directions of modern science is development, research and improvement of the biomedical devices, intended for a contact with the living organism. For these purposes special polymers are widely used in reconstructive and regenerative medicine. One of the most widely used biopolymers is poly- L- suckling acid (PLLA, PLA). However, this biopolymer has disadvantages: hydropathy, slow degradation and others. For the solution of these problems, there are methods of volume and superficial retrofitting of polymers, such as copolymerizing, plasma treatment, and radiation of different types: gamma-radiation, radiation of electrons and ions beam etc. These methods play an important role in the obtaining of given properties of coating in medicine. One of the methods of volume retrofitting is radiation treatment based on the influence of impulsive electronic beam. This method allows getting the required properties of polymeric materials, affecting molecular structure of substance, causing excitation and molecules ionizing.

The objective of this work is to study radiation absorbed dose measured with a sample of polymeric material as a result of the influence of impulsive electronic beam and the exposure of optimal method of measuring. The sample irradiation was carried out at the DEG-500 accelerator (TPU, Tomsk). Two methods of evaluation of the radiation absorbed dose were used: using faraday cup and <<POR>> dosimetric films.

Measuring of radiation absorbed dose with the faraday cup is based on voltage scanning at the oscillograph. A charge passed through the cylinder is calculated from this integral $q = \int Idt$, where $I = \frac{U}{R} = \frac{Sk}{R}$; S – a square under the curve showed by oscillograph. Having graphed $S(t)$ according to function values in every 2 ns and having integrated it with the «Origin 8.1» program, a charge value is calculated. The general formula for calculation is $D = \frac{E}{m} = \frac{NE_{\bar{e}}\bar{e}}{m} = \frac{SkE_{\bar{e}}}{Rm}$, where $R = 0{,}05\ Ohm\ and\ k = 9{,}3$ – the constructive multiplier of amplification and voltage value showed by the

oscillograph. The <<POR>> film used in the second method is a radiation-sensitive film. Allocating two films in front of the sample and behind it, the difference of radiation absorbed dose between these films will be equal to the dose absorbed by the sample $\Delta D = \Delta D'' - \Delta D'$. A spectrophotometer is applied for the calculation of radiation absorbed dose.

The method using faraday cup was proved to be inexpedient because of major inaccuracy (the value of the dose is 913.2 KGy). Application of the second method using <<POR>> dosimetric films provided more valid value of the dose absorbed by the sample (26.31 KGy). Further research should be carried out for the optimization of technological regimes of polymers modification on basis of polymilk acid irradiation with impulsive electronic beams. Structure and properties of polymeric materials also have to be studied.

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THIN HYDROXYAPATITE COATING ON AZ91D MAGNESIUM ALLOY FABRICATED VIA RF-MAGNETRON SPUTTERING

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The development of biodegradable materials for bone injuries repair is an attractive scientific topic [1]. The wettability of the bare alloy and HA coating deposited on Mg alloy was monitored. It was revealed that after only 15 min of water droplet spreading over the surface a significant decrease in the water contact angle (from 100° to 66°) was observed. A significantly higher water spreading rate was observed in the case of bare alloy compared with that of the HA coated samples. The observed changes in the surface wettability over time indicated a strong time-dependent tendency to turn initially hydrophobic behavior to hydrophilic. The aim of this study was to investigate the structure, chemical composition and wettability of the CaP coating deposited via RF magnetron sputtering on AZ91D magnesium alloy.

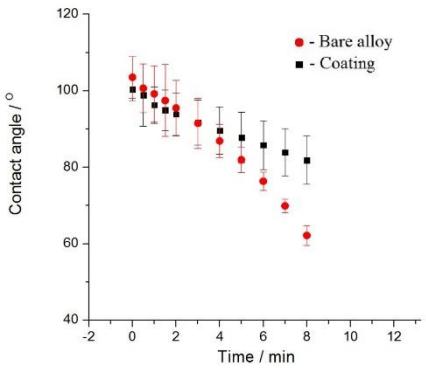

Figure 1. Water spreading behavior of a single droplet on the surface of the HA coating and bare alloy