SURFACE MODIFICATION OF PET-TRACK MEMBRANES BY LOW-TEMPERATURE PLASMA AND GAMMA RADIATION

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Nuclear tracks membranes (TM) from polyethylene terephthalate (PET) have a chance to be used in medicine [E.O. Filippova, V.V .Sokhoreva, and V.F. Pichugin, Petroleum Chemistry, V. 54, pp. 669-672 (2014)]. The sterilization is a mandatory procedure in this case. g -irradiation is widely used for sterilization of medical grafts. In addition, application of low-temperature plasma has both antimicrobial and surface modifying effects.

These are defined the aim of the work: investigate the effects of low-temperature plasma and g -irradiation in sterilization doses on the structure and properties of PET TM.

TMs were prepared by $40Ar^{+8}$ ions (E = 41 MeV) irradiation of PET film and subsequent etching in NaOH solution. Low-temperature atmospheric plasma with 2 W/cm^2 of power density used.

The results of the experiment showed that action of low-temperature plasma leads to reconstruction of TM surface: 15-fold increase in its roughness takes place (parameter Ra increases from 0.25 mm to 3.30 mm; surface energy increase more than 4 times by virtue of polar component, surface hydrophilicity increases while negative ξ-potential decreases.

I – irradiation in sterilizing dose (1 kGy and 10 kGy) of plasma treated TM restores the roughness to the value of 1.3 initial one and increases the value of negative ξ – potential up to 36 %. Effect of g – irradiation is similar to those of low doses.

Keywords: *polyethyleneterephthalate, plasma, gamma-irradiation.*