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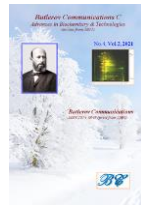

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Influence of ionizing radiation on air permeability and structure of five-layer spunmelt materials

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Abstract

Sterilization of disposable medical clothing and linen, quite often, is carried out by radiation sterilization. It should be borne in mind that under the influence of radiation, some polymers can degrade and, accordingly, it is necessary to conduct research on the effect of radiation sterilization on a polymer medical device. And to increase the radiation resistance of polymer products, work is being carried out on the modification of polymers.

Taking into account the prospects for the development of nonwoven materials, an urgent task will be to study the effect of radiation sterilization on the air permeability and structure of nonwoven materials for medical purposes. 5-Layer spunmelt materials were chosen as an object. The object of the study was exposed to electron radiation at the "Electronic Sterilizer" radiation facility with an UELV-10-10-S-70 electron accelerator. Radiation sterilization of products made of nonwoven materials, as a rule, is carried out in the dose range from 20 kGy to 60 kGy, which ensures the death of spore-forming bacteria and guarantees sterility in the entire volume of the product. In the work, the air permeability index and the pore size were studied after radiation sterilization.

As a result of the study of five-layer spunmelt materials after radiation exposure in the dose range from 20-60 kGy, a slight increase in the air permeability index by 4-7% was revealed, which is associated with a change in the size of pores, their stabilization in diameter. Analysis of the results of experimental data showed that radiation sterilization in the case of a five-layer spunmelt materials (manufactured by OOO "Snabika", Russia) surface density of 35 g/m^2, leads to a decrease in large pores by 7%, medium pores by 3% and an increase in small pores by 8%. And for five-layer spunmelt materials (manufactured by Ahlstrom Fibercomposites India Private, India) with a surface density of

35 g/m^2, radiation sterilization leads to a decrease in large pores by 0.3%, medium pores by 3% and an increase in small pores by 2%.

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