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# Physical-mechanical properties of cellulose-fibrous materials and the influence on them of the γ-radiation

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## Abstract

Work presents the results of investigating the influence of γ-irradiation on the physical-mechanical properties of cellulose-fibrous materials. It are used fibrous semifinished products – sulfate bleached coniferous cellulose, thermomechanical mass, and also compositions of paper pulp on their basis, which include kaolin, rosin glue and coagulant-precipitator (sulfate alumina and sulfate of titanyl and ammonium $(NH_4)_2TiO(SO_4)_2 \cdot H_2O$). It is shown that the replacement of the industrially utilized sulfate alumina to the water-soluble salt of titanium(IV) contributes to an increase in the indices of mechanical strength and radiation durability of the paper preparates. Thus, breaking length and to the resistance to tear of paper afterward γ-irradiation practically in 2 time exceeds this index for the nonirradiated model. During the study of interaction of cellulose with sulfate of titanyl and ammonium it is established that maximum interaction of cellulose with salt of titanium(IV), which undergoing in the aqueous solutions the complex processes of hydrolysis and polymerization, is observed in the range $3.55 > pH < 6.2$. Changes in the IR-spectra of the irradiated cellulose before and after of modification by salt of titanium(IV) testify about regrouping of the system of hydrogenous bonds and possibility of the formation of new terminal bonds, which positively affects the strength characteristics of cellulose fibers. For the irradiated modified cellulose are characteristic an increase in the expanded surface and the increased fibrillation of fibers, which contributes to an increase in the cohesive forces of the fibers between themselves.

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