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THE USE OF HUMIC ACIDS FOR MODIFICATION OF BIODEGRADABLE FILMS MANUFACTURED ON THE BASIS OF POLYVINYL ALCOHOL AND HYDROXYPROPYLMETHYL CELLULOSE

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The article is devoted to the problem of obtaining packaging materials that combine a high level of gas and / or moisture resistance and strength with the ability to quickly decompose without harmful effects on the environment. The purpose of the research described in the article is to study the possibility of making such a material, which, during the period of use, will not only be resistant to the effects of various bacteria, but even prevent their appearance, and upon burial it will be biodegradable. The initial components, namely polyvinyl alcohol, hydroxypropyl methylcellulose, and humic acids of coal origin (as antibacterial additives) were reasonably selected.

The modifying effect of humic substances obtained from three different samples of low-grade Ukrainian coal has been studied. In the course of the studies performed, it was found that humic acids of different origins and with different characteristics have a specific effect on the processes of structure formation in solutions of polyvinyl alcohol and hydroxypropyl methylcellulose. In particular, it was shown that in polyvinyl alcohol and methylcellulose solutions with the addition of humic acids that do not contain particles of carbon residues of various degrees of dispersion, an increase in the formation of an ordered structure is observed. Micrographs of solutions of polyvinyl alcohol and hydroxypropyl methylcellulose with humic acids are presented. The peculiarities of the influence of humic substances on the processes of structure formation of solutions of polyvinyl alcohol and hydroxypropyl methylcellulose have been investigated in order to obtain hybrid environmentally friendly biodegradable polymer films.

The corresponding experimental-statistical mathematical models have been developed, they describe the dependence of the conditional viscosity and conductivity of polyvinyl alcohol and hydroxypropyl methylcellulose on the content of humic acids, the duration of preparation and one of the characteristics of the raw materials used to obtain humic acids. The corresponding equations are given.

Keywords: biodegradable polymer films, coal, humic acids, polyvinyl alcohol, hydroxypropyl methylcellulose, experimental statistical mathematical models

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