

TECHNOLOGICAL PROPERTIES OF POLYMERS OBTAINED FROM HUMIC ACIDS OF UKRAINIAN LIGNITE

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One of the most important areas of modern research in the field of polymer materials is the field of obtaining and studying the properties of polymer hydro gels. Hydrophilic polymers with large volumes of water absorption and storage are known as hydro gels, or super absorbents [1]. The hydro gel is a three-dimensionally cross linked and swollen polymer in water and does not dissolve in it. The water-holding capacity of hydro gels is due to the presence of hydrophilic groups along the polymer chain, such as OH, -CONH, -CONH₂, -COOH [2].

They can be composed of natural substances and synthetic high molecular weight materials. Due to a complex of unique properties, these “smart” materials for targeted delivery of useful and functional substances are in demand and promising polymer compositions for many industries: medical, cosmetic, pharmaceutical, agricultural, etc. Hydro gels are widely used for various biomedical applications - tissue engineering, molecular imprinting, immune isolation, dressings, drug delivery, and the like. In addition, a biodegradable, non-toxic, low cost starch hydro gel can be produced.

Graphic and mathematical dependences of the effect of humic acids (0 – 15 %) obtained from 3 coal samples ($V^d = 29,1 - 43,7 \%$; $C^{daf} = 60,71 - 80,83 \%$; $O^{daf}_d = 10,9 - 29,12 \%$) and the gelation time (0 – 15 minutes) for the dynamic viscosity of the hydrogel.

The influence of the content of humic acids on the melting point, degradation temperature and gelatinization time of hydrogels has been established.

It has been determined that an increase in the size of coal particles to 1.0 mm in humic acids leads to a decrease in the processes of structure formation of the hydrogel.

References:

1. Enas M.A. Hydrogel: Preparation, characterization, and applications: A review. Journal of Advanced Research. 2015. No 6. P. 105-121.
2. Zavan B., Cortivo R. and Abatangelo G. Hydrogels and Tissue Engineering. Springer-Verlag. Italia, 2009.