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STUDY OF CHEMICAL AND PHYSICAL FEATURES OF LIGNITE DERIVATIVES FOR EVALUATION OF THEIR HYBRID FUNCTIONALITY POTENTIAL

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The article shows that despite the existence of studies on the modification of various types of polymeric materials with lignite and its derivatives (in particular, it has been proven that the addition of lignite to polymers can affect their biodegradation), there is a further need to study the physicochemical features of the hybrid functionality of these materials in relation to a wide range of materials.

The paper analyzes lignite and its derivatives in the form of humic acids in terms of their use for hybrid modification of multifunctional materials. The subject of the study is related to the non-energy and non-fuel use of fossil coal. This area is one of the most promising, as it allows to obtain marketable products of high demand, the cost of which is much higher than the cost of the raw materials.

By performing qualitative, quantitative, and spectroscopic analyses of humic acids of different types of lignite, it has been proved that they have a significant hybrid functionality due to the presence of a large number of different functional groups in their composition. It has been shown that the most characteristic functional groups of lignite humic acids include phenolic hydroxyl -OH groups, carboxyl COO-, NH_2 deformation groups, aliphatic CO groups, etc. This determines the ability of lignite humic acids to act as hybrid modifiers in relation to a wide range of substances through the following mechanisms: chemical interaction, dipole-dipole interaction in the form of hydrogen bond systems, and configuration changes in the structure of various materials and substances. It has also been found that the high hybrid functionality of lignite humic acids is determined by their polarity, which significantly increases the reactivity of active peripheral groups.

Keywords: coal, humic acids, hybrid functionality, modification, properties.

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