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Study of the effect of the temperature of buckwheat husk ash production on the antifriction properties and wear resistance of epoxy coatings

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Abstract

Russia ranks second in the world after China in terms of buckwheat production, while buckwheat crops are fairly evenly distributed throughout Russia. 18-22% of the total mass of the feedstock during the processing of grain into cereals is the shell of buckwheat, which accumulates in tens of tons at the processing sites.

In Russia, about 62.7 thousand tons of buckwheat husk waste are generated annually as a result of buckwheat threshing. Having reached certain bulk volumes, the waste becomes a source of sufficiently powerful heat generation, provoking intense combustion, which leads to environmental pollution.

Buckwheat husk is the most valuable raw material containing polysaccharides, cellulose, lignin, biologically active polyphenolic complexes, flavonoids, trace elements. There are practically no successful industrial productions in our country that use it rationally. At the same time, oxides of silicon, calcium and potassium contained in buckwheat husk make its use as a filler of epoxy materials promising.

Based on the results of X-ray fluorescence analysis, the mineral composition of buckwheat husk ash obtained at different combustion temperatures was determined. The gel-sol analysis method has shown that an increase in the burning temperature of

buckwheat husks from 350 to 800 °C contributes to a more complete curing of the epoxy composition. It is established that the optimal temperature for obtaining buckwheat husk ash, which provides its maximum modifying effect in epoxy compositions, is 800 °C. It is shown that filling epoxy compositions with buckwheat husk ash obtained at a temperature of 800 °C increases their wear resistance by 37% and reduces the coefficient of static friction by 50%.

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