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Microscopic Analysis of the Structure of Refractory Materials Developed on the Basis of Local Mineral Raw

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ANNOTATION: the article is devoted to the results of microscopic analysis of the structure of fire-resistant materials developed on the basis of local mineral raw materials. The authors point out that in this regard, a special place is occupied by microscopic analysis of refractory materials, because the use of various radiation and various designs of microscopes, from optical to electronic, requires various special preparation of objects and special methods for decoding the observed images. Moreover, the use of these methods in relation to the fire-resistant compositions obtained during the experiments, consisting of kaolin, wollastonite, sodium water glass, silica, finely dispersed thermovermiculite, silicon dioxide, dolomite, etc. demonstrates their moth-eye morphology, which provides a basis for other experiments related to increasing the quality of fire resistance of the objects under study.

KEY WORDS: electron microscopy, fire-resistant compounds, kaolin, wollastonite, soda water glass, silica, finely dispersed thermopermiculite, silicon dioxide, dolomite, possibilities of microscopic methods.

The problem of obtaining effective heat-insulating materials from local mineral raw materials always remains relevant, and in this regard, tile press materials also need thermal protection [1-6].

In this regard, the plate press materials obtained during the experiments are chemically unrelated components (mineral particles and organic), including binders, which form the structure of a new composite material. In this regard, it is very important to establish the nature of their interaction in the main composition. Based on this, in order to study the structure of the resulting tile materials developed on the basis of the mineral wollastonite, kaolin, nanoparticles of silicon dioxide, silica, dolomite, thermovermiculite, liquid glass, their electron microscopic analysis was carried out using optical and electron microscopy methods, (See electronic images of samples in picture 1.).

The possibilities of microscopic methods have the following important features:

using these methods, it is possible to carry out the calculation of quantitative parameters and fix the results of the object under study. It is currently recommended to equip microscopes used in this field with digital cameras that can be connected to a personal computer;

the diagnostics of minerals is carried out using the polarization method of microscopy in an immersion medium. The surfaces of mineral grains, layers, filaments, plasma, their relationships are considered;

when equipping laboratories with microscopes, all of the above factors should be taken into account - the ability to conduct research using a variety of microscopic techniques, including digital processing of the results;

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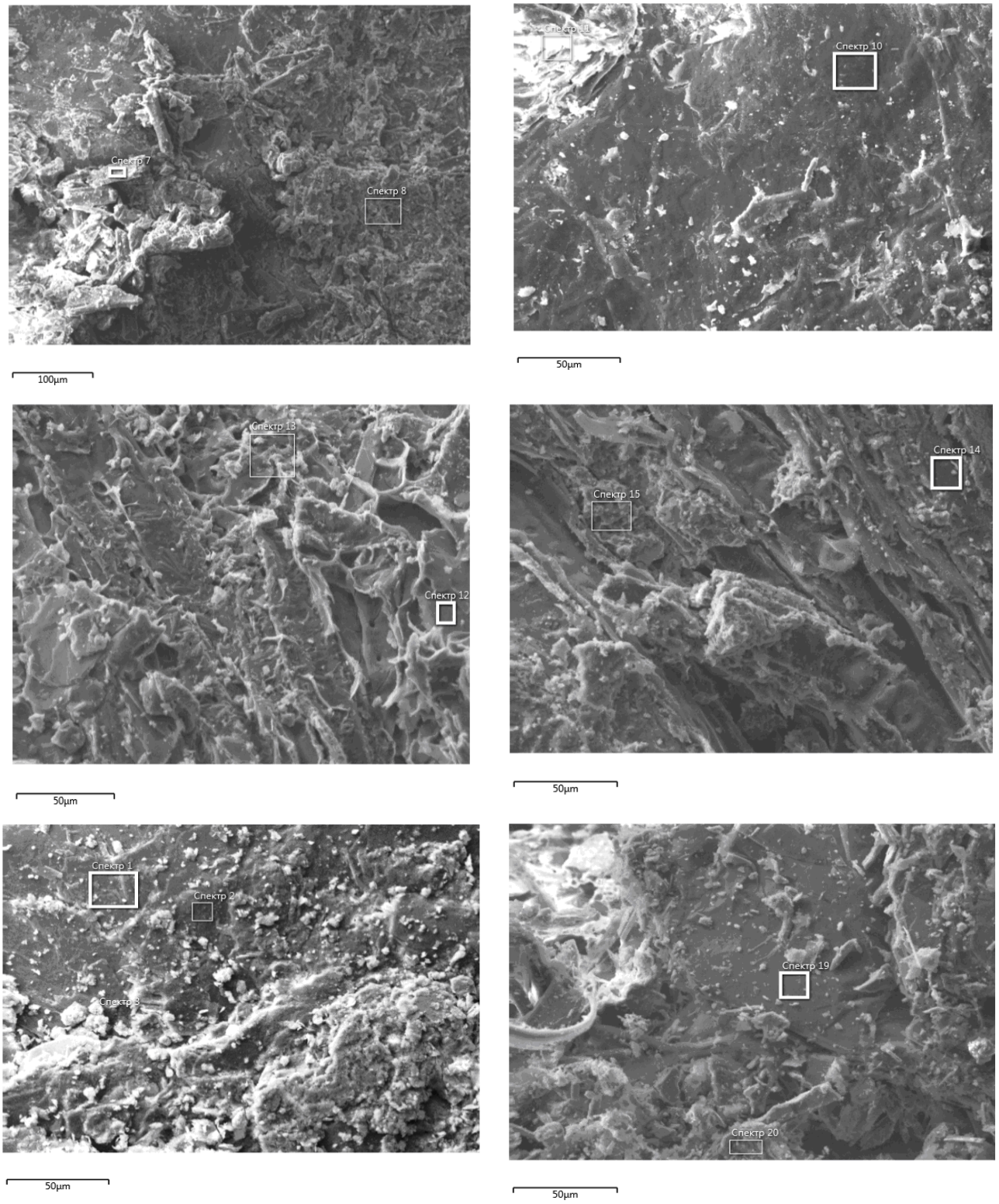
modern high-quality optical systems, digital equipment can significantly improve the quality and information content of the optical method used in the creation of thermal insulation and refractory materials.



Picture. 1. Electron photographs of particles of newly obtained compositions based on kaolin, dolomite, the finely dispersed mineral wollastonite, and sodium liquid glass.

The study of photographs of the particle surface of the obtained materials and from other analyzes, it can be concluded that the samples of the obtained compositions, having a smoother surface than the rest of the samples, formed a denser structure, which gives the material more strength physical and mechanical characteristics. And also in the figures you can see that these particles of the wollastonite mineral, separately distributed over the entire surface, do not form a dense structure, the comparison of which with others gives the basis for making some comparative conclusions in favor of other samples with smoother surfaces.

Thus, from electronic photographs of the obtained samples of new materials, one can learn more informatively about the nature of the interactions of the main components and makes it possible to more accurately determine the type of materials obtained.

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