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Investigation Of Performance Properties Of Novel Composite Fire-extinguishing Powders Based On Mineral Raw Materials

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Abstract

At present the most efficient fire extinguishers are power ones. Fireextinguishing powders of serial production do not fulfill modern requirements, primarily from the viewpoint of their universal and practical use. It must be noted that most of them contain halogen, and it is established that penetration of halogens into the atmosphere causes a breaking of the ozone layer. The main goal of investigation presented in this paper is development of non-halogen, non toxic, environmentally-friendly, highly-efficient, inexpensive, universal, composite fire-extinguish powders based on domestic mineral raw materials such as clay shale, zeolite and perlite. The proposed method of obtaining composite powders does not require the following expensive chemical processing and modification with halogen-inclusive hydrofobizative additives. Hence, these composite powders will be cheaper (1,5-2 times) than powders of serial production. The raw materials: clay shale, zeolite, perlite were selected according to high operating properties, which are indicative of a reduction of burning processes. The powders must not only be effective during the fire extinguish, but also they must maintain those properties, which decrease the extinguishing effect after small changes in properties. The effectiveness of powders is defined not only according to their dispersity and inhibition ability, but also according to their storage and transportation conditions. These conditions are defined by the exploitation properties of powders. The most important among them are: consolidation and caking, dispersity, tendency of humidity, flow and storage duration. We studied the performance properties of zeolite, perlite and clay shale and composite powders based on such materials and established dependence of tendency to consolidation and caking on dispersity. Accordingly, the dispersity of composite powders was selected in such a way that the tendency of consolidation and caking was minimal. At the same time particle size should be relevant towards the rapid head and destruction, so that we have a homogenous effect and heterogeneous inhibition. Keywords: environmentally friendly, composite fire extinguishing powders, performance properties, tendency of consolidation and caking, dispersity, tendency of humidity.

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