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Elaboration of new types of environmentally safe fire-extinguishing powders and establishment of the conditions of extinguish optimum and effective use of such powders

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The aim of the present investigation is to develop a technology for production of novel, halogen-free, environmentally safe, highly efficient fire-extinguishing powders based on local mineral raw materials, which does not require modification with expensive, halogen-inclusive, hydrofobizing additives and providing low-cost production of fire-extinguishing powders in comparison with imported analogues. The optimal dispersity was selected in such way, that caking capacity is minimal and a homogeneous action of combustion products on the flame as well as a heterogeneous inhibition of combustion process must take place. The evaluation of powder efficiency is carried out with consideration of both effects. Experimental data confirm that the developed fire-extinguishing powders are characterized with high performance characteristics, as well as high fire-extinguishing capacity. At the same time it should be noted, that the efficiency of the obtained powders is practically the same as of standard imported powders, but do not contain any halogens, should be environmentally safe and 1.5-2 times cheaper than the imported analogues. For obtained powders, the conditions of extinguish optimum and effective use of powder are stated. Optimum extinguishing condition means the selection of optimum intensity of powder supply into seat of fire when minimum consumption of powder provides fire extinguishing in minimum time. Thus, in order to determine optimum conditions of extinguishing it is necessary to study the dependence of powder specific consumption and extinguishing time to supply intensity. For our powders optimum condition of extinguish is: powder supply intensity I-0.6-1.0 kg/m2sec to fire center when powder specific consumption does not exceed G=0.8-1.2 kg/m2. Therefore, we can surmise that the use of fire-extinguishing powders of our preparation is possible to extinguish all types of fires over ground, as well as, at underground constructions and does not need additional antiseptic measures.

Biography

Lali Gurchumelia is a Chemist, Doctor of Technical Sciences and works at the TSU Rafael Agladze Institute of Inorganic Chemistry and Electrochemistry, Georgia. Her scope of scientific interests is Chemical Science, Chemical Engineering, Ecological Engineering, and Ecological Biotechnology. She has 55 publications and in the last 10 years she has participated in five scientific grants. Currently, she is a Manager of the grant # 216770 - "New type fire-extinguishing powders and foam-suspensions based on local mineral raw materials" funded by the National Science Foundation. She has participated in many international conferences and congresses: Nürnberg, Germany; Toledo, Spain; New Forest, UK; Montreal, Canada; Istanbul, Turkey; Elenite Holiday Village, Bulgaria; Rome, Italy; Paris, France; Yerevan-Vanadzor; Tbilisi, Georgia and Ureki, Georgia. She has many years of experience in the study and evaluation of fire–extinguishing and fire- protective materials.

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