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Elaboration of fire-extinguishing foam-suspensions based on new types, environmentally safe fire-extinguishing powders and evaluation of their efficiency



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The aim of the presented investigation is the elaboration of new types, halogen free, environmentally safe and highly efficient fire-extinguishing powders on the basis of local mineral raw materials, which will have good compatibility with water and foams and production of highly efficient foam-suspensions based of received powders. Fire-extinguishing powders will be produced by mechanical mixing of local mineral raw materials, do not require modification with expensive halogen-containing hydrofobizing additives, making the extinguishing materials far cheaper than imported analogues. Raw materials - zeolite, clay shale, perlite and ammophos was selected due to their high-performance properties and ability to suppress the combustion and burning processes. For the increase of efficiency of powder optimal dispersity (up to 250 μm) was selected to provide the minimal caking capacity, a homogeneous action of combustion products on the flame and a heterogeneous inhibition of combustion process. The evaluation of powder efficiency was carried out considering the both effects. As it is known, ammophos are heterogenic inhibitors well dissoluble in water. In case of suspension production on the bases of obtained composite powders modified with the ammophos, water inhibition increase is expected. The addition of surface active

substances into powder suspensions decreases water surface tension, increases permeability and causes powder flotation, which will enable to spray powder together with water and foam. Therefore foam-suspensions we prepared by mechanical mixing of water, obtained fire-extinguishing powders and surface active substances. Foam-suspensions of our preparation have higher cooling effect and permeability compared to powders, while differing from water and foam they make homogenous, as well as, heterogeneous inhibition of burning process. Thus, they have higher extinguishing ability than water, foams or powders taken separately. From the all above-mentioned one can suggest, that the fire-extinguishing powders of our preparation may be effectively used for extinguishing of all classes of fires, as well as, in complex with water and foams for extinguishing of large scale fires – forest fires.

Biography

Lali Gurchumelia is a Chemist, Doctor of Technical Sciences in TSU Rafael Agladze Institute of Inorganic Chemistry and Electrochemistry (Georgia). Her scope of scientific interests are chemical science, chemical engineering, ecological engineering, ecological biotechnology. She has 55 publications, the last 10 years she participated in 5 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 of the National Science Foundation. She participated in many international conferences and congresses in Nurnberg, 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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