THE INFLUENCE OF CHEMICAL BOND PARAMETERS IN AN INHIBITOR MOLECULE ON THE EFFICIENCY OF GAS-PHASE COMBUSTION SUPPRESSION

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Abstract: For the first time, an analysis of the relationship between bond lengths and bond energies in molecules of fluorinated gas-phase flame combustion inhibitors has been conducted. No correlation was found between the chemical bond lengths in inhibitor molecules and their efficiency. Based on bond energy data, it is shown that the best inhibitory effect can be achieved in compounds whose molecules exhibit high heat capacity and sufficient strength, containing no more than two weak bonds that can be readily attacked by active sites responsible for the combustion process. The presence of a weak C–C bond in the molecule is more important than the presence of a weak C–H bond. The best results are possible if the inhibition process follows a cyclic mechanism.

Keywords: bond energy; bond length; inhibition; combustion

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Table Caption

Characteristics of bonds in the structure of the molecule of gaseous fire extinguishing agents and the minimum fire extinguishing concentration

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