To the question of homogeneous inhibition of flame propagation

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The presented paper is dedicated to the important problem for modern fire-fighting modeling of the inhibition of laminar flame by the particles of inorganic salts. The main goal of the work involved the clearing of the fact: may the inhibition stages efficiently compete or not with the most important chemical processes, proceeding in the flame (including the branching of the reaction chains). The inhibition of the combustion of simplest hydrocarbon - methane by the particles of sodium chloride of various size (their diameters comprised 5μm, 10μm and 20μm) was selected as the model process. For determination of the degree of heating and evaporation of solid particles in the flame zone the corresponding differential and integral equations were written. Their solution was carried out by numerical methods. The modeling has shown that at flame extinguishing by small-size particles (do < 10μm) the homogenous inhibition may efficiently compete with important gas-phase reactions in the moderate and high-temperature regions of the flame (T > 500 K). At flame extinguishing by the coarse-size particles (do > 20μm) much attention must be also given to the heterogeneous inhibition in the low-temperature region of the flame.