

Heterogeneous inhibition of flame

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Solid particles uniformly dispersed in the constant flow of a flammable gas mixture exhibit a marked inhibition effect on the flame. Two kinds of dust have to be distinguished: “thermal” and “chemical” inhibitors; the former acting mainly by a cooling effect and the latter by a more specific surface destruction of the free radicals which propagate the chain reaction.

The work is devoted to the theoretical investigation of heterogeneous chemical inhibition of laminar flame propagation by solid particles. “ $H_2 + air$ ” and “ $CH_4 + air$ ” flames at atmospheric pressure were studied. It has been shown that effective inhibition of combustion reaction may proceed only in lower temperature region of flame zone: $T < 600 K$. At high temperature conditions the effectiveness of chemical inhibition of the reaction is quite low. Presumably, such result indicates that the flame suppression by the fire-extinguishing powders is hardly to explain only by the heterogeneous chemical factors. They must be added with effect of thermal factor, *i.e.* cooling effect of solid particles on combustion zone.

Keywords: flame propagation, heterogeneous inhibition,
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