

ON ACETYLENE SYNTHESIS BY PARTIAL OXIDATION OF SIMPLE HYDROCARBONS

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Abstract: “Freezing” of intermediate combustion products of model natural gas and associate petroleum gas mixtures by cooling them is modeled using detailed kinetic mechanism. Hydrocarbon mixtures are partially oxidized by oxygen in the self-ignition regime at initial temperature of 973 K. The aim of combustion product freezing is to stop acetylene concentration decay in them. Acetylene concentration is shown to level off when the temperature in the frozen products drops to 650 K. The acetylene concentration in mixtures steeply rises during ignition and then drops, the rate of acetylene concentration decay in products being cooled is not necessarily slower than that in noncooled products. There is some threshold pressure value above which their ratio reverses. The higher the content of heavier hydrocarbons in the initial mixture the lower this pressure value.

Keywords: partial oxidation; hydrocarbons; acetylene; kinetic modeling; “freezing”

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