

Abstract Submitted
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Structure of detonation waves in mixtures containing chemical inhibitors MILTIADIS V. PAPALEXANDRIS, Universite Catholique de Louvain — In this talk we present numerical results of detonation transmission in mixtures containing chemical inhibitors. In our study, the chemical kinetics model consists of a three-step chain-branching mechanism for the fuel combustion and an one-step mechanism for the endothermic reaction between inhibitor and radical. Results from both one and two-dimensional simulations are discussed. It is shown that the absorption of heat and the consumption of radical in the endothermic step result in longer induction zones. This leads to a temporary detachment of the reaction zone from the precursor shock. Eventually, the material behind the shock starts to burn rapidly, thus producing pressure waves which reach the precursor shock and re-initialize the detonation. This is followed by large over-pressures and highly irregular oscillations of the shock. The talk concludes with a discussion on the necessary inhibitor concentration in the initial mixture to achieve permanent detonation suppression.

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