

Key Technologies (7)
Key Technologies (5) (5)

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ON THE COUPLING OF THERMOACOUSTIC WITH EXTERNAL HEAT SOURCE(S) AND RESULTANT PROPULSIVE FIRES

Abstract

Space propulsion mandates the necessary understanding of propagating fires. The subject is entitled to research emphasis owing to resources, mission safety and adjoined huge financial losses. Almost all of the combustion processes are accompanied by sound which significantly affects its progression. Acoustic effect coupled with external heat source is an aspect yet to be explored. The present work represents practical case where combustion phenomenon is accompanied with external heating and acoustics. The work attempts to gain physical insight into acoustic and thermal energy interaction. To study the effects, an experimental setup consisting of labelled matchstick with external heat sources coupled with sound was upraised. The effect of systematic variation of external heat source distance and orientation, with respect to the fuel without the presence of acoustic and then with acoustics at different frequencies and orientations, were studied. From this experiment an alteration in the regression rate of the candle was noted. The results of the experiment can be utilized to increase fire safety and a better combustion process.