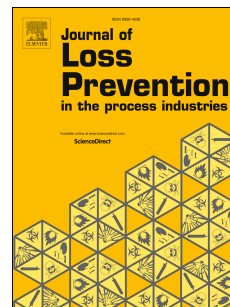


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# Study on Hybrid Combustion of aero-suspensions of Boron-Aluminum Powders in a Quiescent Reaction Medium

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## Abstract

The present research deals with a hybrid combustion of aluminum/boron dust particles in a heterogeneous quiescent reaction medium with spatially discrete heat sources. A developed thermal model is employed to estimate flame propagation speed in a reaction medium. The burning velocity and minimum ignition energy are studied parametrically as a function of dust concentration and particle diameter for different percentages of boron powder in a hybrid mixture of aluminum/boron dust cloud. The model shows that the addition of boron powder as a component of the mixture decreases the burning rate and causes a higher amount of minimum ignition energy needed for ignition, owing to the role of boron as a heat sink. Comparison of the simulation results with the available experimental data shows that the model captures the flame propagation speed as a function of particle concentration, except at very low concentrations.

**Keywords:** Hybrid combustion; Heterogeneous combustion; Boron-Aluminum powders;

Metals ignition

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