

Abstract

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Diffusive thermal instabilities of C₄H₁₀-C₃H₈/air laminar premixed flames

Preferential heat and mass transfer induces diffusive thermal instabilities in premixed laminar flames. Such instabilities in hydrocarbon flames are characterized by cellular structure and a tendency to promote flame extinction. We investigate the properties of such instabilities in C₄H₁₀-C₃H₈/air flames. The adiabatic burning velocity of the laminar premixed flame was measured at different equivalence ratios while exhibiting cellular instabilities. Direct photographs have been captured to qualitatively assess the effect of burner plate temperature on the cellular structure of the flame. The present study preliminarily suggests a normal logarithmic correlation to predict the adiabatic burning velocity of diffusive thermal instabilities in laminar premixed C₄H₁₀-C₃H₈/air flames.